Christmas tree shopping environments, mental fatigue recovery, and shopping preferences: A nationwide marketing study

Final Report Prepared for:

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*The Real Christmas Tree Board (RCTB), also known as the Christmas Tree Promotion Board, is focused on improving the future of the industry by increasing the value and demand for cut Christmas trees through promotion, research and education. The RCTB is a national research and promotion program supported by production assessments from both domestic and imported Christmas trees with oversight by the U.S. Department of Agriculture.

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1. Abstract

Christmas tree shopping environments, mental fatigue recovery, and shopping preferences: A nationwide marketing study

Summary Statement--This study indicates that shopping for real Christmas trees outdoors (offering outdoor biophilic designs) has significantly more perceived restorative quality in the setting (allowing recovery from mental fatigue) than shopping for artificial trees indoors based on 2 different overall restorative quality measures. Real Christmas tree farms and lots (e.g., choose and cut farm, garden center, Boy Scout lot, and home improvement store) are excellent examples of these biophilic designs. There is more room for improvement for tree display design, marketing and merchandizing, and future research. Therefore, some propositions and recommendations to increase the effect of those tree displays are also provided in this report.

Abstract--A recent CNN article proposed that real Christmas trees (and greenspaces and nature in general) provide important health benefits such as the reduction in anxiety, psychological stress, and depression. The Mayo Clinic recognizes that many people experience stress around the holidays, so their recommendation to restore inner calm may be even more important during Christmas. Despite the plethora of literature that identifies the health benefits of nature, very little research examined the phenomena in detail as it relates to Christmas tree shopping. The purpose of the nationwide online survey (n=1,208, 45 questions, and 2 video evaluations) is to examine the extent to which Christmas tree shopping environments that include real trees in the outdoors (i.e., choose and cut farm, garden centers, Boy Scout lot, and home improvement store) provide opportunities for the recovery from mental and attentional fatigue when compared to artificial trees indoors (i.e., variety of store displays). Researchers at West Virginia University helped fill this void in the literature by examining not only the factors of improved mental health associated with different Christmas tree shopping environments (outdoor biophilic designs offering real trees vs. indoor store designs offering artificial trees), but it also identified the specific natural elements of the shopping environment (in addition to other tree-related attributes such retail locations, prices, species, and height) that contribute to positive consumer responses. Christmas tree retailers will be able to use this information to improve tree display designs, improve marketing and merchandizing, and develop future research questions.

The 5 Perceived Restorativeness Scales (fascination, being-away, compatibility, coherence, and scope) and overall restorative quality of the two types of Christmas tree shopping environments (outdoor biophilic designs vs. indoor store designs) were compared. The key finding indicates that real/outdoor trees have a higher perceived restorative quality (real-time video evaluation $p<.05$ and post-video evaluation $p<.001$), but more can be done to increase (and better measure) these effects in the future. Although the fascination ratings for artificial/indoor tree ratings were significantly higher ($p<.01$), it had a much weaker effect than real trees (less than half) on overall restorative quality. That is, although indoor artificial trees are more fascinating, it appears to be the kind of "hard" fascination that does not contribute as much to restoration when compared to the "softer" fascination associated with real trees. The hard fascination of artificial/indoor Christmas trees indoors (with all of the flashy lights) might be compared with other examples of hard fascination such as fast movement, loud noises, watching sports games on television, or

visiting amusement parks. On the other hand, "soft" fascination involves stimuli that does not require much effort (which reduces the internal noise and burden). Classic examples include wind blowing through leaves or ripples of water traveling across a pond. Real/outdoor Christmas trees provide another really good example. These findings not only add to the list of benefits that have been identified for purchasing real Christmas trees, but also supports Basu, Duvall, and Kaplan's (2018) argument that soft fascination is key and an underexamined element of Attention Restoration Theory.

The positive effect of coherence (e.g., orderly tree displays) and scope (e.g., perception of depth and spaciousness) on overall restorative quality that was perceived by respondents was greater for real/outdoor tree displays. This larger effect was documented in a multivariate multiple regression model but also in most of the peak restorative moments that were identified during the video evaluation. Based on these findings, the authors provide some propositions on how to further improve the perception of depth, spaciousness, and the impression of a receding landscape, especially for small spaces and tree displays.

Finally, conjoint analysis was used to examine the utility value of 16 combinations of attributes including tree price, species, height, and product. The combination of "$60-80, pine, 6-8', real" is the most preferred/optimal by study respondents, closely followed by the combination of "$60-80, fir, 6-8', real", and the combination of "$80-100, fir, 8-10', real". Price was the most important attribute. In terms of product, 100% of customers preferred real trees over artificial ones. Several marketing, design, and future research recommendations and propositions are made based on these and other study findings.

2. Background and Study Purpose

There are many benefits associated with purchasing a real Christmas tree including creating a Christmas experience that people remember as a child, protecting the environment (e.g., trees convert CO_2 into Oxygen, provide wildlife habitat, provide greens space, and are recyclable and biodegradable), and supporting North American Farmers (Christmas Tree Promotion Board, n.d.). A recent news article by CNN added health benefits to that list of benefits (Marples, 2021). The CNN article provided an important reminder that exposure to real Christmas trees (and greenspaces and nature in general) can provide important health benefits such as the reduction in anxiety, psychological stress, and depression. The daily routines, tasks, and hassles of everyday existence commonly require focused attention and considerable effort to stay with them (Kaplan, 1995). This leads to mental fatigue which is one of the causes of stress. The Mayo Clinic recognizes that many people experience stress around the holidays, so their recommendation to restore inner calm may be even more important during the Christmas season (Mayo Clinic, n.d.). Despite the plethora of literature that identifies the health benefits of nature, very little research examined the phenomena in detail as it relates to Christmas tree shopping. The purpose of the nationwide study is to examine and compare the extent to which Christmas tree shopping environments that include real (live) trees in the outdoors (i.e., choose and cut farm, garden centers, and home improvement store) and artificial (fake) trees indoors (i.e., variety of chain store displays) provide opportunities for the recovery from mental fatigue and have the capacity to focus attention. By doing so, this research will fill a void in the literature by examining not only the factors of attention restoration associated with different Christmas tree

shopping environments (outdoor biophilic designs offering real trees vs. indoor store designs offering artificial trees), but it will also identify the specific natural elements and types of displays (in addition to other tree-related attributes such as retail location, prices, species, and height) that contribute to positive consumer responses. Christmas tree retailers will be able to use this and other related marketing information that is collected to better meet the needs of their customers and attract new customers.

3. Literature Review

Brief History on the Health Benefits of Nature

Nature and plants have been traditionally viewed as "healers" in the history of human development (Jiang, 2022). Trees have been associated with many spiritual and therapeutic qualities in different cultures due to their longevity, historical status, and continuity from one season to another (Squire, 2002). Landscape architects started to associate nature and parks with human salutogenesis as early as in the 18th centenary – several urban park systems were initiated by Frederick Law Olmsted (known as the father of American landscape architecture and arguably also park management) to address the stress, pollutions, and unhealthy living conditions in major American cities (Szczygiel & Hewitt, 2000). The visual qualities of the natural environment have been proven with dominant effects in reducing people's stress (Ulrich, 1991) and relieving mental fatigue (Kaplan, 1995). The amount or density of trees in outdoor spaces usually serves as a positive predictor of people's aesthetic preferences and high degrees of restorativeness (Wang et al., 2019). In intimate spaces like interiors, the psychological benefits of indoor plants include stress-reduction, emotional support, and increased pain tolerance (Bringslimark et al., 2009). The multi-sensory stimuli, particularly the odorant stimuli from nature, such as methyl salicylate (wintergreen scent), have been universally rated as smelling healthful (Dalton, 1999).

Attention Restoration Theory (Conceptual Framework)

The theoretical framework for this study comes from Kaplan's (1995) Attention Restoration Theory (ART). A large body of research has accumulated in support of ART (Lin, Tsai, Sullivan, & Chang, 2014) and is one of the most important and widely adopted theories that explains nature's restorative effects. Marketing research efforts that explore the restorative potential of commercial environments primarily draw from ART and are especially important for this study (Berto, 2005; Joye et al., 2010; Kaplan, 1995, 2001). In addition, over 100 studies of recreation experiences in wilderness and urban nature areas indicate that restoration is one of the most important verbally expressed benefit opportunities afforded by nature (Ulrich et al., 1991). ART suggests that prolonged mental effort leads to fatigue and natural environments foster restoration because they hold non-taxing attention (Kaplan 1995). That is, natural environments allow information processing mechanisms to recover from the mental fatigue that results from everyday life and hassles. Prolonged and excessive demands commonly require focused attention and considerable effort (Kaplan 1995). Mental fatigue can lead to a variety of problems such as stress, and since attention is essential for human effectiveness, there can be a decline in problem solving, decline in behaving appropriately, increase in irritability, and increase in accidents, etc. (Berto, 2007). As emphasized by Kaplan (1995), "the restoration of effectiveness is at the mercy of directed (focused) attention fatigue" (p. 172). A way to benefit from attention

regeneration (Berto, 2005) and recover from stress (Ulrich, 1981), is by exposure to natural environments.

Perceived Restorativeness Scale

Hartig, Kaiser, and Bowler (1997) developed the Perceived Restorativeness Scale (PRS) to measure the extent to which environments have restorative qualities. PRS is based on Attention Restoration Theory and was initially made up of 26 items that measured study respondent's perception of the restorative factors (including those presented by Kaplan, 1995) that can exist in an environment to varying degrees. The scale has been frequently reported in the literature, and in 2014, Pasini, Berto, Brondino, Hall, and Ortner developed a short form of the scale to make it more suitable for research where time is limited. Based primarily on the work of Kaplan (1995), Hartig et al. (1997) and Pasini et al. (2014), 5 restorative factors (fascination, being-away, coherence, scope, and compatibility) were considered for this proposed research and are listed and defined below along with their associated PRS:

- **Fascination** which include settings that can hold one's attention effortlessly and without capacity limitations. Natural settings such as clouds, sunsets, snow patterns, leaves in the breeze are examples provided by Kaplan (1995) because they are undramatic (e.g., gentle form of fascination called soft fascination) and allow the perceiver to think about other things as well. This is one of the main components of a restorative environment.

    - Places like this are fascinating
    - In places like this, my attention is drawn to many interesting things
    - In places like this, it is hard to be bored

- Physical and/or psychological **being-away** from demands on directed attention. Being-away is a setting that is physically or conceptually distant from everyday environments, unwanted distractions, reminders of one's usual work, noise, and stimulation overload. A sense of being away is important but it does not require that the setting be distant.

    - Places like this are a refuge from nuisances
    - To stop thinking about the things that I must get done, I like to go to places like this

- ART originally focused on 4 restorative factors including fascination, being-away, compatibility, and extent. Extent was defined as being in a whole different world that entails large tracts of land or in a small area that seems much larger with the addition of trails, paths, etc. that are sufficient to sustain exploration. Kaplan (1995) defines extent as a place "rich enough and coherent enough so that it constitutes a whole other world" (p. 173). Therefore, extent was later thought to comprise elements such as coherence and scope. **Coherence** is an orderly environment with distinct areas, and repeated themes and textures. "In a coherent environment, things follow each other in a relatively sensible, predictable, and orderly way" (Kaplan, 2001, p. 488).

- There is a clear order in the physical arrangement of places like this
- In places like this it is easy to see how things are organized
- In places like this everything seems to have its proper place

- **Scope** is the second element of extent—see above. It requires a setting that is physically or conceptually large enough so that one's mind can wonder, and their thoughts can drift away from daily activities (Lin et al., 2014).

  - That place is large enough to allow exploration in many directions
  - In places like that there are few boundaries to limit my possibility for moving about

- **Compatibility** or the match between a person's goals and inclinations and the demands provided by the environment can also be important. Analogs of compatibility include Czikszentmihalyi's (1975) "flow" experience which is an optimal experience that involves becoming immersed or feeling "in the zone". It can occur when the degree of challenge is balanced with one's skillfullness (physical or mental).

  - Being in places like this suits my personality
  - I can do things I like in places like this
  - I have a sense that I belong in places like this

Application of ART in Marketing Research Associated with Biophilic Store Designs

Marketing research on the restorative potential of commercial environments (a contemporary retail phenomenon referred to as "biophilic store design" by pioneering marketing researchers) often draw from ART (Rosenbaum, Ramirez, & Camino, 2018)[1]. Joye et al. (2010) introduced the concept of biophilic store design and defined it as the integration of greenery or natural elements into the built retail environment. Söderlund and Newman (2015) summarize research that indicates shoppers and shop employees were less stressed and there was increased retail potential when biophilic initiatives were used in a commercial context. More recently, Rosenbaum, Ramirez, and Camino (2018) conducted 3 studies that used ART and PRS to link biophilia design of lifestyle centers to the restoration from mental fatigue. A lifestyle center is a type of open-air retail setting that is at least 50,000 square feet and can include dining, recreation, entertainment, and other amenities such as plants and landscaped gardens. Based on their research, they conclude that "when biophilic elements are incorporated into lifestyle center

[1] What is around the corner? "'…shopping malls suffer from a customer "discovery deficit" (Verde and Wharton, 2019), with shopper boredom emulating from a lack of newness and unique experiences in the mundane and expansive built environments. Many retailing scholars suggest that retailers (Brengman et al., 2012; Mower et al., 2012) and mall developers (Rosenbaum et al., 2016) can increase shopper interest by engaging in "demalling" (Reynolds et al., 2002), a process of converting enclosed malls into open-air shopping areas... A key architectural design feature in open-air shopping areas is the integration of natural elements, such as greenery, water displays (fountains), and animals (e.g., birds, butterflies, squirrels), into shopping contexts... Pioneering marketing researchers on this contemporary retail phenomenon have coined the term "biophilic store design" to denote a managerial strategy that "incorporates natural forms, elements, and conditions into the built [retail] environment" (Joye et al., 2010, p. 58).'" (Rosenbaum, Ramirez, & Camino, 2018, p. 66).

design, shoppers can sense the restorative potential of these centers. Resultantly, those who spend time in restorative lifestyle centers may experience catharsis from negative symptoms associated with mental burnout and fatigue." (p. 72). Rosenbaum et al. (2018) also recommend that landscape architects and service design researchers try to better understand the specific types of natural elements (e.g., certain types of trees and plants, forms of water displays, or the presence of small animal life such as birds and butterflies) that evoke positive consumer responses. This study will help fill this void in the literature by examining not only the factors of ART associated with different Christmas tree shopping environments (outdoor biophilic designs offering real trees and indoor stores offering artificial trees), but also identify the specific natural elements that contribute to positive consumer responses.

Shopping Environments, Restorative Benefits, and Shopping Preferences and Behaviors

It is assumed that shopping environments, restorative benefits and shopping preferences and behaviors are interrelated in a way that preferred shopping environments contribute to mental fatigue recovery with restorative benefits, which, in turn, affect shopping preferences and behaviors. In addition to shopping environments, other tree-related attributes such as price, species, and height can also influence a consumer's decision to purchase a real Christmas tree. Therefore, it is important to understand a consumer's choices and benefit trade-offs by developing optimal products for different market segments. Choice-based conjoint analysis has been used to determine the attribute importance and to understand what matters most to a consumer.

Behe et al. (2005) conducted a web-based survey of 331 participants who were asked to view 27 photographs of tabletop Christmas trees to determine consumer preferences. They found that tree species were the most important attributes, followed by decoration color and price. Zaffou and Campbell (2017) identified four attributes (price, retail location such as real vs artificial trees, tree species, and height) as being important in the decision process of purchasing Christmas trees. Of these four attributes, tree height was most valued while tree species were less important based on a conjoint analysis from data collected from an online survey of 640 Connecticut consumers.

Although conjoint analysis has been widely used to examine the consumer shopping preferences its application is not without criticism. For example, Carson and Louviere (2011) argue that stated preference data suffer from systematic biases (e.g., hypothetical commitment bias). To mitigate this measurement bias, Behe et al. (2014) used eye tracking technology in conjunction with the conjoint analysis to better understand consumers' shopping decision and behaviors.

Similar to Behe et al. (2014), this study used Dialsmith's online tool to objectively measure consumers' restorative responses when they watch videos that show different shopping environments. This objective measure (dial scores) will be analyzed in combination with the subjective measure (stated preferences) using conjoint analysis to understand the decision process mechanism related to the purchase of Christmas trees.

4. Methodology

Video and Instrument Development for Online Surveys

Literature using visual representations of environmental conditions has traditionally been found in studies of environmental aesthetics and restorative character. For example, methodologies including photograph, simulation and video, and self-reported experiences (closed and open ended survey/journal) have been used. The goal of these methods is to produce the most valid and reliable data on measuring environmental preference (Brown & Daniel, 1987). Historically, most research has been conducted posteriori with a researcher providing students with a series of photographs or slides and asking participants to evaluate these images on a preference scale (Ewing, et al., 2005). A review of three texts containing 58 research studies on aesthetics or restorative character of the natural environment between 1973 and 2001 utilized 60 different methodologies: 73% used photographs/slides, 17% experiential, 8% used computer simulation/virtual reality, and 2% used video (Kaplan & Kaplan, 1989; Nasar, 1992; Sheppard & Harshaw, 2001). Most studies were posteriori (conducted off site after photos, simulations, or video were taken). Only two studies were conducted on site, asking participants to visit the area of study and assess conditions. This proposed study will also help fill this void in the literature by examining videos.

This study adopted a methodology similar to scenic beauty and attention restoration studies published by Pierskalla, Deng, and Siniscalchi (2016) and Pierskalla et al. (2007). Two short videos (3 minutes) that represent two categories of tree shopping environments: (1) real (or live) trees displayed in the outdoors (i.e., choose and cut farm, garden centers, Boy Scout lot, and home improvement store) and (2) artificial (or fake) trees displayed indoors (i.e., variety of chain store displays). The authors wrote and used a similar video script for each Christmas tree business including main entrance, landscape view or broad overview of full tree displays using 180 degree rotating view on a tripod, walk along tree display, and close up view of trees (including trees with various heights and needles). Following the script, the videos were produced by Elevation Media during the first week of December 2022 with each business represented in random order within the video.

Continuous audience response technology (CART) provided by Dialsmith LLC was used to collect moment-to-moment and post-video evaluation responses from respondents. The perception analyzer system technology has been used to conduct focus groups and market research, and to measure audience reaction to video such as advertisements, films, and campaign messages “so everything that is perceived is also recorded...Nothing slips through the cracks" (Dialsmith, 2014). In this proposed study, their newest technology, the on-screen slider for online video evaluations, was used within an online survey instrument.

An online survey was developed by the authors (see Appendix A). The survey started by asking respondents to read a definition of “restorative qualities”:

> We would like you to evaluate the “restorative qualities” of Christmas tree shopping environments or settings that you perceive in a 3-minute video. Before you start the short video evaluation, take a moment to better understand what we mean by “restorative qualities” of a Christmas tree shopping environment by carefully reading the following:

When you experience environments or settings with the highest "restorative qualities" you are more likely to:

a. recover from mental fatigue
b. improve your ability to concentrate
c. restore your capacity to focus your attention
d. feel less irritable in these settings as you recover from mental and attentional fatigue.

On the other hand, when you experience environments or settings with the lowest "restorative qualities" you are less likely to recover from mental and attentional fatigue.

Following a 20 second practice video clip, respondents were asked to evaluate one of the two randomly selected videos based on a 100-point "restorative quality" scale by using the on-screen slider. The evaluation began with the on-screen slider set at the midpoint (50). Data were collected during every second of the 3-minute video evaluation. Post-video evaluations also were included to assess the 5 restorative factors of the Christmas tree shopping environment based primarily on the work of Kaplan (1995), Hartig et al. (1997) and Pasini et al. (2014). A total of 13 PRS items (representing 5 restorative factors including fascination, being-away, coherence, scope, and compatibility) were evaluated on 0 to 10-point scale, where 0 = not at all to 10 = completely. The specific items that were examined are provided in the literature review and Appendix A of this report. In addition, respondents were asked to provide a post-video assessment (0 = not at all to 10 = completely) of their overall perception of "restorative quality" represented in the type of environments or settings shown in the video. Questions regarding socio-demographics, shopping loyalty (e.g., intent to buy a real tree and recommend a real tree), past shopping experiences, and conjoint analysis questions were also included in the survey.

Sampling

Sampling was conducted by Dialsmith, Inc. during the last week of January 2023. Dialsmith uses the Cint platform which offers 4,500+ panel partners and 28,259,312 panelists in the USA. Study participants were contacted through online recruitment, email recruitment, specific invitations, and loyalty websites. All participants/panelists are subject to comprehensive quality checks. Dialsmith, Inc. distributed the online survey using the sample provider. Study participants included both current and potential customers of real Christmas trees. Upon successful completion of a survey, the panelists were immediately credited with a $4.50 (or a $4.50 points equivalent) incentive.

Data Analysis

Data were analyzed using IBM SPSS Statistics Version 28. Descriptive statistics for response rate, socio-demographics, region, type of Christmas tree purchase, customer loyalty, etc. are provided. Chi-square was used to examine the association of type of Christmas tree purchase and household. Several t-tests examined differences of the 5 restorative factors (measured with PRS scales) by type of video evaluated (real/outdoor vs artificial/indoor trees). ANCOVA was used to examine the effect of a video on overall restorative quality (both real-time and post-video evaluations) while controlling for the five restorative factors. Multivariate multiple regression (MMR) was used to measure the effect of the 5 restorative factors on both measures of overall

restorative quality. Moment-to-moment results (e.g., timelines) helped pinpoint the peak restorative quality identified in the real/outdoor trees video. Finally, conjoint analysis was used to examine the utility value of 16 combinations of attributes including tree price, species, height, and product.

5. Results and Discussion

- **Nationwide survey**--A nationwide sample of 1,208 qualified completed surveys (604 respondents per video) were collected. The response rate was 57% and the average completion time was 14 minutes and 19 seconds (median=10:24). The sample was also balanced across four regions of the US (South=30.6%, Northeast=22.1%, Midwest=21.3%, and West=26.0) (Table 1).

- **Balanced sample**--The sample was reasonably balanced among several demographics (Table 1) including gender (51.3% females), race (18% Black or African Americans, 61.3% White/Caucasian, 16.1% Hispanic or Latino, and 10.6% Asian), age (15% to 30% per age category from 18-24 to 55-64 years old), education (ranging from 18% high school graduate or equivalent to 16% graduate degree), and household income (12.6% with less than $20,000 to 22.7% with $100,000).

- **Top target market is households with children**--Thirty-seven percent of the respondents had a real Christmas tree in their home in 2022 and 50.7% only had an artificial Christmas tree (Table 2). The remaining respondents (16.6%) did not have any Christmas tree in their home. Table 3 further breaks down these frequencies by type of household. Households most likely to have a real Christmas tree in their home include a foster child (100%), roomer/boarder (100%), child (44.4%), opposite-sex spouse (42.4%), other nonrelative (54.5%), grandchild (40.0%), and same-sex spouse (38.1%).

- **Underserved market is those living alone**--Those living alone were least likely (34.4%) to have any tree and could potentially benefit from the restorative experience associated with shopping for a real tree outdoors (Table 3). Cunic (2021), medically reviewed by Morin, provided several ways to cope with being alone at Christmas including addressing their mental state. The restorative benefits offered when shopping for a real tree might be one way to accomplish that. Future research should examine the constraints of this group that stands in the way of purchasing a real Christmas tree.

- **Balanced location of sales**--Of those respondents that indicated they had a real Christmas tree in their home, most purchased their tree at a chain store (37.2%), followed by a retail lot (29.2%), choose and cut farm (27.3%), nursery (23.0%), online (19.2%), and non-profit group (12.2%) (Table 4).

- **Real Christmas tree customers are loyal**—The same respondents that indicated they had a real Christmas tree in their home also expressed high levels of customer loyalty on four different scales (means=4.2 to 4.3 on a 5-point scale) (Table 5).

Table 1. Socio-demographics.

	n	Percent
Gender (Q11)		
Male	574	47.5
Female	620	51.3
Transgender	9	0.7
None of these	5	0.4
Race (check all that apply) (Q12)		
Black or African American	217	18.0
White/Caucasian	741	61.3
American Indian or Alaskan Native	29	2.4
Hispanic or Latino	195	16.1
Asian	128	10.6
Native Hawaiian or Pacific Islander	4	0.3
Other	9	0.7
Age (Q13)		
18-24	218	18.0
25-34	348	28.8
35-44	229	19.0
45-54	178	14.7
55-64	227	18.8
65+	3	0.2
Prefer not to say	5	0.4
Education (Q15)		
Less than high school	7	0.6
Some high school	22	1.8
High school graduate or equivalent (e.g., GED)	217	18.0
Some college, but degree not received or is in progress	261	21.6
Associate's degree (e.g., AA, AS)	140	11.6
Bachelor's degree (e.g., BA, BS, AB)	367	30.4
Graduate degree (e.g., Masters, Professional, Doctorate)	194	16.1
Household Income (before taxes in 2022) (Q16)		
Less than $20,000	152	12.6
$20,001 to $40,000	226	18.7
$40,001 to $60,000	208	17.2
$60,001 to $80,000	168	13.9
$80,001 to $100,000	135	11.2
$100,000+	274	22.7
Prefer not to say	45	3.7
Region of the US		
South	370	30.6
Northeast	267	22.1
Midwest	257	21.3
West	314	26.0

Table 2. Type of Christmas tree(s) in your home in 2022 (Q5*).*

Type of tree	n	Percent
Only a real Christmas tree(s)	247	20.4
Only an artificial Christmas tree(s)	613	50.7
Both artificial and a real Christmas tree(s)	148	12.3
No Christmas tree (real or artificial)	200	16.6

Table 3. Household by type of Christmas tree(s) in home in 2022 (Q5) by household (Q14).

Household (Check all that apply)	Type of Tree in Home[1] Real Tree	Artificial Tree Only	No Tree	χ^2	*df*	*Cramer's V*
Opposite-sex Spouse (Husband/Wife)	206 (42.4%)	244 (50.2%)	36 (7.4%)	64.50*	2	.231*
Opposite-sex Unmarried Partner	30 (27.5%)	63 (57.8%)	16 (14.7%)	2.41	2	.045
Same-sex Spouse (Husband/Wife)	8 (38.1%)	10 (47.6%)	3 (14.3%)	0.30	2	.016
Same-sex Unmarried Partner	3 (23.1%)	7 (53.8%)	3 (23.1%)	0.73	2	.025
Child	192 (44.4%)	212 (49.1%)	28 (6.5%)	69.97*	2	.241*
Grandchild	2 (40.0%)	2 (40.0%)	1 (20.0%)	0.23	2	.014
Parent (Mother/Father)	67 (27.8%)	130 (53.9%)	44 (18.3%)	3.34	2	.053
Brother/Sister	54 (33.3%)	87 (53.7%)	21 (13.0%)	1.81	2	.039
Other relative (Aunt, Cousin, Nephew, Mother-in-law, etc.)	17 (32.7%)	30 (57.7%)	5 (9.6%)	2.10	2	.042
Foster Child	3 (100.0%)	0 (0%)	0 (0%)	6.19	2	.072
Housemate/Roommate	16 (32.0%)	25 (50.0%)	9 (18.0%)	0.08	2	.008
Roomer/Boarder	2 (100.0%)	0 (0%)	0 (0%)	4.12	2	.058
Other nonrelative	6 (54.5%)	4 (36.4%)	1 (9.1%)	2.45	2	.045
No one (I live alone)	46 (22.0%)	91 (43.5%)	72 (34.4%)	60.29*	2	.223*

*Significant ($p < .001$)

[1]Percentages are by rows.

Table 4. Purchase location of your home's real Christmas tree(s) in 2022 (Q6).

Type of Business (check all that apply)	n	Percent
Real tree from a chain store (Walmart, Home Depot, Lowes, etc.)	147	37.2
Real tree from a choose and cut farm	108	27.3
Real tree from a retail lot	115	29.1
Real tree from a nursery	91	23.0
Real tree from a non-profit group (Boy Scouts, churches, etc.)	48	12.2
Real tree purchased online	76	19.2
Other location	8	2.0
I don't know	4	1.0

Table 5. Customer loyalty (Q7).

Statements regarding customer loyalty of real Christmas Tree purchases[1]	*Mean*	n
I would be in favor of the purchase of a real Christmas tree for my home in the future	4.30	814
I would tell other people positive things about the purchase of a real Christmas Tree	4.20	814
I would recommend the purchase of a real Christmas tree to family or friends	4.26	814
I would recommend the purchase of a real Christmas tree to people who seek my advice	4.26	814

[1]Items measured on a 5-point scale (1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, and 5=Strongly agree).

- **Fascination is a restorative factor that is significantly higher for artificial/indoor trees (Figure 1)**—The Perceived Restorative Scales (PRS) are reliable and have Cronbach's alpha scores near or well above 0.70 (Table 6). The items were included in question 3 of the survey instrument (see Appendix A) and measured on an 11-point scale (0=Not At All to 10=Completely). Fascination and its items were the only ratings that were significantly different (t-test, 2-sided $p<.01$) between participants (n=604) who evaluated the video representing real/outdoor Christmas trees and participants (n=604) who evaluated the video representing artificial/indoor Christmas trees. Specifically, the fascination mean scores were higher (Cohen's d=2.5 to 3.1) for the group evaluating the artificial/indoor tree video. At first, this was an unexpected and surprising finding, but additional analysis suggested that this type of fascination might not be the "soft" fascination that is required for a restorative experience given the much smaller effect (Partial η^2 =.024) on overall restorative quality perceived in the artificial/indoor trees video (see Table 9). (Partial eta squared indicates the size of the effect that the independent variable has on the dependent variables). This is an important finding of this study that is discussed in greater detail later in the report (see page 21).

Table 6. Perceived Restorative Scale (PRS) item mean scores by real/outdoor trees video versus artificial/indoor trees video.

Perceived Restorativeness Scale (PRS) items (Q3[1])	Real/Outdoor Tree Video *M*	Real/Outdoor Tree Video *SD*	Artificial/ Indoor Tree Video *M*	Artificial/ Indoor Tree Video *SD*	*t*(1206)	*p (2-sided)*	Cohen's *d*
Fascination	5.80	2.54	6.35	2.49	-3.76*	<.001	2.51
Places like this are fascinating	5.83	2.94	6.28	2.87	-2.72	.007	2.90
In places like this, my attention is drawn to many interesting things	6.23	2.71	6.96	2.55	-4.79	<.001	2.63
In places like this, it is hard to be bored	5.35	3.04	5.80	3.09	-2.58	.010	3.06
Scale reliability: Cronbach's alpha	.849		.847				
Being-away	5.60	2.63	5.50	2.88	0.61	.541	2.75
Places like this are a refuge from nuisances	5.65	2.84	5.41	3.03	1.37	.171	2.94
To stop thinking about the things that I must get done, I like to go to places like this	5.55	3.13	5.59	3.33	-.205	.838	3.23
Scale reliability: Cronbach's alpha	.709		.773				
Coherence	7.03	2.10	6.96	2.12	0.56	.577	2.11
There is a clear order in the physical arrangement of places like this	6.99	2.31	6.84	2.43	1.09	.275	2.37
In places like this, it is easy to see how things are organized	7.11	2.34	7.07	2.37	0.269	.788	2.35
In places like this, everything seems to have its proper place	6.99	2.34	6.97	2.34	.135	.892	2.34
Scale reliability: Cronbach's alpha	.885		.873				
Compatibility	5.77	2.72	5.99	2.82	-1.36	.174	2.77
Being in places like this suits my personality	5.82	2.95	6.02	3.04	-1.18	.237	2.99
I can do things I like in places like this	5.84	2.86	6.05	2.90	-1.30	.194	2.88
I have a sense that I belong in places like this	5.66	2.99	5.89	3.10	-1.32	.187	3.05
Scale reliability: Cronbach's alpha	.918		.930				
Scope	6.63	2.11	6.59	2.16	0.34	.731	2.13
That place is large enough to allow exploration in many directions	7.16	2.36	7.10	2.37	0.44	.662	2.37
In places like that, there are few boundaries to limit my possibility for moving about	6.10	2.58	6.08	2.62	0.17	.868	2.60
Scale reliability: Cronbach's alpha	.623		.658				

[1] Perceived Restorativeness Scale (PRS) items measured on a 11-point scale (0=Not At All to 10=Completely).

Note: The abbreviations *M* and *SD* stand for mean and standard deviation respectively.

Figure 1. Examples of indoor artificial Christmas tree displays examined in this study.

- **Perceived restorative quality (e.g., affording recovery from mental and intentional fatigue) is highest for places with real/outdoor Christmas trees**—This is the key finding of this study and can be added to the list of benefits of purchasing a real Christmas tree. When the authors used analysis of covariance (ANCOVA) to test for differences in restorative quality represented in the videos, the results were significant ($p<.05$). ANCOVA is a general linear model that combines ANOVA and regression to examine random treatment effects (real/outdoor trees vs. artificial/indoor trees video evaluations) on overall perceived restorative quality. Covariates (i.e., fascination, being-away, compatibility, coherence, and scope) were included in the general linear models to help increase precision of the treatment effect. By controlling for those five restorative factors using ANCOVA, both measures of perceived restorative quality were significantly ($p<.05$) higher for the real/outdoor Christmas trees video (Tables 7 and 8). That is, the authors reject the null hypothesis that our treatment (randomly assigned video) results in equal mean restorative quality: real-time video evaluation $F(1, 1201) = 4.126$, $p=.042$ (Table 7) and post-video evaluation $F(1, 1201) = 15.96$, $p<.001$ (Table 8). The effect of video on overall perceived restorative quality was greater for the post-video evaluation measure (Table 8). These significant results are promising for future research, and the measured effects could be improved by controlling for more external factors such as display type.

Table 7. ANCOVA: Real-time video evaluations of overall perceived restorative quality (Q2[1]) by video (controlling for five restorative factors, Q3[2])

			Effect of Video		
Treatment Groups (videos)	***Mean***	***SD***	***F***	***p***	**Partial η^2**
Real/outdoor trees video	61.79	21.37	4.126	.042	.003
Artificial/indoor trees video	60.70	19.75			

[1]Dependent variable: Perceived restorative quality was measured every second (in real time) during the video evaluation on a 100-point scale from 0=lowest quality to 100=highest quality.

[2]Covariance: The five restorative factor mean scores include Fascination, Being-away, Coherence, Compatibility, and Scope.

Table 8. ANCOVA: Post-video evaluations of overall perceived restorative quality (Q4[1]) by video (controlling for five restorative factors, Q3[2])

			Effect of Video		
Treatment Groups (videos)	***Mean***	***SD***	***F***	***p***	**Partial η^2**
Real/outdoor trees video	6.40	2.81	15.96	<.001	.013
Artificial/indoor trees video	6.16	2.66			

[1]Dependent variable: Overall perceived restorative quality (post-video evaluation) was measured on a 11-point scale (0=Not at All to 10=Completely).

[2]Covariance: The five restorative factors include Fascination, Being-away, Coherence, Compatibility, and Scope.

- **Multivariate multiple regression**--MMR is used to model the relationship between more than one independent variable (predictors) and more than one dependent variable (responses). In this study, MMR analysis was used to better understand the effect that the five restorative factors (predictors) have on two measures of overall perceived restorative quality (1. post-video assessment and 2. real-time video assessment) for each video (Table 9). The overall test for multiple responses (two dependent variables) was used in this study because it is more powerful than separate univariate regressions (one dependent variable) and it avoids multiplying error rates.

  The assumptions for MMR that were examined in this study were satisfied. Both dependent variables are related conceptually and are at least moderately correlated (r=.583) which is ideal. Scatterplots indicate that the relationships between the dependent and independent variables are positive and linear. The predicted values that were plotted against standardized residuals (i.e., residual plot) were symmetrically distributed (clustering towards the middle of the plot) and did not have any clear patterns which is also ideal.

  The effects (partial η^2) of the 5 restorative factors (predictors) on the overall perceived restorative quality can be compared for both videos in Table 9. Most notable is the larger effect fascination, coherence and scope have on overall restorative quality perceived in the real/outdoor trees video. Compatibility was the only factor to have a notably larger effect size for the artificial/indoor trees video. The discussion of these results follows.

  The positive effect of <u>fascination</u> on perception of restorative quality is larger for real/outdoor Christmas trees—Fascination had about twice the effect on perceived restorative quality for real/outdoor trees when compared to artificial/indoor trees (Table 9). This means that although artificial/indoor trees were considered more fascinating by study participants (see Table 6), it is the kind of fascination that does not make a major contribution to the overall perceived restorative quality. Artificial Christmas trees located inside stores (see Figure 1), with all the lights displayed, are very fascinating, but it is more likely a "hard" fascination. Hard fascination includes factors like fast movements and loud noises including watching sports games on television or visiting amusement parks. Perhaps the flashy tree lights and indoor Christmas tree displays are also a type of hard fascination. On the other hand, “soft” fascination involves stimuli that does not require much effort (which reduces the internal noise and burden). Classic examples include wind blowing through leaves or ripples of water traveling across a pond. Based on this study’s findings, shopping for real Christmas trees outdoors may provide another example of “soft fascination”—a type of fascination that has a larger effect on restorative quality. This finding helps address Basu et. al (2018) and others’ call to better understand fascination. They argue that soft fascination is key but an underexamined element of Attention Restoration Theory.

The positive effect of <u>scope</u> on the perception of restorative quality is substantially larger for real/outdoor Christmas trees—Scope has a much larger (partial η^2=.046) and significant (p<.001) effect on perceived restorative quality of real/outdoor Christmas trees when compared to artificial/indoor trees (partial η^2=.007, p=.141) (Table 9). Outdoor Christmas tree farms and other outdoor retailers have an advantage over indoor stores because they offer a setting (or the impression of a setting) that is physically or conceptually large enough so that one's mind can wonder and their thoughts can drift away from daily activities (i.e., scope).

It is not surprising that scope is an important restorative factor. Research suggests that park-like stands of trees with increased visual access and depth are appealing landscapes to people. In addition, distant views that are opened-up, especially to the horizon, are highly preferred landscapes (Heerwagen & Orians, 1993). Examples of these impressions found in Christmas tree displays are provided in Table 11. It seems possible that Christmas tree retailers can enhance the desired effect of depth perception (and scope) by modifying the landscape's **textural density, relative size, occluding events, and linear perspective (see pages 24-25 for details).** These designed liminal spaces may be best suited for small outdoor displays where space is a premium. That is, a smaller outdoor space can appear larger when the pattern of Christmas trees is organized in such a way as to enhance the impression of a receding landscape. Not only is it possible to enhance the perception of restorative quality, but this type of gateway that is characterized by gradual changes in tree patterns might also contribute to long-term memory (e.g., create memorable event boundaries), fascination, mystery, surprise, etc. (Note: Event segmentation theory or EST, is a theoretical perspective that claims event segmentation regulates the contents of active memory, and event boundaries have an advantaged status in long-term and episodic memory). Future research is still needed to examine if these propositions apply to tree displays. This could be done by creating Christmas tree demonstration displays where differences in customer perceptions can be measured and compared.

The positive effect of <u>compatibility</u> on the perception of restorative quality was larger for artificial/indoor Christmas trees—Compatibility was a significant predictor (p<.001) for the restorative quality perceived during both videos, but it was notably larger (about 3 times larger) for artificial/indoor Christmas trees (Table 9). Analogs of compatibility include Czikszentmihalyi's (1975) "flow" experience which is an optimal experience that involves becoming immersed or feeling "in the zone". It can occur when the degree of challenge is balanced with one's skillfullness (physical or mental). The real Christmas tree industry should continue to find ways to improve services (e.g., tree delivery and set-up) that can reduce the challenge of purchasing a real Christmas tree or increasing the perceived self-efficacy of some prospective customers. For example, Hilderbrandt (1991) found that 27.6% of study respondents of Kansas households listed allergies or health problems as a reason for purchasing an artificial tree. Providing

allergy-friendly trees might help those customers perceive compatibility. This deserves additional research to better understand the constraints of some customers.

Table 9. Multivariate Multiple Regression (MMR): Effects of Restorative Factors[1] on Restorative Quality[2].

	Real/Outdoor Christmas Trees Video		Artificial/Indoor Christmas Trees Video	
Restorative factors	***p***	**Partial η^2**	***p***	**Partial η^2**
Fascination	<.001	.052	<.001	.024
Being-away	<.001	.045	<.001	.049
Coherence	<.001	.057	<.001	.047
Compatibility	<.001	.032	<.001	.096
Scope	<.001	.046	.141	.007

[1]Independent variables: The five restorative factors were measured on 11-point scales from 0=Not At All to 10=Completely.

[2]Dependent variables: Perceived restorative quality was measured with two variables: Real-time video evaluation measured on a 100-point scale from 0=lowest quality to 100=highest quality and post-video evaluation measured on an 11-point scale from 0=Not at All to 10=Completely.

Table 10. Positive correlation between customer loyalty items and overall perception of restorative quality of real/outdoor Christmas trees (real-time and post-video assessments).

	Real-time video assessment (Q2)[2]		Post-video assessment (Q4)[3]	
Statements regarding customer loyalty of real Christmas tree purchases (Q7)[1]	**Pearson Correlation (n=209)**	***P (2-sided)***	**Pearson Correlation (n=209)**	***P (2-sided)***
I would be in favor of the purchase of a real Christmas tree for my home in the future	.183	.008	.246	<.001
I would tell other people positive things about the purchase of a real Christmas Tree	.179	.009	.262	<.001
I would recommend the purchase of a real Christmas tree to family or friends	.157	.023	.281	<.001
I would recommend the purchase of a real Christmas tree to people who seek my advice	.187	.007	.317	<.001

[1]Items measured on a 5-point scale (1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, and 5=Strongly agree).

[2]Perceived restorative quality was measured every second (in real time) during the video evaluation on a 100-point scale from 0=lowest quality to 100=highest quality.

[3]Overall perceived restorative quality (post-video evaluation) was measured on an 11-point scale from 0=Not at All to 10=Completely.

- **Perceived restorative quality of real/outdoor Christmas trees is significantly and positively correlated with customer loyalty**—Pearson correlation coefficients were calculated to measure the relationship between perceived overall restorative quality of real/outdoor tree videos and measures of real tree customer loyalty. Measures are reported for both real-time and post-video assessments of restorative quality (Table 10). All measures were significant (2-sided, $p<.05$) and positively related. That is, those customers that perceive high levels of overall restoration in the video also tend to be more loyal customers. Therefore, Customer loyalty is another benefit of providing a positive restorative shopping experience.

- **Top 10 restorative scenes of the real/outdoor Christmas trees video—** Figure 2 shows the evaluation timeline and the top 10 scenes with peak restorative quality that were perceived in the real trees video. Those scene snapshots are provided in Table 11. Rosenbaum et al. (2018) recommend that landscape architects and service design researchers try to better understand the specific types of natural elements (e.g., certain types of trees and plants, forms of water displays, or the presence of small animal life such as birds and butterflies) that evoke positive consumer responses. This study helps address his call for additional research and offers propositions and recommendations about how to improve the biophilic design of real Christmas tree farms and lots (e.g., choose and cut farm, garden centers, Boy Scout lot, and home improvement store).

  Pictures 1, 3, 5, 6, and 9 are innovative tree displays that represent <u>coherence and scope</u> in varying degrees (Table 11)—These pictures further support the importance of coherence (organized trees) and scope (a receding landscape or depth) as contributing factors of restorative quality and compliments the findings presented in Table 9 (see page 23). They represent a type of organized complexity (the right balance of order and variety or contrast) that affords an ideal perception of depth and spaciousness. That is, distant views that are opened-up, especially to the horizon, are highly preferred landscapes (Heerwagen & Orians, 1993). However, the authors propose that scope (depth perception) in these displays (pictures 1, 3, 5, 6, and 9) could be enhanced by modifying the (1) textural density, (2) relative size, (3) occluding events, and (4) linear perspective of the trees—each are explained in detail below. These propositions seem promising for Christmas tree displays but still require additional research.

  (1) Gibson's ecological perception theory suggests that the rate of change in a landscape's **textural density** provides cues for depth perception (Bruce & Green, 1990). For example, a customer who views a display of trees (having uniform tree size and density throughout the display) will naturally notice an apparently lower density of trees in the near setting and higher density of trees in the distant setting. The trees nearest the customer will also appear larger in scale than distant trees. These gradients of texture are perceived invariants and inform the visitor about the depth of the setting (i.e., provide scope). It is possible for retailers to heighten the perception of depth by altering this gradient pattern of trees. Establishing higher densities of smaller trees on the outmost edge, while allowing lower densities of larger trees to

exist in the near setting by the entrance, can potentially heighten impressions of a landscape surface receding away; thus the authors propose that it can enhance depth perception and make the space appear larger. Exiting this same space would have the opposite effect because the space would be compressed, and the customer would feel pulled into the setting which could also provide a unique and enjoyable experience.

(2) Similar to gradient pattern cues, we propose that **relative size** cues can also be enhanced to give the impression of a receding landscape of a space. The relative size of an object depends upon its distance. When a retinal image is large it can either be a small object up close or a large object that is far away. Therefore, when perceiving two similar objects such as two trees, there can be a tendency to see the smaller tree further away. Because the distant or background trees (on the outmost edge) are smaller in absolute size, the relative depth would be increased.

(3) A third type of cue that is used to perceive depth is **occlusion**. Occlusion is a category of events wherein objects (e.g., smaller background trees) occasionally disappear and reappear when overlapping with other objects (e.g., larger foreground trees) or as they become wiped away or hidden from our peripheral view during human movement (Strickland & Scholl, 2015). Our visual systems make effective use of these monocular interpositions (overlapping objects) to deduce the depth relations among objects (Kaplan, 1969). This impression can be magnified by transitioning from large to small trees, wherein a larger number of background trees are hidden.

(4) **Linear perspective** is a fourth type of depth cue that can enhance the impression of receding landscape scenery. The technique involves using parallel lines (like railroad tracks) that converge in a single vanishing point, and it is often used by artists and architects. In theatre, it is used to make small spaces appear larger. In our Christmas tree display example, trees can be presented in such a way (V-shaped or triangular pattern) as to create linear perspective (convergence of landscape pattern near the horizon or background) and enhance the perception of depth of an otherwise small space.

Pictures 2 and 10 represent large trees (Table 11)--Although conjoint analysis (see Table 14) indicates that customers tend to prefer purchasing smaller trees (6-8'), they perceive higher restorative quality when larger trees were presented in the video (pictures 2 and 10). The preference of large trees in studies of scenic beauty is well established. For example, based on preference rating (5-point scale) of 100 scenes, Herzog (1984) identified three dimensions or categories of scenes including one called, large trees, which received the highest scores among the dimensions (3.79 on a 5-point scale). The ratings increased to 4.0 when the trees were viewed in combination with pathways which can offer a pleasing effect as a boarder element or refuge. (Note: Similar to this study, Herzog would sometimes refer to the work of Kaplan and Gibson in his publications).

Locating the larger trees near the pathway entrance (foreground or front row) might also enhance the impression of depth and scope of a place.

Pictures 7 and 8 represent short and long needle trees (Table 11)—Both short and long needle trees were rated high by study participants. This supports the findings of the conjoint analysis (see Table 14). That is, tree species was the least important attribute examined in the conjoint analysis.

Picture 4 represents the positive effect of smell on restorative quality (Table 11)—This finding adds additional support to the Real Christmas Tree Board social post in 2022: "real Christmas trees are the #1 scent of the season. Not even grandma's cookies can top that." Larson (2004) also reported that natural tree buyers ranked fragrance as a top reason for their purchase. He also suggests that scents affect product and store ratings, shopping times, and sales. More specifically Leenders et al. (1999) advise that at least 70 percent of shoppers should be aware of the scent.

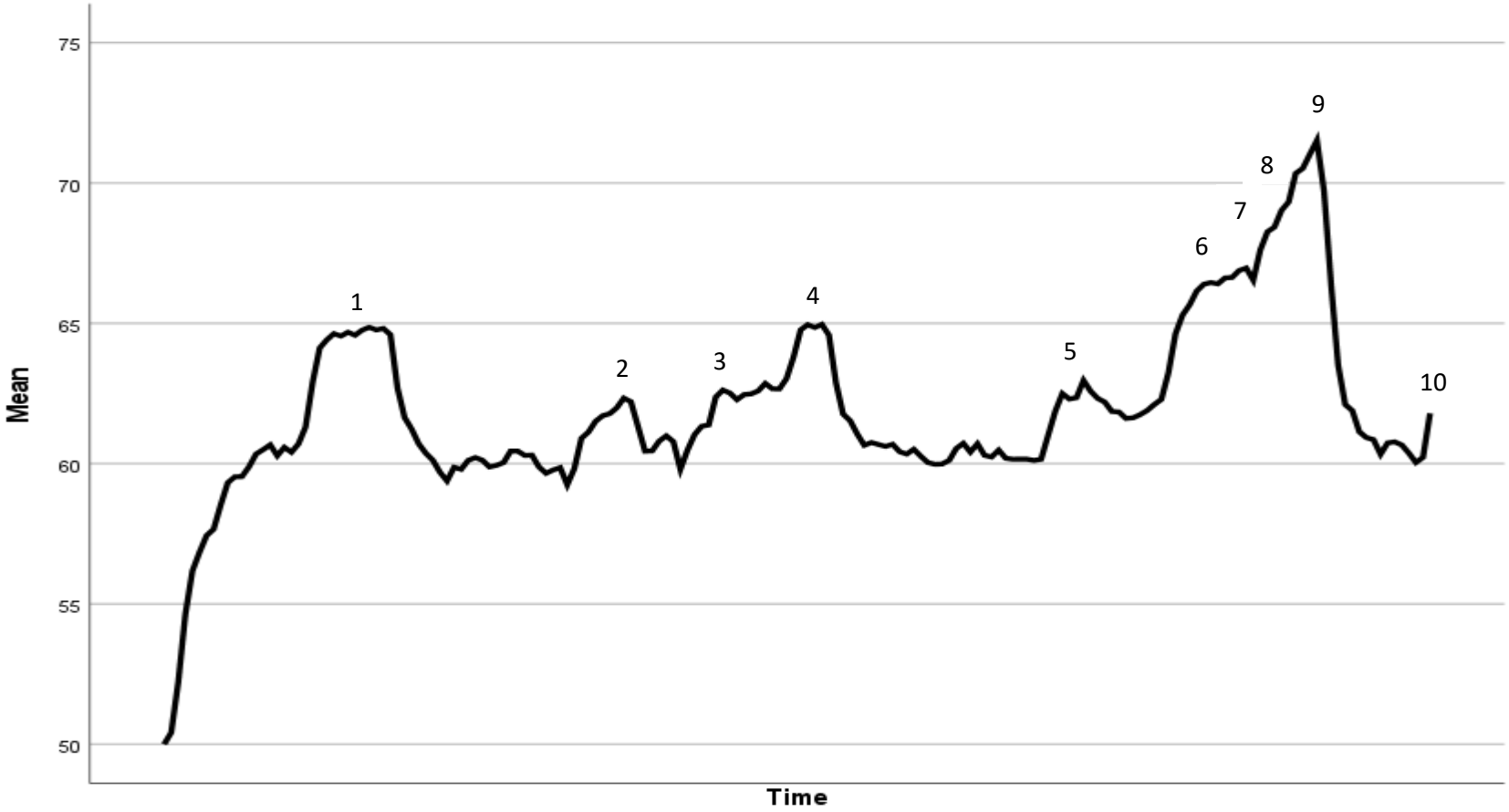

Figure 2. Evaluation timeline for the real/outdoor Christmas trees video.

Table 11. Peak restorative moments identified during the evaluation of real/outdoor trees video.

Timeline Position	Peak restorative video scenes	Timeline Position	Peak restorative video scenes
1		6	
2		7	
3		8	
4		9	
5		10	

- **Conjoint analysis**--It is assumed that shopping environments, restorative benefits and shopping preferences and behaviors are interrelated in a way that preferred shopping environments contribute to mental fatigue recovery with restorative benefits, which, in turn, affect shopping preferences and behaviors. In addition to shopping environments, other tree-related attributes such as price, species, and height can also influence a consumer's decision to purchase a real Christmas tree. Therefore, it is important to understand consumer's choices and benefit trade-offs by developing optimal products for different market segments. Choice-based conjoint analysis has been used to determine the attribute importance and to understand what matters most to a consumer.

  Four important attributes (price, species, height, and product) were included in the conjoint analysis (Table 12). Specifically, price is measured at four levels ($60-80, $80-100, $100-120, and $120-140) for each of three species (fir, spruce, and pine) with three different heights (6-8', 8-10', and 10-12') and two types of trees: real vs. artificial.

Table 12. Christmas tree attributes and levels used in the conjoint analysis (Q8).

Attributes	Levels
Price	$60-80
	$80-100
	$100-120
	$120-140
Species	Fir
	Spruce
	Pine
Height	6-8'
	8-10'
	10-12'
Product	Real
	Artificial

From a total of 72 (4x3x3x2) possible combinations of attributes and levels, 16 orthogonal designs were generated using the Statistical Package for the Social Sciences (SPSS) software. These 16 (not the total 72) designs were used to reduce the cognitive burden of participants (Table 13). Respondents were asked to score each combination/choice using a scale of 1 to 10 where 1 = least preferred and 10 = most preferred (Andrada et al., 2015). Conjoint analysis is used to determine the utility for each level of the attributes and the importance of each attribute which have important implications for the production and marketing of Christmas trees.

Of the 1,208 valid responses, 48 had equal values in all 16 choices. These 48 responses were considered not valid and hence removed from the conjoint analysis. Table 14 presents conjoint analysis results on the utility estimate for each attribute level as well as importance value for each attribute (also see Figures 3 and 4).

Table 13. A total of 16 orthogonal designs were used in the survey.

Design	Price	Species	Height	Product
1	80-100	Fir	8-10'	Real
2	120-140	Fir	6-8'	Artificial
3	100-120	Fir	10-12'	Artificial
4	60-80	Pine	6-8'	Real
5	120-140	Spruce	8-10'	Real
6	80-100	Fir	6-8'	Artificial
7	100-120	Fir	6-8'	Real
8	100-120	Spruce	6-8'	Real
9	80-100	Pine	10-12'	Real
10	120-140	Fir	10-12'	Real
11	120-140	Pine	6-8'	Artificial
12	60-80	Fir	6-8'	Real
13	100-120	Pine	8-10'	Artificial
14	60-80	Fir	8-10'	Artificial
15	80-100	Spruce	6-8'	Artificial
16	60-80	Spruce	10-12'	Artificial

Table 14. Results of the conjoint analysis.

			Utilities	
		Importance Values	**Utility Estimate**	**Std. Error**
Price		60.839		
	60-80		.383	.020
	80-100		.169	.020
	100-120		-.165	.020
	120-140		-.387	.020
Species		1.940		
	Fir		-.009	.016
	Spruce		.015	.018
	Pine		-.006	.018
Height		25.246		
	6-8'		.162	.016
	8-10'		-.003	.018
	10-12'		-.159	.018
Product		12.275		
	Real		.078	.012
	Artificial		-.078	.012
(Constant)		5.698	5.698	.013

Note. Observed and estimated preferences are highly correlated. Pearson's R = .993, $p < .001$; Kendall's tau = .993, $p < .001$.

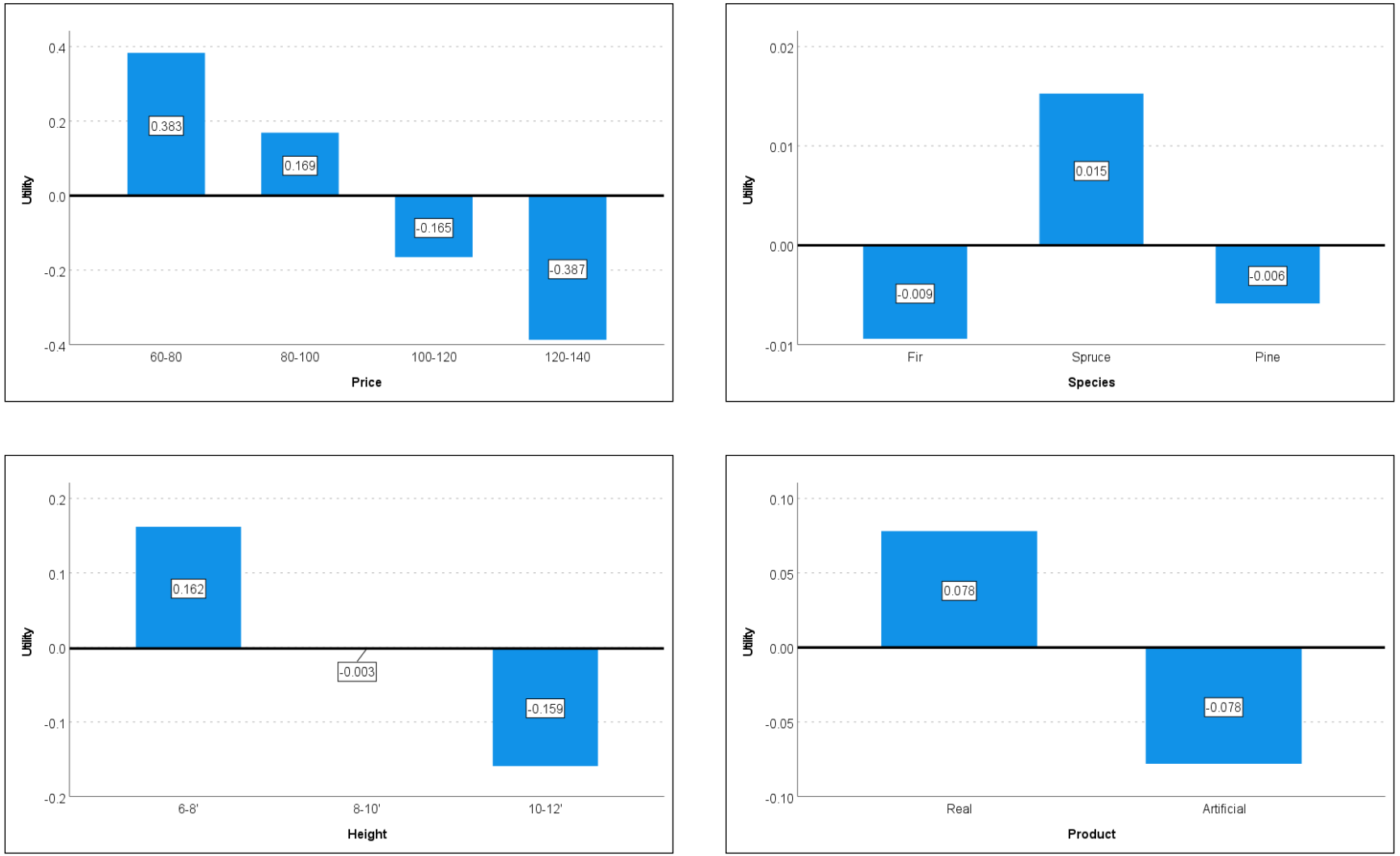

Figure 3. Utilities at different attribute levels.

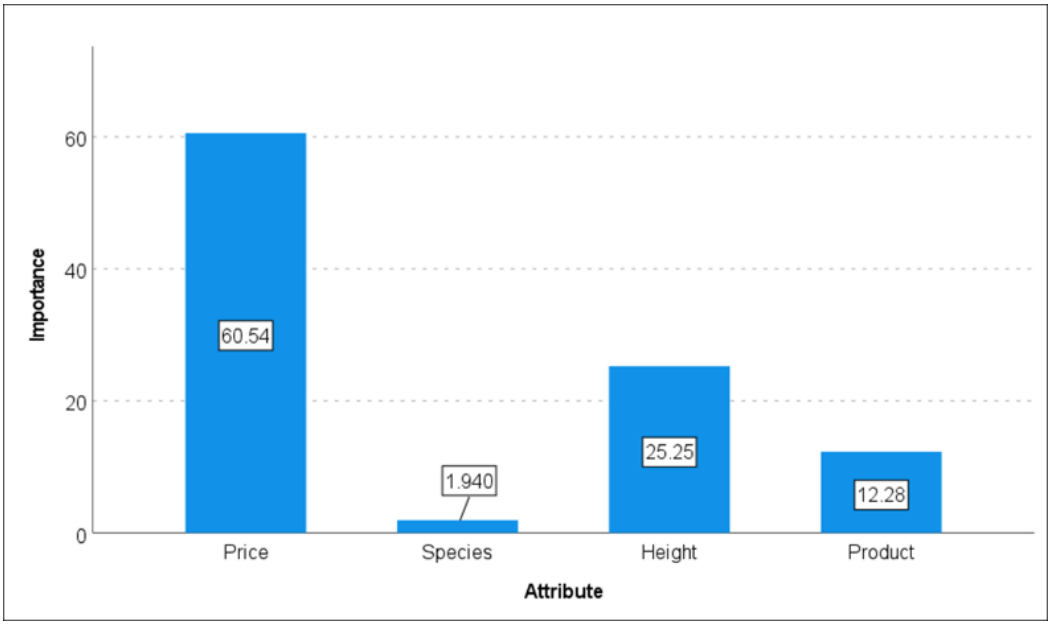

Figure 4. Importance values by attribute.

Respondents considered price as the most important (60.839 out of 100), followed by height (25.246) and product (12.275) while species was regarded as the least important (1.940). This finding is somewhat consistent with Zaffou and Campbell (2017) who also reported that tree height was most valued while tree species were less important based on a conjoint analysis of data collected from an online survey of 640 Connecticut consumers. However, another study (Behe et al., 2005) on tabletop Christmas trees found that tree species was the most important followed by decoration color and price.

In terms of the utility value for a specific level within an attribute, price at a higher level is less preferred than price at a lower level; spruce is more preferred than other two species, fir and pine; trees at a height of 6-8' are more preferred than trees at 8-10' and 10-12', or the taller the tree the less preferred it is. Finally, in terms of product, 100% of customers preferred real trees over artificial ones.

Table 15 presents utility values by design (ordered by utility values from the largest to the smallest). As shown, the combination of "$60-80, pine, 6-8', real" is the most preferred/optimal among all 16 combinations designed (0.617), closely followed by the combination of "$60-80, fir, 6-8', real" (0.614), and the combination of "$80-100, fir, 8-10', real" (0.235). Overall, the top 7 most preferred combinations of Christmas tree attributes include the choice of "real", suggesting customers prefer real trees, even with a compromise/trade-off of other less favorable attribute options or levels with negative utility values such as higher prices and taller trees.

Table 15. Utility values by design.

Design	Price	Species	Height	Product	Utility*
4	60-80	Pine	6-8'	Real	0.617
12	60-80	Fir	6-8'	Real	0.614
1	80-100	Fir	8-10'	Real	0.235
8	100-120	Spruce	6-8'	Real	0.09
9	80-100	Pine	10-12'	Real	0.082
7	100-120	Fir	6-8'	Real	0.066
5	120-140	Spruce	8-10'	Real	-0.297
14	60-80	Fir	8-10'	Artificial	-0.409
15	80-100	Spruce	6-8'	Artificial	-0.434
6	80-100	Fir	6-8'	Artificial	-0.458
10	120-140	Fir	10-12'	Real	-0.477
16	60-80	Spruce	10-12'	Artificial	-0.541
13	100-120	Pine	8-10'	Artificial	-0.954
11	120-140	Pine	6-8'	Artificial	-1.011
2	120-140	Fir	6-8'	Artificial	-1.014
3	100-120	Fir	10-12'	Artificial	-1.113

*Ordered by utility values from the largest to the smallest.

6. Conclusion

This study provides the first empirical evidence to support the recommendation to shop for Christmas trees at local choose and cut farms, garden centers, Boy Scout lots, home improvement stores, or other type of outdoor tree lots, especially for customers seeking recovery from mental fatigue. By controlling additional external factors such as type of tree display in future research, this can be the beginning of a promising line of research. The study findings also provide support for a recent CNN article's proposition that real Christmas trees can provide important health benefits such as the reduction in anxiety, psychological stress, and depression. The Mayo Clinic recognizes that many people experience stress around the holidays. For example, households with children and those that are living alone during the Christmas holiday might be feeling mentally fatigued or maybe they simply want to improve their mental state. The main finding of this study is that the outdoor biophilic designs that are common at a Christmas tree farm or any outdoor retail tree lot can help those customers recover from mental fatigue, improve their ability to concentrate, restore their capacity to focus their attention, and help them feel less irritable as they recover from mental and attentional fatigue.

The potential lure of artificial trees and their flashy lights often found in indoor Christmas tree displays should be questioned by customers seeking attention restoration and the recovery from mental fatigue, and it should be further examined in future research. The findings from this study suggest that this type of fascination might be similar to other "hard" fascinations such as fast movements and loud noises including watching sports games on television or visiting amusement parks, and they do not contribute to overall

restoration at a level similar to real Christmas tree displays. '"Stimuli categorized as "hard" fascination forcefully grab one's attention and are difficult to resist. As a result, they tend to fill the mind, leaving little room for more peripheral mental activity or reflection."' (Basu et al., 2018, p.1057). Hard fascination "eventually leads to mental fatigue and symptoms such as distractibility, impulsivity, and irritability." (Basu et al., 2018, p. 1056). On the other hand, the biophilic nature of outdoor tree displays may offer the "soft" fascination that reduces the internal noise and mental burden for customers much like the effect of wind blowing through leaves or ripples of water traveling across a pond. It is this "soft" fascination that contributes more to restoration because it captures attention effortlessly. This study's finding is especially important and fascinating considering it can be connected to William James' (1962/1892) discussion of attention that was published over 130 years ago and more recently by Kaplan (1995) and others.

The display of real Christmas trees may also have an advantage over indoor displays of artificial trees because they offer a setting that is physically or conceptually large enough so that a customer's mind can wonder and their thoughts can drift away from daily activities (i.e., scope). That type of setting can also offer coherence when there are orderly displays of trees with repeated themes and textures. In fact, most of the peak restorative moments identified during the evaluation of real/outdoor trees video involved innovative displays that had the characteristics of scope and coherence. Based on these findings, the authors provide some propositions on how to further improve the perception of depth, spaciousness, and the impression of a receding landscape, especially for small spaces. They suggest that tree displays can be enhanced by modifying the textural density, relative size, occluding events, and linear perspectives of trees. By doing so, businesses can improve opportunities for restoration which is also associated with stronger customer loyalty. These propositions seem promising and deserve the attention of future research.

Other restorative design elements of real Christmas tree displays that were identified in the video evaluation include the presence of larger (or taller) trees. Based on the literature, these larger trees could be located near a pathway as a boarder element to the customers experience' (even though they are not the most preferred size tree for purchase). And as proposed in this report, they could be located near the pathway entrance (foreground or front row) to enhance the impression of depth and scope of a place that can improve the perceived restorative quality.

Compatibility was a significant predictor of restorative quality for both real/outdoor and artificial/indoor trees, but the effect was about 3 times larger for the latter. This is a concern that the real Christmas tree industry should continue to address by finding additional services that can reduce the challenge of purchasing a real Christmas tree for some customers. Some current examples include tree delivery and setup services. Are there other services that can be offered during the shopping experience to enhance compatibility?

Finally, conjoint analysis indicates that the combination of "$60-80, pine, 6-8', real" is the most preferred/optimal by study respondents, closely followed by the combination of

"$60-80, fir, 6-8', real", and the combination of "$80-100, fir, 8-10', real". These findings can help marketers find a price point for the different tree combinations such as for the most preferred 6-8' real trees. In fact, price was the most important attribute, followed by height and product. The importance of price is somewhat surprising given the early work of Davis and Wohlgenant (1993) that showed demand for natural trees is inelastic (lower sensitivity of Christmas tree customers to change in price) suggesting that marketers can increase revenue by raising prices. Richards (2020) most recently found similar findings. He reported that both short-run and long-run price elasticity for real Christmas trees continues to be relatively inelastic. Perhaps the conjoint analysis findings presented in this report provide justification for a reexamination of price elasticity of demand for real trees given the recent changes in economic conditions in the US such as rising inflation. Perhaps travel cost models in addition to willingness to pay methodology can be used to measure demand. In the meantime, Larson (2004) provides helpful price tactics that should be considered by marketers that are seeking additional information.

In conclusion, recovery from mental and attentional fatigue is another benefit of purchasing real Christmas trees, and it might be especially important during the holiday. This information should be used to help with industry marketing campaigns and merchandising. For example, displaying this additional benefit of real Christmas tree shopping on a sign, website, advertisement, etc. for retail operations, informational booths, trade shows, and community events can increase customer interest (Larson, 2004). For example, "Feel the Quality" signs have increased impulse purchases (Peck & Childers, 2003). Perhaps a similar message could be created for the presence of biophilic design elements (e.g., soft fascination, coherence, and scope as well as more specific setting attributes such as tree fragrance) that afford recovery from mental and attentional fatigue. What are your ideas? Finally, this study contributes to Attention Restoration Theory and the biophilia design paradigm by examining restoration in the context of shopping for real Christmas trees.

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Appendix A: Study Instrument

Section I: Perceived Attention Restoration Scale

2. We would like you to evaluate the "restorative qualities" of Christmas tree shopping environments or settings that you perceive in a 3-minute video. Before you start the short video evaluation, take a moment to better understand what we mean by "restorative qualities" of a Christmas tree shopping environment by carefully reading the following underlined sentences: When you experience environments or settings with the highest "restorative qualities" you are more likely to:
    a. recover from mental fatigue
    b. improve your ability to concentrate
    c. restore your capacity to focus your attention.
    d. feel less irritable in these settings as you recover from mental and attentional fatigue.

    On the other hand, when you experience environments or settings with the lowest "restorative qualities" you are less likely to recover from mental and attentional fatigue.

3. You will be shown a video clip of Christmas tree shopping environments or settings. Evaluate the "restorative quality" of the shopping environments that you see throughout the video. If you feel the restorative quality has improved in the setting, move the slider to the right (100=highest quality). If you feel the restorative quality of the setting has decreased, move the slider to the left (0=lowest quality). The midpoint of the restorative quality scale is 50. Remember to rate the restorative quality (by moving the slider) of what you see WHILE you are watching the video. Your ratings will be continuously recorded during every second of your video evaluation.

    "Let's practice. Please continuously rate the 20 second video clip. If you feel the restorative quality has improved in the setting, move the slider to the RIGHT (100=highest quality). If you feel the restorative quality of the setting has decreased, move the slider to the LEFT (0=lowest quality). The midpoint of the restorative quality scale is 50."

    Again, you will be shown a video clip of Christmas tree shopping environments or settings. Evaluate the "restorative quality" of the shopping environments that you see throughout the video. If you feel the restorative quality has improved in the setting, move the slider to the RIGHT (100=highest quality). If you feel the restorative quality of the setting has decreased, move the slider to the LEFT (0=lowest quality). The midpoint of the restorative quality scale is 50. Remember to rate the restorative quality (by moving the slider) of what you see WHILE you are watching the video. Your ratings will be continuously recorded during every second of your video evaluation. When you're ready to proceed, click the "play" button to view and rate the video.

[Show 1 of 2 videos—randomly assigned].

4. We are interested in how you might experience the type of environments or settings shown in the overall video. To help us understand your overall experience, we would like you to respond to the following statements. Please read the statement carefully, then ask yourself: "how much would this statement apply to my experience in places like those that were shown in the video?" To indicate your answer, select only one number on the rating scale beside the statement from 0 (not at all) to 10 (completely), or any number in between that reflects your perception. For example, if you think that the statement does not at all apply to your experience of the environments shown in the video, then you would circle "0" (not at all). If you think it completely applies, then you would circle "10" (completely).

Places like this are fascinating

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

In places like this my attention is drawn to many interesting things

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

In places like this it is hard to be bored

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

Places like that are a refuge from nuisances

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

To get away from things that usually demand my attention I like to go to places like this

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

To stop thinking about the things that I must get done I like to go to places like this

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

There is a clear order in the physical arrangement of places like this

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

In places like this it is easy to see how things are organized

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

In places like this everything seems to have its proper place

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

Being in places like this suits my personality

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

I can do things I like in places like this

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

I have a sense that I belong in places like this

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

That place is large enough to allow exploration in many directions

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

In places like that there are few boundaries to limit my possibility for moving about

Not At All Completely

0 1 2 3 4 5 6 7 8 9 10

5. Please report your overall perception of "restorative quality" represented in the type of environments or settings shown in the video by responding to the following statement:

In places like this it is possible to recover from mental fatigue and the capacity to focus attention

Not At All

Completely

0 1 2 3 4 5 6 7 8 9 10

Section II: Past Shopping Experiences

6. Which of the following Christmas tree(e) did you have in your home in 2022? (Select only one).

   __only a real Christmas tree(s) (Go to question 6)

   __ only an artificial (fake) tree(s) (Go to question 8)

   __ both artificial (fake) and real Christmas tree(s) (Go to question 6)

   __no Christmas tree (real or artificial/fake) (Go to question 8)

7. Where was your home's real Christmas tree(s) purchased in 2022? (Select all that apply).

   ___real tree from a chain store (Walmart, Home Depot, Lowes, etc.)

   ___real tree from a choose and cut farm

   ___real tree from a retail lot

   ___real tree from a nursery

   ___real tree from a non-profit group (Boy Scouts, churches, etc.)

   ___real tree purchased online

   ___other location (please explain)_____

   ___I don't know

Section III: Customer Loyalty

7. Please respond to the following statements regarding repeat purchases of a real Christmas tree for your home and recommendations you might make to others.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I would be in favor of the purchase of a real Christmas tree for my home in the future					
I would tell other people positive things about the purchase of a real Christmas tree					
I would recommend the purchase of a real Christmas tree to family or friends					
I would recommend the purchase of a real Christmas tree to people who seek my advice					

Section IV: Conjoint analysis

8. The following are 16 combinations of Christmas tree shopping preferences. Please score each combination using a rating scale of 1 to 10, where 1 means least preferred and 10 means most preferred. Scores can be identical if you like two or more of the combinations. **Please go over them carefully before scoring.**

Combinations of Christmas tree characteristics				Score									
Price	Species	Height	Product	***Least preferred***									***Most preferred***
80-100	Fir	8-10'	Real	1	2	3	4	5	6	7	8	9	10
120-140	Fir	6-8'	Artificial	1	2	3	4	5	6	7	8	9	10
100-120	Fir	10-12'	Artificial	1	2	3	4	5	6	7	8	9	10
60-80	Pine	6-8'	Real	1	2	3	4	5	6	7	8	9	10
120-140	Spruce	8-10'	Real	1	2	3	4	5	6	7	8	9	10
80-100	Fir	6-8'	Artificial	1	2	3	4	5	6	7	8	9	10
100-120	Fir	6-8'	Real	1	2	3	4	5	6	7	8	9	10
100-120	Spruce	6-8'	Real	1	2	3	4	5	6	7	8	9	10
80-100	Pine	10-12'	Real	1	2	3	4	5	6	7	8	9	10
120-140	Fir	10-12'	Real	1	2	3	4	5	6	7	8	9	10
120-140	Pine	6-8'	Artificial	1	2	3	4	5	6	7	8	9	10
60-80	Fir	6-8'	Real	1	2	3	4	5	6	7	8	9	10
100-120	Pine	8-10'	Artificial	1	2	3	4	5	6	7	8	9	10
60-80	Fir	8-10'	Artificial	1	2	3	4	5	6	7	8	9	10
80-100	Spruce	6-8'	Artificial	1	2	3	4	5	6	7	8	9	10
60-80	Spruce	10-12'	Artificial	1	2	3	4	5	6	7	8	9	10

Section V. About You

9. Please indicate the state in which reside full-time: _____

10. Please provide your home zip code: _____

11. Do you currently describe yourself as male, female or transgender? (Select only one).

___Male

___Female

___Transgender

___None of these

12. Choose one or more races that you consider yourself to be (select all that apply):

___Black or African American

___White/Caucasian

___American Indian or Alaskan Native

___Hispanic or Latino

___Asian

___Native Hawaiian or Pacific Islander

___Other _____

13. What is your age?

___18-24

___25-34

___35-44

___45-54

___55-64

___65+

___Prefer not to say

14. Who lives in your home full-time or part-time, besides yourself? (Check all that apply).

___Opposite-sex Spouse (Husband/Wife)

___Opposite-sex Unmarried Partner

___Same-sex Spouse (Husband/Wife)

___Same-sex Unmarried Partner

___Child

___Grandchild

___Parent (Mother/Father)

___Brother/Sister

___Other relative (Aunt, Cousin, Nephew, Mother-in-law, etc.)

___Foster Child

___Housemate/Roommate

___Roomer/Boarder

___Other nonrelative

___No one (I live alone)

15. What is the highest level of education you have completed? (Select only one).

___Less than high school

___Some high school

___High school graduate or equivalent (for example GED)

___Some college, but degree not received or is in progress

___Associate's degree (for example AA, AS)

___Bachelor's degree (for example BA, BS, AB)

___Graduate degree (for example master's, professional, doctorate)

16. What was your approximate household income from all sources, before taxes, in 2022? (Select only one).

___Less than $20,000

___$20,001 to 40,000

___$40,001 to 60,000

___$60,001 to $80,000

___$80,001 to 100,000

___$100,000+

___Prefer not to say