tourism and hospitality

MDPI

Article

Influencing Hotel Patrons to Use Reef-Safe Sunscreen

Christine Bergman [1,*], Rochelle Good [2] and Andrew Moreo [3]

[1] Food & Beverage and Event Management Department, University of Nevada, Las Vegas, NV 89154, USA
[2] William F. Harrah College of Hospitality, University of Nevada, Las Vegas, NV 89154, USA; rochelle.good@unlv.edu
[3] Chaplin School of Hospitality Management, Florida International University, North Miami, FL 33199, USA; amoreo@fiu.edu
* Correspondence: christine.bergman@unlv.edu; Tel.: +1-(702)-895-5458

Abstract: The health of Hawaiian coral reefs is threatened by sunscreen ingredients (e.g., oxybenzone). This study sought to determine factors leading to the pro-environmental behavior of using reef-safe sunscreen (RSS) and identify practices hoteliers could implement to influence patrons to engage in this behavior. The study applied a framework to model pro-environmental behavior in the hospitality industry. It proposed that attitudes, personal capabilities, and habits are causal variables that influence pro-environmental intention, the predictor of pro-environmental behavior. Contextual factors were proposed as moderating variables for the relationship between pro-environmental intention and pro-environmental behavior. Past Hawaiian hotel patrons (n = 400) were the subjects for this survey. Intention to use RSS and the factors that influenced intention were investigated. Responses were analyzed using multiple linear regression and ANOVA. Results suggested that hotel patrons' intention to use RSS was primarily influenced by three determinants: attitudes, personal capabilities, and contextual factors. Targeting the development of personal capabilities and employing contextual factors that facilitate the behavior were shown as effective methods to influence RSS use. Findings supported educational campaigns and complimentary RSS programs as practices that Hawaii hotel operators could use to influence patrons' intention to use RSS.

Keywords: coral reefs; sunscreen; sustainability; pro-environmental; Hawaii; hotel

Citation: Bergman, C.; Good, R.; Moreo, A. Influencing Hotel Patrons to Use Reef-Safe Sunscreen. *Tour. Hosp.* **2022**, *3*, 536–557. https://doi.org/10.3390/tourhosp3030033

Academic Editors: Vasiliki Boukouvala and Prokopis Theodoridis

Received: 30 May 2022
Accepted: 21 June 2022
Published: 24 June 2022

1. Introduction

A significant amount of hospitality and tourism research has examined ways to improve the sustainability of companies within these industries [1]. Some of these studies focused on pro-environmental appeals and educational campaigns that were targeted at tourists. As stated by Barr et al. [2] "whilst individuals are relatively comfortable with participating in a range of environmental behaviors in and around the home, the transference of these practices to tourism contexts can be problematic." Others, since this statement was reported, concluded that pro-environmental appeals and educational campaigns are not likely to be effective methods of reducing the negative environmental impact of the hospitality and tourism industry on the environment [3]. These authors suggested that research is needed that explores theory-based interventions on pro-environmental behavior in the tourism industry using the Value–Belief–Norm theory of environmentalism. The Value–Belief–Norm theory suggests that both the consequences of peoples' behavior while on holiday, as well as letting tourists know what specific behaviors they can engage in to avoid those consequences, will support an increase in pro-environmental behavior [4].

Hawaii is an archipelago in the North Pacific that is a popular tourist destination for those seeking relaxation, warm weather, and outdoor activities. Its residents are dependent on these visitors for the state tax revenue they generate and for many of the jobs they have in the hospitality industry [5].

In order to accommodate these visitors, there are 240 hotels across the islands [6]. Hawaii's hotels offer accommodations for enjoying the Islands' natural resources, including many options for outdoor and ocean activities. To protect themselves from ultraviolet radiation while outside in Hawaii, many hotel patrons apply sunscreens; much of these products end up in the ocean [7,8].

Oxybenzone, a compound with photoprotective properties, is used as an active ingredient in many sunscreens as a method of absorbing light in order to protect users from the damaging effects of radiation [9]. Studies demonstrate that oxybenzone and several other chemical sunscreen ingredients have damaging effects on corals, including those that surround the Hawaiian Islands [8]. Patrons using sunscreens containing these chemicals contaminate coral reefs when their sunscreen washes off in the ocean or while bathing. Oxybenzone causes coral bleaching: a stress response during which corals expel the symbiotic algae living inside them that produce their energy through photosynthesis [7]. Corals cannot survive without these algae and slowly starve [10]. Thus, hotel patrons are contributing to the destruction of Hawaiian coral reefs by using sunscreens that contain oxybenzone and other harmful ingredients.

Environmental stressors, pollution, overfishing, and disease are threatening the dynamics and stability of corals worldwide [7,11,12]. Many coral reefs are in a precipitous state of decline, referred to as the "coral reef crisis" [11–13]. Approximately 19% of the original area of worldwide coral reefs has been destroyed, while an additional 20% risks being lost within 20–40 years [14].

Hawaiian hotel operators could play an instrumental role in the protection of coral reefs by influencing patrons to use reef-safe sunscreens instead of sunscreens containing ingredients that are harmful to coral reefs. Reef-safe sunscreens are effective environmentally friendly sunscreens that do not contain ingredients that are harmful to coral reefs. Considering healthy coral reefs support Hawaiian tourism, aiding in coral reef preservation could contribute to maintaining the tourism and business levels fundamental to the Hawaiian hotel industry.

The Hawaii Governor signed Act S.B. 2571 [15], which banned the sale and distribution of sunscreens containing oxybenzone or octinoxate [16]. A modification of this law also bans the sale and distribution of sunscreens containing the compounds avobenzone and octocrylene [17]. However, this law and its proposed modification do not prohibit tourists from buying sunscreen containing oxybenzone or the other potentially reef-damaging compounds before leaving on their holiday to Hawaii and using it during their outside activities.

The Hawaiian hotel industry should contribute to protecting the state's coral reefs and thus prevent a downturn in tourism and hotel patronage that could result from their destruction. Therefore, it warrants examining how Hawaii hotel operators could satisfy patrons' needs for sun protection products while observing the sunscreen laws and decreasing tourists' use of sunscreens containing reef-damaging compounds brought with them from home. This study aims to determine the dominant factors leading to the pro-environmental behavior of using reef-safe sunscreen and identify practices that Hawaii hotel operators could implement to influence patrons to engage in this behavior.

2. Literature Review

2.1. Health of Coral Reefs

Of all Hawaiian tourists, over 80% engage in ocean recreation, and 51% participate in scuba diving or snorkeling [18]. Human activity can directly affect the vitality of coral reefs, including the overfishing of coral reefs, bottom trawling, and harvesting coral for the commercial sale of jewelry and building materials [11,19–21]. Swimming, snorkeling, scuba diving, and other recreational ocean activities cause coral breakage and damage through contact [22]. Pollutants are also causes of coral degradation [13,14], including the compound oxybenzone [8].

Oxybenzone, a chemical compound with photoprotective properties, is used as an active ingredient in many sunscreens to absorb ultraviolet light to protect users from the damaging effects of radiation [9]. Exposure to oxybenzone causes large amounts of coral mucous—consisting of coral tissue and zooxanthellae—to be released from corals, resulting in coral bleaching and leading to coral mortality [7,23]. The compound has exhibited the effects of a skeletal endocrine disruptor, proving toxic to coral planulae by increasing their susceptibility to bleaching, inhibiting growth, and inducing deformation [8].

It is estimated that an average of 25% of sunscreen is released off a swimmer within 20 min of submersion. The remaining sunscreen is removed while people continue swimming and afterward while bathing [7]. Wastewater treatment plants cannot remove oxybenzone, octinoxate, avobenzone, or octocrylene during wastewater processing, and thus these compounds are released into the environment [15,23]. It is estimated that 4000 to 6000 tons of sunscreen pollute the Earth's coral reefs annually and that many of these sunscreens contain 1–10% oxybenzone. Based on these estimates, 10% of coral reefs worldwide are in danger of coral bleaching resulting from oxybenzone sunscreen contamination [7,8].

2.2. Relationship between Hawaii Hotels and Coral Reef Destruction

Globally, some hotel operators have recognized the health dangers associated with ultraviolet radiation and have taken steps to make sun protection measures more convenient for patrons. For example, the MGM Grand Las Vegas installed sunscreen mist booths that spray guests with a coating of sunscreen [24]. Numerous Hawaiian hotels sell sunscreens to their patrons and visitors, and some provide complimentary sunscreen to patrons at their pool and/or beach areas [25,26]. In fact, having sun protection products conveniently available is one of the Forbes Travel Guide's 500 standards that are evaluated during hotel reviews [27,28].

Greater concentrations of oxybenzone were detected in coral tissue during seasons with higher coastal recreation levels, demonstrating that increased coral pollution by oxybenzone could be attributed to increased sunscreen contamination from recreational users [29]. Hawaii hotel patrons are contributing to the destruction of surrounding coral reefs by using sunscreens that contain oxybenzone and other harmful chemical ingredients. There are alternative sunscreen options that do not harm coral reefs, referred to as reef-safe sunscreens.

2.3. Sunscreens

Exposure to radiation and sunburns increases the probability of developing skin cancer [30] and exposure is linked to faster photoaging [31]. Partaking in sun protection measures decreases exposure to radiation and lessens the risk of sunburn. The National Cancer Institute [30] classifies sun protection measures as three different behaviors: using a broad-spectrum sunscreen with an SPF rating of 15 or higher (SPF 15+), wearing sunglasses and sun-protective clothing, and seeking shade.

The U.S. Food and Drug Administration (FDA) has approved six of the FDA-approved active ingredients that meet the requirement to provide broad-spectrum protection: octocrylene, oxybenzone, methyl anthranilite, avobenzone, titanium dioxide (TiO2), and zinc oxide (ZnO) [23]. Of these active ingredients that meet the requirements for broad-spectrum protection, the initial four are considered organic (chemical) filters, and the other two are classified as inorganic (physical) filters. Chemical filters absorb radiation while physical filters reflect or scatter rays [31]. There are no FDA requirements pertaining to the environmental safety of sunscreen ingredients.

Physical sunscreen ingredients ZnO and TiO_2 are more effective in protecting against UVA, a particular form of UV radiation, than oxybenzone [23]. They are also more photostable, have deceased allergenic potential compared to chemical ingredients, and do not harm coral reefs (Wang et al., 2010, DiNardo and Downs [23,31]).

2.4. Pro-Environmental Hotel Programs

Hotels use significant amounts of energy, water, and nondurable products; this consumption is both environmentally and economically costly. A pro-environmental program may be implemented as a cost-reduction measure, in order to improve image, increase customer loyalty and retention, achieve a competitive advantage, decrease the property's negative effects on the environment, or for a combination of reasons [32–37].

Green management efforts in hotels were shown to result in a good reputation, improved customer retention, and improved employee loyalty [34]. A positive relationship was found between hotels with pro-environmental initiatives and customer satisfaction, and between customer satisfaction and loyalty [35]. Guests were more likely to patronize hotels with pro-environmental practices and had a willingness to pay more for these hotels [32,33]. A hotel's overall green image was found to strengthen patrons' intentions to revisit the hotel and to make positive recommendations [33].

Several hospitality and tourism venues in Hawaii have implemented product- and educational-related programs aimed at decreasing the sunscreen contamination of the Islands' coral reefs. The Honolulu-based hotel chain and management company Outrigger Hotels and Resorts initiated their "OZONE" program. The program included educational in-room videos on coral conservation, on-property lectures, the provision of free reef-safe sunscreen samples, and coral replantation efforts that patrons could partake in [38–40].

Aqua-Aston Hospitality, a hotel chain, launched the "For Our Reef" program. The program involved educational campaigns on reef conservation and the installation of reef-safe sunscreen dispensers at the company's almost 50 hotels. The program allowed patrons of the hotels to trade in their sunscreen at a check-in desk or towel stand for a free three-ounce bottle of SPF 30 reef-safe sunscreen [41,42].

2.5. Theoretical Framework

The framework for this study was adapted from Stern [4], which recognizes three categories of causal variables—attitudes (Attitudes), personal capabilities (Personal Capabilities), and habits (Habits)—that influence pro-environmental intention, which is the predictor of pro-environmental behavior. An individual's attitudes towards a behavior indicate their positive or negative perception of engaging in the behavior [43]. Attitudes include general environmental predispositions, behavior-specific personal norms, non-environmental attitudes (attitudes not related to the environment, but, for example, to the product attributes), and the perceived costs and benefits of action. Personal capabilities refer to the knowledge and skills involved in performing a particular behavior in addition to general capabilities and resources that can facilitate or impede the behavior [43]. Habits refer to ingrained behavior patterns that can interfere with or assist with the adoption of new behaviors [44].

The Attitude–Behavior–Context model posits that behavior is a function of attitudes and contextual factors and that the more inhibiting the contextual factors are on the behavior, the weaker the relationship between the attitudinal factors and the behavior. Contextual factors, also known as external conditions, refer to any external sources of support or impediment to performing the behavior, including physical, financial, legal, and social conditions [45]. Contextual factors may include material costs and rewards, social norms, advertising, and any policy or practice that facilitates or impedes engaging in the behavior [4]. Attitudes and contextual factors were shown to be significant predictors of pro-environmental behavior in experiments involving roadside recycling [45].

Contextual factors, in addition to intra-personal factors, should be considered in assessing pro-environmental behavior [46,47]. Thus, the framework used for this study included intra-personal factors [4] and contextual factors (Contextual Factors) used as a moderating variable. This framework expands upon previous models in recognizing that intra-personal factors do not always lead to pro-environmental behavior.

3. Methodology

3.1. Introduction

This research used a survey to examine the pro-environmental behaviors and sunscreen behaviors of Hawaii hotel patrons and the variables that may influence these patrons to use reef-safe sunscreens. The following section describes the conceptual framework used, the survey design and subjects, the survey pre-test, and the data collection and analysis methods.

To apply the proposed framework in the context of this research, the components of the model were divided into two subsets for analysis. The relationship between the causal variables—Attitudes, Personal Capabilities, Habits—and Intention was tested to assess for significance in predicting Hawaii hotel patrons' intention to use reef-safe sunscreen while in Hawaii, as depicted in Figure 1.

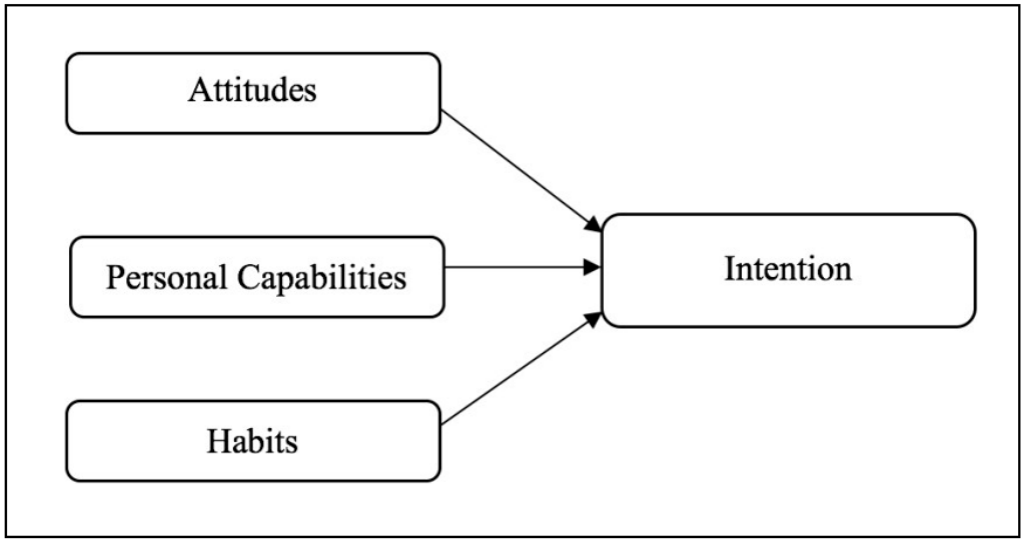

Figure 1. Proposed conceptual framework of pro-environmental behavior: Subset I. Model testing the relationship between Pro-Environmental Attitudes (Attitudes), Personal Capabilities, Habits, and Pro-Environmental Intention (Intention).

The second subset of the model proposed that Contextual Factors can act as a moderating variable for the relationship between Intention and Behavior. Behavior could not be reliably measured in the context of this research; therefore, the moderating effects of Contextual Factors on Behavior could not be assessed. As a proxy, the influence of Contextual Factors on Intention was tested. A series of hotel practices were proposed as Contextual Factors and were tested as within-subjects experimental conditions (Figure 2). Intention was measured under each condition in order to compare the influence that the hotel practices could have on Hawaii hotel patrons' intention to use reef-safe sunscreen.

3.2. Survey

The information learned from the literature review was used to design a survey to yield further insights into the subject by collecting data from a sample of the population of Hawaii hotel patrons. The survey was distributed to respondents through email and performed online. The parameters of interest included Attitudes, Personal Capabilities, Habits, Contextual Factors, Intention, and participant demographics' Intention to use reef-safe sunscreen while in Hawaii was measured as the dependent variable.

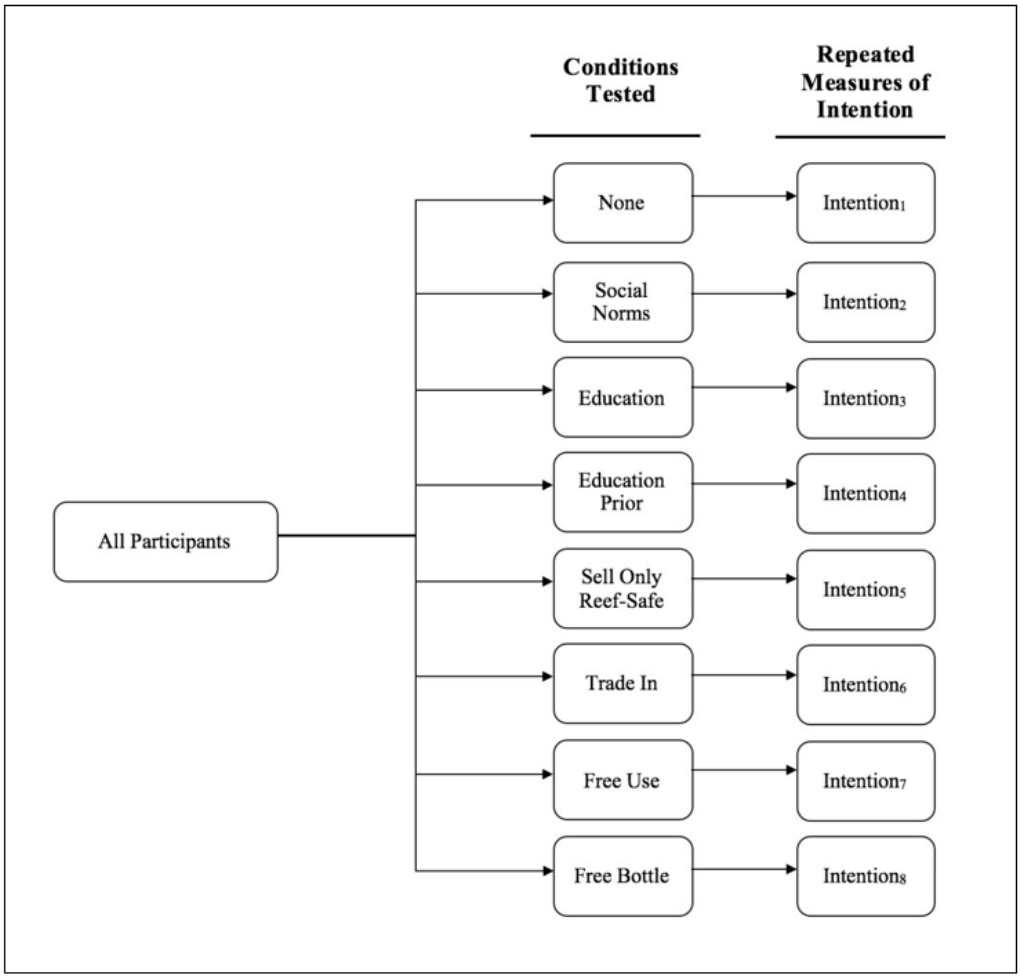

Figure 2. Proposed conceptual framework of pro-environmental behavior: Subset II. Experimental design testing influence of Contextual Factors on Intention.

Four scales were used during the survey. Attitudes about twelve sunscreen attributes were measured using a 5-point scale of importance (1 = not at all important and 5 = extremely important). The New Ecological Paradigm (NEP) scale, a measure of environmental worldview, was used to measure the attitude of general environmentalist predisposition [48]. The NEP scale measured respondents' level of agreement regarding 15 statements about the relationship between humans and the environment using a 5-point scale (1 = strongly disagree and 5 = strongly agree).

A 7-point Likert scale of agreement (1 = strongly disagree and 7 = strongly agree) was used to evaluate all of the items discussed in the following paragraph. Behavior-specific norms were based on whether respondents "feel a moral obligation" to engage in three pro-environmental behaviors related to environmentally friendly products. The scale of agreement was used to measure behavior-specific knowledge about the importance of coral reefs, whether zinc oxide can harm coral reefs, whether oxybenzone can harm coral reefs, and whether oxybenzone can pollute coral reefs even when it is not worn in the ocean. Behavior-specific skills examined participants' ability to choose a sunscreen that does not harm coral reefs. The scale of agreement was also used to measure Habits; specifically, the habitual use of the same sunscreen product.

After examining the components of the three proposed causal variables, Intention was assessed by asking: "If you were staying at a hotel in Hawaii, how likely is it that you would use a reef-safe sunscreen?" The item was measured using a 7-point scale of likelihood (1 = extremely unlikely and 7 = extremely likely).

Hotel practices were introduced as categories of Contextual Factors and were tested as within-subjects conditions (Table 1). Seven hotel practices were proposed to each

respondent, and Intention was measured using scale four for each condition. Each measure of Intention repeated the same question plus the addition of one condition as per the following format: "If you were staying at a hotel in Hawaii, how likely is it that you would use a reef-safe sunscreen if your hotel [insert proposed hotel practice]?" This design was implemented to allow for the comparison of Intention between different categories of Contextual Factors, including the initial condition that measured Intention without the application of Contextual Factors.

Table 1. Description of Hotel Practices.

Label	Hotel Practice
None	Hotel took no action.
Social Norms	Hotel made guests aware that most guests at the hotel used reef-safe sunscreen.
Education	Hotel made guests aware of the detrimental effects that certain sunscreen ingredients can have on coral reefs.
Education Prior	Hotel made guests aware of the detrimental effects that certain sunscreen ingredients can have on coral reefs prior to their trip and provided information on how to find and choose a reef-safe sunscreen.
Sell Only Reef-Safe	Hotel offered a selection of reef-safe sunscreens for sale and did not sell any sunscreens that were not reef-safe.
Trade-In	Hotel allowed guests to trade in their current sunscreen for a reef-safe sunscreen.
Free Use	Hotel provided complimentary reef-safe sunscreen for use at its pool and/or beach areas.
Free Bottle	Hotel provided guests with a complimentary bottle of reef-safe sunscreen.

To identify items that could mitigate the influence of certain proposed hotel practices, respondents were asked to select any applicable items (as well as provide additional items if necessary) that would keep them from using reef-safe sunscreen while in Hawaii if it were provided to them free of charge.

Participant information specific to the research was collected as part of the survey: how many times the respondent had stayed at a hotel in Hawaii within the past 5 years, where the respondent obtained the sunscreen that they used while in Hawaii, and who the respondent typically traveled to Hawaii with. The demographics of age, gender, household income, level of education, and number of children under the age of 18 were also recorded.

3.3. Subjects

This study examined the population of individuals that patronize Hawaii hotels. Purposive non-probability sampling was employed; the participants were selected to conform to certain criteria including being at least 18 years of age, having stayed at a hotel in Hawaii within the past 5 years, and having used over-the-counter sunscreen while in Hawaii. The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Nevada, Las Vegas (protocol code 132300-9 and 10 April 2018).

The survey research platform Qualtrics Version 18 (Qualtrics, Provo, UT, USA) was used to identify and enlist participants that fit the survey eligibility criteria [49]. The sample frame consisted of the individuals that were a part of the Qualtrics panel, that received the email invite to participate, and that passed the survey screener questions. Random probability sampling was conducted within the sample frame in order to eliminate systematic error and increase data accuracy.

In 2017, Hawaii hosted close to 9.4 million visitors, therefore, a potential target population of 9.4 million was assumed [5]. To ensure results reflected this target population at a 95% confidence level with a 5% margin of error, surveys were distributed until 400 reliable responses were obtained.

The survey was administered over a two-week period. Randomly selected individuals from the Qualtrics panel were sent an email inviting them to participate in the study. The survey began with three screening questions to ensure that respondents met the eligibility criteria.

3.4. Data Analysis

The survey data was processed and analyzed using SPSS Statistics [50]. The frequency and percentage of each demographic subgroup were calculated to establish a demographic profile of the survey sample. Descriptive statistics of frequency, mean, and standard deviation were generated to create an overview of participant information specific to the research, including the importance of different sunscreen attributes and where Hawaii hotel patrons obtain the sunscreen they use while in Hawaii.

Means and standard deviations were calculated and reviewed for all items to provide an initial overview of the construct components. The reliability of the proposed construct was tested using Cronbach's Alpha to examine the internal consistency of the items that composed each variable. Items that reliably tested the same variable were combined to create a parcel indicator for their respective variable.

Multiple linear regression analysis was conducted to examine whether the Subset I of the proposed model explained a significant amount of the variance in respondents' intention to use reef-safe sunscreen while Attitudes, Personal Capabilities, and Habits were assessed for individual significance in predicting respondents' Intention [51]. Results throughout all analyses were defined as statistically significant when $p < 0.05$. The model was tested to ensure that it met the assumptions of multiple linear regression. This included ensuring sufficient sample size, linearity, no multicollinearity, the absence of outliers, multivariate normality, and homoscedasticity.

Subset II of the model was examined using a one-way repeated measures analysis of variance (r-ANOVA) to determine if hotel practices, treated as Contextual Factors, had a significant effect on respondents' mean intention to use reef-safe sunscreen while in Hawaii [52]. The analysis of variance was tested and appropriate corrections were applied to ensure that the assumption of sphericity was met.

Bonferroni post hoc tests were used to identify any significant differences in Intention between the proposed hotel practices and compared to the condition in which no hotel practice was applied. Descriptive statistics were used to summarize the concluding survey items designed to collect supplementary data on inhibiting items related to the proposed hotel practices.

4. Results

4.1. Data Processing

During data collection, 4762 individuals electronically consented to participate in the study and began the survey. Of these respondents, 2198 (46.2%) failed to pass all of the screening questions and were not allowed to participate in the study as they did not meet the eligibility criteria. Multiple attention checks were embedded in the survey to ensure that only reliable data was collected. These checks resulted in the elimination of 2121 (82.7%) of the eligible 2564 respondents. An additional 43 (1.7%) of the 2564 eligible respondents did not complete the survey and were therefore not included in the data set. A total of 400 responses were retained as reliable data to be used in the study.

4.2. Description of the Sample

The survey responses were processed to generate a profile of the respondents based on the demographic data, as depicted in Table 2. Females (52.3%) composed a slightly higher proportion of the sample than males (47.8%). The sample consisted of similar distributions of respondents between the four age categories; 31–40 years old were the most represented (27.5%) and 41–50 years were the least represented (22.5%).

Table 2. Demographic profile of respondents.

Demographic Variable	*n*	%
Gender		
Female	209	52.3
Male	191	47.8
Age		
18–30	95	23.8
31–40	110	27.5
41–50	90	22.5
Over 50	105	26.3
Household Income (USD)		
Under $25,000	13	3.3
$25,000 to $49,999	80	20.0
$50,000 to $74,999	97	24.3
$75,000 to $99,999	75	18.8
$100,000 to $124,999	67	16.8
$125,000 to $150,000	29	7.3
Over $150,000	39	9.8
Education		
Less than high school	3	0.8
High school graduate or equivalent	40	10.0
Some college	78	19.5
Associate's degree	54	13.5
Bachelor's degree	149	37.3
Master's degree or above	76	19.0
Children Under 18		
None	216	54.0
1	86	21.5
2	73	18.3
3	15	3.8
4 or more	10	2.5
Number of Stays at a Hotel in Hawaii (Past 5 Years)		
1–2 times	318	79.5
3–5 times	58	14.5
6–10 times	15	3.8
Over 10 times	9	2.3

Note: N = 400.

More than half of the respondents (56.3%) had a bachelor's degree or higher. An additional 33% of the sample had either an associate's degree or some college education. Most respondents (77.0%) reported an annual household income of at least $50,000 USD, more than half (52.7%) had incomes of at least $75,000 USD, and 33.9% of respondents had incomes of $100,000 USD and above. Approximately half of the respondents (54.0%) did not have children under the age of 18; similar proportions of respondents had either one child (21.5%) or two children (18.3%).

The majority of the sample (79.5%) had stayed at a hotel in Hawaii either one or two times within the past five years and 14.5% of respondents reported three to five stays over the past five years. Only 6.1% had stayed at Hawaii hotels six or more times in the past five years.

4.3. Importance of Sunscreen Attributes

A one-way repeated-measures analysis of variance (r-ANOVA) was run to identify whether there were any significant differences in ratings between the different sunscreen attributes (Table 3). The sunscreen characteristics that were deemed most important by the subjects were: SPF level (M = 4.29), water-resistant (M = 4.14), and broad-spectrum (M = 4.01). The mean differences between ratings for these top three attributes were not significant; however, the mean rating for each of these attributes was significantly higher

than the mean of each of the other nine attributes. The environmentally friendly Attribute was in the group found to be of least importance to the subjects.

Table 3. Importance of sunscreen attributes.

Attribute	*M*	*SD*
SPF level	4.29 [a]	0.84
Water-resistant	4.14 [a]	0.83
Broad-spectrum	4.01 [a]	0.87
Transparent once applied	3.68 [b]	1.08
Not greasy/oily	3.67 [b]	1.02
Price	3.57 [b]	0.98
Smooth texture	3.47 [b]	1.00
Non-allergenic	3.17 [c]	1.23
Environmentally friendly	3.03 [c]	1.13
Kid-friendly	3.01 [c]	1.45
Nice fragrance	2.97 [c]	1.14
All-natural	2.87 [c]	1.25

Note: N = 400. Statements were rated on a 5-point scale (1 = not at all important and 5 = extremely important). The Bonferroni adjustment method was used to perform pairwise comparisons ([a,b,c] Similar letter indicates the means are not significantly different) between Attribute means after running a one-way repeated-measures ANOVA ($p < 0.05$).

4.4. Sources of Sunscreen

Respondents were asked to indicate each sunscreen source option as either the only source of sunscreen or if it was one of the multiple sources of sunscreen used while in Hawaii. Notably, 65.3% of respondents indicated that they only used sunscreen from home while in Hawaii and an additional 22.5% of respondents reported bringing sunscreen from home as one of the multiple ways they obtain their sunscreen for use in Hawaii.

The second most common source was to use sunscreen purchased from a location other than the hotel while in Hawaii; 16.0% of respondents cited this as their only source of sunscreen and an additional 20.0% reported this mode as one of multiple sources.

Twenty-four percent of respondents cited using sunscreen purchased from their hotel as either their sole source of sunscreen or one of multiple sources. Two other sources of sunscreen were reported, albeit infrequently, by respondents. Using complimentary sunscreen provided at a hotel's pool or beach areas was noted by 10.3% of the sample, and using complimentary bottled sunscreen from a hotel was reported by 5.1% of the sample.

4.5. Subset I Analysis: Attitudes, Personal Capabilities, Habits, and Intention

The first subset of the conceptual framework proposed three categories of causal variables—Attitudes, Personal Capabilities, and Habits—that influence Intention. The mean NEP score of 3.36 indicated that the sample had general environmentalist predispositions that were relatively neutral, tending slightly towards a slight pro-ecological worldview (Table 4). The three items measuring behavior-specific personal norms showed that the sample means ranged from a fairly neutral stance to slight agreement with feeling a moral obligation towards the three general pro-environmental behaviors tested. Means for the three items ranged from 4.09 to 4.63.

Personal capabilities consisted of behavior-specific knowledge and behavior-specific skills. Four items were used to assess respondents' knowledge related to the pro-environmental behavior of using reef-safe sunscreen; higher scores were indicative of greater knowledge. Mean knowledge for the four items ranged from 3.51 (knowledge that zinc oxide can harm coral reefs) to 5.57 (knowledge that coral reefs provide important benefits). The measure of behavior-specific skills, a self-report of respondents' ability to choose a reef-safe sunscreen, resulted in a mean of 4.81. Habits were measured by the habitual use of the same sunscreen (M = 4.83).

Table 4. Description of Attitudes, Personal Capabilities, Habits, and Intention.

Component	Item	*M*	*SD*
Attitudes			
General environmentalist predisposition	New Ecological Paradigm scale: Mean Score [a]	3.36	0.61
Behavior-specific norms	I feel a moral obligation to make an effort to use environmentally friendly products. [b]	4.63	1.40
	I feel a moral obligation pay more for a product if it is better for the environment. [b]	4.09	1.57
	I feel a moral obligation to take the time to determine if a product is environmentally friendly before purchasing/using it. [b]	4.27	1.54
Personal Capabilities			
Behavior-specific knowledge	Coral reefs contribute important benefits. [b]	5.57	1.18
	The sunscreen ingredient zinc oxide can harm coral reefs. [b,c]	3.51	1.12
	The sunscreen ingredient oxybenzone can harm coral reefs. [b]	4.51	1.10
	Oxybenzone sunscreen can pollute coral reefs even when it is not worn in the ocean. [b]	4.22	1.21
Behavior-specific skills	I know how to choose a sunscreen that does not harm coral reefs. [b]	4.81	1.60
Habits	I habitually use the same sunscreen. [b]	4.83	1.60
Intention	If you were staying at a hotel in Hawaii, how likely is it that you would use a reef-safe sunscreen? [d]	4.37	1.39

Note: N = 400. [a] Rated on a 5-point scale (1 = strongly disagree and 5 = strongly agree). [b] Rated on a 7-point scale (1 = strongly disagree and 7 = strongly agree). [c] Reverse-coded since higher values are indicative of lower behavior-specific knowledge. [d] Rated on a 7-point scale (1 = extremely unlikely and 7 = extremely likely).

A one-way repeated-measures analysis of variance (r-ANOVA) was run to identify whether there were any significant differences in scores between the different items of Personal Capabilities. The mean differences in all pairwise comparisons were significant at $p < 0.05$, except "The sunscreen ingredient oxybenzone can harm coral reefs" and "I know how to choose a sunscreen that does not harm coral reefs", which were not significantly different.

The explanatory variable, Intention, was measured as respondents' intention to use reef-safe sunscreen while in Hawaii. The mean Intention score of the sample (M = 4.37) revealed that, in general, respondents' intention to use reef-safe sunscreen while in Hawaii was only slightly higher than neutral (4 = neither likely nor unlikely).

The reliability of the proposed construct was examined by testing the internal consistency of the items that composed each variable using Cronbach's Alpha. General environmentalist predisposition was measured using the NEP scale (15 items; $\alpha = 0.83$) and behavior-specific personal norms were measured with three related items ($\alpha = 0.91$); both were found to be reliable using Cronbach's Alpha.

Personal Capabilities consisted of behavior-specific knowledge and behavior-specific skill. The results of examining the four items measuring behavior-specific knowledge showed poor reliability ($\alpha = 0.20$). Removing the second item of the scale (knowledge of whether the sunscreen ingredient zinc oxide can harm coral reefs) produced acceptable reliability (three items; $\alpha = 0.70$). Testing the three reliable items of behavior-specific knowledge with the item of behavior-specific skill showed poor reliability (four items; $\alpha = 0.59$), resulting in the removal of behavior-specific skill from the proposed construct.

The revised construct included Attitudes (18 items), Personal Capabilities (three items), and Habits as predictors of Intention. NEP scores were transformed from a five-point scale to a seven-point scale and responses were averaged with the mean of the three behavior-specific personal norm items to create a parcel variable to represent Attitudes. The mean of the three reliable behavior-specific knowledge items was taken to generate a parcel variable representing Personal Capabilities.

Multiple linear regression analysis ($p < 0.05$) was run to examine whether Attitudes, Personal Capabilities, and Habits significantly predicated respondents' intention to use reef-safe sunscreen while in Hawaii (Table 5). The results of the regression indicated that the model was significant, and explained 44.5% of the variance in respondents' intention to use reef-safe sunscreen while in Hawaii ($R^2 = 0.445$, F (3,396) = 105.99, $p = < 0.001$). Table 6 summarizes the coefficients and collinearity statistics of the regression.

Table 5. Effects of Attitudes, Personal Capabilities, and Habits on Intention.

Unstandardized Coefficients			Standardized Coefficients			Collinearity Statistics	
Model	*B*	*SE*	β	t	Sig.	Tolerance	VIF
(Constant)	−1.18	0.39		−3.07	0.002		
Attitudes	0.24	0.07	0.14 **	3.49	0.001	0.90	1.11
Personal Capabilities	0.92	0.06	0.61 ***	15.36	<0.001	0.89	1.12
Habits	0.01	0.03	0.02	0.39	0.700	0.99	1.01

Note: N = 400. ** $p < 0.01$. *** $p < 0.001$.

Table 6. Description of Contextual Factors and Intention.

Intention to Use Reef-Safe Sunscreen while in Hawaii			
Contextual Factors	**Label**	***M***	***SD***
Hotel took no action.	None	4.37	1.39
Hotel made guests aware that most guests at the hotel used reef-safe sunscreen.	Social Norms	5.49	1.30
Hotel made guests aware of the detrimental effects that certain sunscreen ingredients can have on coral reefs.	Education	5.38	1.30
Hotel made guests aware of the detrimental effects that certain sunscreen ingredients can have on coral reefs prior to their trip and provided information on how to find and choose a reef-safe sunscreen.	Education Prior	5.64	1.20
Hotel offered a selection of reef-safe sunscreens for sale and did not sell any sunscreens that were not reef-safe.	Sell Only Reef-Safe	5.17	1.35
Hotel allowed guests to trade in their current sunscreen for a reef-safe sunscreen.	Trade-In	5.82	1.38
Hotel provided complimentary reef-safe sunscreen for use at its pool and/or beach areas.	Free Use	6.05	1.28
Hotel provided guests with a complimentary bottle of reef-safe sunscreen.	Free Bottle	6.32	1.11

Note: N = 400. Intention measured on a 7-point scale (1 = extremely unlikely and 7 = extremely likely).

It was found that Attitudes (β = 0.14, $p = 0.001$) and Personal Capabilities (β = 0.61, $p < 0.001$) both significantly predicted Intention; Personal Capabilities was found to have a greater effect on Intention than Attitudes. The results indicated that Habits did not significantly predict intention (β = 0.02, $p = 0.700$).

The model was tested to ensure that it met the assumptions of multiple linear regression. A sample size of 400 was acceptable to meet the sample size requirements of a model with three independent variables. Scatterplots were created and analyzed to ensure that the linearity assumption was met for all independent variables. The two significant predictors of Intention met the linearity assumption; however, the relationship between Habits and Intention did not meet this assumption. The scatter plot between Habits and Intention also did not show any other recognizable mathematical function.

Tests for multicollinearity indicated the presence of a very low level of multicollinearity (VIF = 1.11 for Attitudes, VIF = 1.12 for Personal Capabilities, VIF = 1.01 for Habits). The

correlations between Attitudes and Personal Capabilities (r = 0.32, n = 400, $p < 0.001$), Attitudes and Habits (r = −0.01, n = 400, p = 0.475), and Personal Capabilities and Habits (r = 0.09, n = 400, p = 0.030) were all well below the threshold indicative of multicollinearity (r ≥ 0.70), demonstrating that the model met the assumption of no multicollinearity. The relationships between the independent variables and Intention were assessed for sufficient correlation. Attitudes and Personal Capabilities each showed a significant correlation with Intention that was greater than r = 0.3. The correlation between Habits and Intention was negligible and non-significant (r = 0.071, p = 0.077).

The residual statistics of the regression model were examined to establish if there were any outliers in the data that could affect the accuracy of the results. The standardized residuals did not exceed the range of −3.00 to 3.00, and the maximum Cook's Distance (CDMax = 0.04) was less than 1.00, indicating that the assumption of the absence of outliers was met. A Kolmogorov–Smirnov test was performed and indicated that the residuals were normally distributed (D (400) = 0.039, p = 0.146). The model, therefore, satisfied the assumption of multivariate normality.

Visual inspection of a scatterplot of the residuals versus the predicted values indicated that homoscedasticity was probable. The White test was used to confirm that the assumption of homoscedasticity was met. An auxiliary regression analysis was performed, regressing the squared residuals of the model onto a set of independent variables comprised of the original regressors, their squares, and their cross-products. The Lagrange Multiplier (LM) test statistic was computed from the results of the auxiliary regression (LM = 12.85) and was found to be non-significant under chi-squared distribution (χ^2 (9) = 16.92, p = 0.170), indicating that the null hypothesis of homoscedasticity could be accepted.

4.6. Subset II Analysis: Contextual Factors and Intention

The second subset of the conceptual framework proposed that Contextual Factors act as a moderating variable, moderating the relationship between Intention and Behavior. Since Behavior could not be reliably measured in the context of this research, the influence of Contextual Factors (proposed hotel practices) was tested via their effect on Intention. The potential hotel practices were treated as within-subjects experimental conditions and respondents' intention to use reef-safe sunscreen was measured as the dependent variable under each condition.

Table 6 describes the hotel practices (Contextual Factors) that were applied as within-subjects conditions and reports the means and standard deviations of respondents' intention to use reef-safe sunscreen under each condition. A one-way repeated-measures analysis of variance (r-ANOVA) was used to determine if Hawaii hotel patrons' intentions to use reef-safe sunscreen were significantly different between the different contextual conditions. Mauchly's Test of Sphericity was performed to test the assumption that the variances of the differences between all groups were equal. Mauchly's test indicated that the assumption of sphericity had been violated ((χ2 (27) = 636.97, p = < 0.001), therefore, degrees of freedom were corrected using Greenhouse–Geisser estimates of sphericity (ε = 0.696). With Greenhouse–Geisser corrections, results of the r-ANOVA indicated that Contextual Factors had a significant effect on respondents' mean intention to use reef-safe sunscreen while in Hawaii, F (4.87,1942.93) = 197.18, $p < 0.001$, η_p^2 = 0.33 (Table 7).

Table 7. Within-subjects effects of Contextual Factors on Intention.

Source	*df*	Type III *SS*	*MS*	*F*	Sig.	η_p^2	Observed Power
Contextual Factors	4.87	992.10	203.74	197.18 ***	<0.001	0.33	1.00
Error	1942.93	2007.53	1.03				

Note: N = 400. Results with Greenhouse–Geisser corrections for sphericity applied. *** $p < 0.001$.

Bonferroni post hoc tests showed that participants' intention to use reef-safe sunscreen while in Hawaii was significantly higher in each of the seven conditions in which a con-

textual factor was applied, compared to the condition in which no contextual factor was applied (Table 8).

Table 8. Proposed hotel practices: pairwise comparisons of mean differences in Intention.

				95% CI for Difference [a]		
(I) Contextual Factors	**(II) Contextual Factors**	**(II-I) Mean Difference**	***SE***	**Sig. [a]**	***LL***	***UL***
None	Social Norms	1.12 ***	0.06	<0.001	0.95	1.30
	Education	1.01 ***	0.06	<0.001	0.82	1.19
	Education Prior	1.27 ***	0.06	<0.001	1.09	1.45
	Sell Only Reef-Safe	0.81 ***	0.05	<0.001	0.63	0.97
	Trade-In	1.45 ***	0.07	<0.001	1.24	1.65
	Free-Use	1.69 ***	0.07	<0.001	1.47	1.88
	Free Bottle	1.95 ***	0.07	<0.001	1.74	2.16
Social Norms	Education	−0.12	0.06	1.000	−0.31	0.08
	Education Prior	0.15	0.06	0.428	−0.04	0.33
	Sell Only Reef-Safe	−0.32 ***	0.06	<0.001	−0.52	−0.12
	Trade-In	0.33 ***	0.07	<0.001	0.10	0.55
	Free-Use	0.56 ***	0.07	<0.001	0.33	0.78
	Free Bottle	0.83***	0.07	<0.001	0.60	1.05
Education	Education Prior	0.26 ***	0.03	<0.001	0.16	0.36
	Sell Only Reef-Safe	−0.21 **	0.05	0.001	−0.36	−0.05
	Trade-In	0.44 ***	0.07	<0.001	0.23	0.66
	Free-Use	0.67 ***	0.07	<0.001	0.47	0.88
	Free Bottle	0.94 ***	0.06	<0.001	0.75	1.13
Education Prior	Sell Only Reef-Safe	−0.47 ***	0.05	<0.001	−0.61	−0.32
	Trade-In	0.18	0.07	0.159	−0.02	0.38
	Free-Use	0.41 ***	0.06	<0.001	0.22	0.60
	Free Bottle	0.68 ***	0.06	<0.001	0.50	0.86
Sell Only Reef-Safe	Trade-In	0.65 ***	0.06	<0.001	0.45	0.84
	Free-Use	0.88 ***	0.06	<0.001	0.70	1.05
	Free Bottle	1.15 ***	0.06	<0.001	0.96	1.33
Trade-In	Free-Use	0.23 **	0.06	0.001	0.05	0.41
	Free Bottle	0.50 ***	0.06	<0.001	0.32	0.68
Free-Use	Free Bottle	0.27 ***	0.04	<0.001	0.15	0.39

Note. N = 400. Intention measured on a 7-point scale (1 = extremely unlikely and 7 = extremely likely). CI = confidence interval; LL = lower limit; UL = upper limit. [a] Adjustment for multiple comparisons: Bonferroni. ** $p < 0.01$. *** $p < 0.001$.

Respondents' mean intention to use reef-safe sunscreen while in Hawaii was found to be 4.37 when there were no conditions in place (Figure 3). Implementing different hotel practices as experimental conditions resulted in mean Intention increasing from 0.80 to 1.95. Notably, Sell Only Reef-Safe was the least influential hotel practice (M = 5.17); Intention under this condition was significantly lower compared to the application of any of the six other hotel practices. Education resulted in mean Intention increasing to 5.38; however, Education Prior resulted in a significantly higher mean Intention of 5.64.

The most effective hotel practice for influencing patrons to use reef-safe sunscreen was Free Bottle; the mean Intention under this condition was 6.32. Free-Use and Trade-In were the next most effective practices, resulting in a mean Intention of 6.05 and 5.82, respectively. The mean differences between each pair of these three practices were significant.

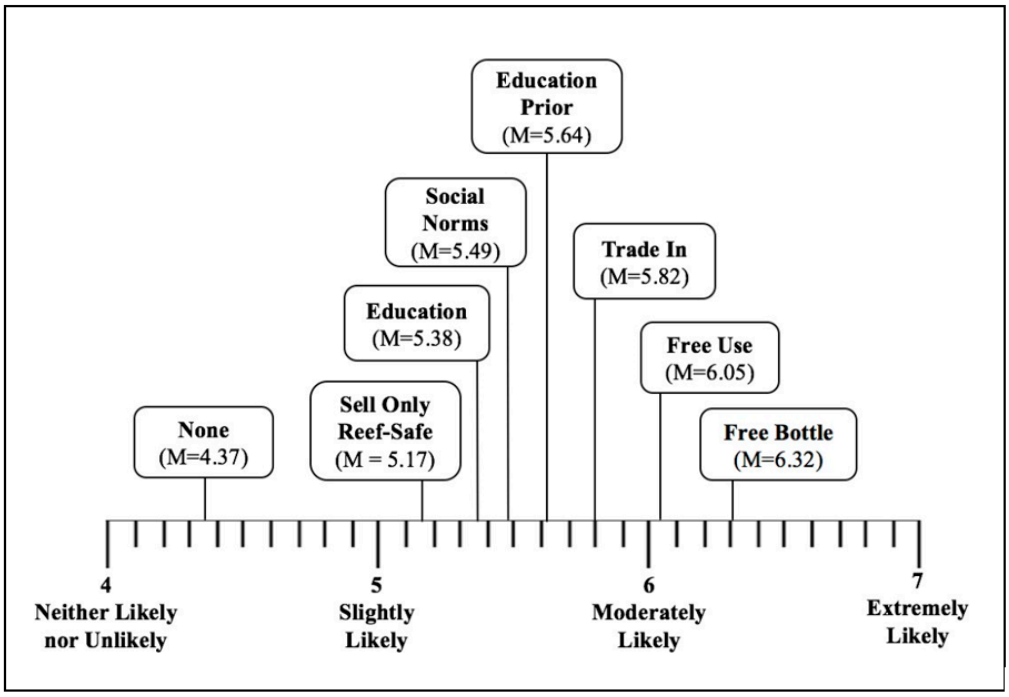

Figure 3. Level of Intention under proposed hotel practices. N = 400. Intention measured on a 7-point scale (1 = extremely unlikely and 7 = extremely likely).

4.7. Inhibiting Items

Respondents were asked to select from a list any items that would keep them from using reef-safe sunscreen while in Hawaii if it were provided free of charge; respondents were also presented the option of entering a text answer to indicate any applicable items that were not included in the list. A considerable portion (40.8%) of respondents indicated that there were not any items that would keep them from using complimentary reef-safe sunscreen while in Hawaii. The remaining 59.2% of respondents reported a mean of 1.54 inhibiting items. The most common inhibiting item, selected by 27.0% of respondents, was if the sunscreen was not water-resistant. Sixteen percent of the sample indicated that having already purchased or brought their own sunscreen would keep them from using reef-safe sunscreen if it were provided to them and 11.0% reported that they would not use complimentary reef-safe sunscreen if it was not all-natural.

One-fifth (20.3%) of respondents indicated one or multiple inhibiting items related to using reef-safe sunscreen on their child or children: 11.3% of respondents would require reef-safe sunscreen to specify that it was kid-friendly, 10.3% would need to try it themselves first and approve, and 1.5% would not use a new sunscreen on their children at all.

Eleven (2.8%) respondents added a text entry to list one or more items that were not included in the original list of items. Grouped by common theme these responses were: not hypo-allergenic/allergies/irritated skin (n = 8), strong fragrance/bad smell (n = 4), does not work (n = 2), and has an SPF below 50 (n = 1).

5. Discussion

The proposed conceptual framework in the present study tested the relationship between Attitudes, Personal Capabilities, and Habits and the Intention to use reef-safe sunscreen while vacationing in Hawaii. Attitudes and Personal Capabilities were significant in the model, while Habits were not.

Attitudes, consisting of general environmental predisposition and behavior-specific personal norms, demonstrated a significant relationship with Intention. Greater predisposition towards a pro-ecological worldview and increased feelings of moral obligation to engage in pro-environmental behavior were shown to increase Hawaii hotel patrons'

intention to use reef-safe sunscreen. The association between pro-environmental attitudes and environmental behavior is consistent with the work of others. A meta-analysis of the psycho-social determinants of pro-environmental behavior found that attitudes are generally a strong predictor of pro-environmental behavior [53]. However, this relationship was not particularly strong in the present study.

Stern [4] suggested that personal capabilities can account for more of the variance of pro-environmental behavior if the behavior is difficult or requires a specific understanding related to the behavior. Personal Capabilities in the present study showed a significant relationship with Pro-Environmental Behavior that was stronger than the relationship between Attitudes and Intention. Our results suggested that the pro-environmental behavior intention, using reef-safe sunscreen, may be constrained by Personal Capabilities. The strength of this relationship suggested that ensuring patrons are properly educated about the issue and related details could be paramount in influencing their behavior.

A person's affect on a particular day in the workplace also reportedly influences their pro-environmental behavior. Bissing-Olson et al. [54] reported that on days that employees are more calm, relaxed, and content, they are more likely to perform their work tasks in a pro-environmental manner. In the present study, subjects' affect was not examined. It is possible that, on average, the subjects' affect during data collection was to some degree negative and this decreased their attitude toward performing the pro-environmental behavior of using reef-safe sunscreen.

As noted above, Personal Capabilities in this research study explained a significant portion of the variance in Intention. Personal Capabilities was reflective of respondents' knowledge regarding the value of coral reefs, that coral reefs are at risk, and the actions that contribute to coral reef destruction. These results were not surprising, as numerous studies, such as the reviews by Hines et al. [55] and Han [56], have reported that environmental knowledge is a prerequisite for pro-environmental intention/behavior, specifically related to hospitality/tourist customers in the latter case. Thus, it appears that lacking knowledge about the effects of the use of reef-safe sunscreens may inhibit a hotel patron's Intention to use them.

Habits were proposed as a predictor of pro-environmental behavior in the present study because they are ingrained behavior patterns that can interfere with the adoption of new behaviors. In the context of this research, the habitual use of the same sunscreen was posited to inhibit Hawaii hotel patrons from using reef-safe sunscreen since this would involve changing an ingrained behavior [46]. Many of the prominent theoretical frameworks used to study pro-environmental behavior, as discussed in this research, do not include Habits as a predictor. Linder et al. [57] have proposed that this is a major shortcoming in the design of studies seeking to understand pro-environmental behavior. This was not a shortcoming of the present study, yet the variance in Intention was not explained by Habits.

The habit discontinuity hypothesis suggests that context change can make it easier to change habits into new ones because environmental cues have been changed [58,59]. The context in the case of this study was geographical location. Approximately ¾ of the subjects used sunscreen that was purchased at home while vacationing. Thus, the habit of buying particular sunscreens took place in their familiar surroundings, while they were asked about their intention to use reef-safe sunscreen in an unfamiliar place. It is possible that Habit was not associated with Intention because the subjects were in a different location without the cues that normally trigger them to buy and use their routine sunscreen.

They rated the top three most important sunscreen attributes as SPF, water-resistant, and broad-spectrum. This was not surprising, as they are all attributes that are associated with the ability of a sunscreen to protect people against over-exposure to rays from the sun. This exposure can damage skin cells, thus increasing the risk of cutaneous diseases, such as sunburn, photo-aging, and skin cancer, one of the most common cancers in the world [60]. The role sunscreen can play in reducing the risk of developing skin cancer is understood by many adults in the developed world due to various related public health campaigns [61].

Sunscreen price was not a top factor desired by subjects. This may be particularly characteristic of hotel patrons in Hawaii since the sample had an annual household income distribution that was positively skewed compared to the higher end of that of the United States population. More than three-quarters of the sample reported an annual household income of at least $50,000 USD, compared to 58% of the US population with an annual household income of at least $50,000 USD [62].

Hotel operators in Hawaii are no longer allowed to sell or provide sunscreens containing oxybenzone or octinoxate to their patrons. While this requirement should make considerable advancement toward eliminating the use of sunscreens that pollute coral reefs near Hawaii, the results of this research indicate that hotel operators have the potential to create a significantly greater influence by implementing the hotel practices proposed in this study (i.e., except providing no sunscreen) related to sunscreens.

The results of measuring behavior-specific knowledge among survey respondents indicated many had little or no knowledge related to reef-safe sunscreen. In addition, respondents reported that Education and Educated Prior would influence their Intention to use reef-safe sunscreen. As discussed by Michelsen and Fischer [63], education about the environment and the problems it is experiencing is required to promote pro-environmental behaviors. There is evidence that tourists may also need specific knowledge of an environmental issue at a destination, in addition to general knowledge of environmental problems, for them to choose to engage in a specific pro-environmental behavior [64,65]. Several studies have indicated that providing this type of education specifically during recreational activities positively influenced tourists' pro-environmental behavior [66–68]. Others have argued that members of the tourism industry have the responsibility to provide learning experiences, both during and after a guest's visit [69].

More than half of the subjects in the present study used sunscreen while in Hawaii that they brought with them from home. The three most important characteristics of these products as reported by the subjects were all related to protection from the sun, not to reef safety. Therefore, to become lifelong habits, tourists may need information about how their behaviors damage or help protect reefs, both before they travel, during their trip, and after their trip. Although the act of simply providing guests with information may seem trivial to some, Hotel operators may be able to play a significant role in decreasing the use of sunscreens that damage reefs.

The most effective hotel practices for influencing patrons to use reef-safe sunscreen were Free Bottle, Free-Use, and Trade-In. If implementing Free Bottle or Free-Use, hotel operators should be aware of items that some subjects reported could mitigate the influence of these hotel practices on their Intention. The most common inhibiting items were if the reef-safe sunscreen was not water-resistant, having already purchased/brought sunscreen to Hawaii, and the sunscreen not being all-natural and kid-friendly. Thus, to ensure that the implementation of Free-Use or Free Bottle would be as effective as possible, the reef-safe sunscreen should also be water-resistant, all-natural, and kid-friendly. These targets are relatively simple to accomplish, as zinc oxide and titanium dioxide sunscreens are the most effective ray-blocking sunscreens that avoid harmful effects on coral reefs [23]. These compounds are physical ultraviolet filters as opposed to oxybenzone, which is a chemical ultraviolet filter, and are kid-friendly and considered all-natural [31].

While results indicated that Free Bottle, Free-Use, and Trade-In would be the most effective hotel practices for influencing Hawaii hotel patrons to use reef-safe sunscreens, they would presumably be the more costly programs to implement. In consideration that cost may be an inhibiting factor for hotel operators, Education and Education Prior could prove to be more practical implementations. Specifically, as the mean difference in Intention between Trade-In and Education Prior was non-significant, Education Prior would be advised over the presumably more costly Trade-In practice.

6. Theoretical Implications

This research supported the concept that different types of pro-environmental behavior are predicted by different sets of determinants. Since the dominant causal factors can be vastly different depending on the behavior being studied, each target behavior should be theorized independently [47].

Results suggested that the pro-environmental behavior of using reef-safe sunscreen is primarily influenced by three determinants: Attitudes, Personal Capabilities, and Contextual Factors. Targeting the development of Personal Capabilities and implementing Contextual Factors that facilitate the behavior are supported as effective methods to influence Hawaiian hotel patrons to use reef-safe sunscreens.

Habit and routine were also included as causal variables in the theoretical underpinning of this research [47]. However, the data did not bear out this relationship in this instance. Again, this finding still supports one of Stern's other propositions, that each environmental behavior is different and should therefore be theorized in a different way. In this case, the environmentally friendly product was purchased at home (most often), while its consumption occurred away from home and in a more environmentally sensitive location (Hawaii). This could then provide a new category of pro-environmental behavior where there is a separation in time and space between the environmental action and the consequence of that action.

7. Operational Recommendations

Hotel operators in Hawaii can no longer legally sell or provide sunscreen to their customers that are not reef-safe. However, the related law stopping this activity does not prevent Hawaiian tourists from using sunscreen with damaging chemicals in them that they brought from home. This study identified practices that Hawaiian hotel operators could implement to encourage patrons to use reef-safe sunscreen, a pro-environmental behavior, and evaluated factors leading to this behavior.

One activity hoteliers should create are educational campaigns that inform guests of the issue related to the use of reef-safe sunscreen prior to their traveling to Hawaii and subsequently reiterate the information throughout their stay at a hotel in Hawaii, and afterward via social media communications. These campaigns should highlight the ecological and social importance of coral reefs, explain that sunscreen ingredients such as oxybenzone can have detrimental effects on coral reefs, note that sunscreens containing ingredients such as oxybenzone can pollute coral reefs even when they are not worn in the ocean, and provide guests with information on how to find and choose reef-safe sunscreens.

In addition, reef-safe sunscreen amenity programs should be created that provide complimentary containers of reef-safe sunscreen to guests and/or provide the complimentary use of reef-safe sunscreen dispensers at the hotel pool and beach areas.

When deciding what sunscreen to offer to their patrons, Hotel operators should consider the sunscreen attributes that they deem most important. This research indicated that these characteristics are: SPF level, water-resistant, and broad-spectrum. These functional characteristics proved to be significantly more important than price, indicating that low-cost sunscreen options are not as desirable if they cannot firstly fulfill important functional requirements. In addition, this study found sunscreen labeled as natural and kid-friendly to also be highly desirable by Hawaiian tourists.

8. Limitations and Future Research

The results of this study may not be generalizable to hotels in other geographical areas. As designed, the construct of behavior-specific knowledge consisted of four items; however, the construct showed poor reliability until one of the items was removed. Inconsistency on this item may have resulted from a framing bias in which the theme of the survey influenced respondents to be more inclined to indicate that a sunscreen ingredient was harmful to coral reefs, versus not harmful.

Personal Capabilities was designed to comprise both behavior-specific knowledge and behavior-specific skills. The measure of behavior-specific skills did not demonstrate reliability and was not included in the construct. It is posited that the measure of behavior-specific skills was inaccurate as it was designed as a self-report of skills; the Dunning–Kruger effect could have resulted in unskilled individuals overestimating their own ability. Results supported this supposition in that respondents' mean self-report of behavior-specific skills was significantly higher than the results for the two items measuring the behavior-specific knowledge that would be necessary to develop the behavior-specific skill in question. Future research on this subject should aim to test behavior-specific skills without the use of self-reporting.

Limitations arose in testing the proposed conceptual framework since pro-environmental behavior could not be measured in the context of this research. As a proxy, this research tested the influence of contextual factors on pro-environmental intention, the predictor of pro-environmental behavior. Many behavioral frameworks acknowledge the gap between pro-environmental intention and pro-environmental behavior, as well as the specific disparity between having environmental knowledge and/or awareness and acting pro-environmentally [70]. Individuals do not always achieve the pro-environmental behaviors that they intend to enact.

A follow-up study of patrons' willingness to pay for the provision of reef-safe sunscreen amenities at Hawaiian hotels would complement this research. Such a study would be relevant in examining the practical applicability of the recommendations yielded from this research.

9. Conclusions

The health of Hawaiian coral reefs is threatened by pollution from common sunscreen ingredients such as oxybenzone. Reef-safe sunscreens are alternative sunscreens that provide effective sun protection while averting damage to coral reefs. Results indicated that Hawaiian hotel patrons primarily use sunscreen brought from home and their intention to use reef-safe sunscreen is primarily influenced by three determinants: attitudes, personal capabilities, and contextual factors. Targeting the development of personal capabilities and employing contextual factors that facilitate the behavior are supported as effective methods to influence Hawaiian hotel patrons to use reef-safe sunscreens. To increase reef-safe sunscreen use, Hawaiian hoteliers are encouraged to concurrently implement reef health educational campaigns and offer free reef-safe sunscreen to their patrons. Influencing hotel patrons to use reef-safe sunscreens could aid in coral reef preservation and ecological sustainability, which would support the future tourism industry in Hawaii.

Author Contributions: Conceptualization, R.G.; methodology, R.G. and C.B.; formal analysis, R.G.; data curation, C.B.; writing—original draft preparation, R.G., C.B. and A.M.; writing—review and editing, C.B. and A.M.; funding acquisition, R.G. and C.B. All authors have read and agreed to the published version of the manuscript.

Funding: The data collected for this study was funded by the William F. Harrah College of Hospitality, University of Nevada, Las Vegas. The Open Access publishing fee was funded by the University of Nevada Las Vegas Libraries.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of the University of Nevada, Las Vegas (protocol code 132300-9 and 10 April 2018).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data for this study is available upon request from the corresponding author.

Acknowledgments: Singh, A.K. Hospitality Statistician, is thanked for his valuable guidance.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References and Note

1. Kim, Y.H.; Nelson, B.; Kim, D.K. Sustainability Research in the Hotel Industry: Past, Present, and Future. *J. Hosp. Mark. Manag.* **2019**, *28*, 576–620. [CrossRef]
2. Barr, S.; Shaw, G.; Coles, T.; Prillwitz, J. A Holiday Is a Holiday': Practicing Sustainability, Home and Away. *J. Transp. Geogr.* **2010**, *18*, 474–481. [CrossRef]
3. Dolnicar, S.; Knezevic Cvelbar, L.; Grün, B. Do Pro-environmental Appeals Trigger Pro-environmental Behavior in Hotel Guests? *J. Travel Res.* **2017**, *56*, 988–997. [CrossRef]
4. Stern, P.C. Toward a coherent theory of environmentally significant behavior. *J. Soc. Issues* **2000**, *56*, 407–424. [CrossRef]
5. Hawaii Tourism Authority. *Fact Sheet: Benefits of Hawai'i's Tourism Economy*; Hawaii Tourism Authority: Honolulu, HI, USA, 2019. Available online: https://www.hawaiitourismauthority.org/media/4167/hta-tourism-econ-impact-fact-sheet-december-2019.pdf (accessed on 22 June 2022).
6. STR Share Center. STR SHARE Center (Census Database Hawaii) [Data file]. 2020, Obtained after request via email.
7. Danovaro, R.; Bongiorni, L.; Corinaldesi, C.; Giovannelli, D.; Damiani, E.; Astolfi, P.; Greci, L.; Pusceddu, A. Sunscreens cause coral bleaching by promoting viral infections. *Environ. Health Perspect.* **2008**, *116*, 441–447. [CrossRef]
8. Downs, C.A.; Kramarsky-Winter, E.; Segal, R.; Fauth, J.; Knutson, S.; Bronstein, O.; Ciner, F.R.; Jeger, R.; Lichtenfeld, Y.; Woodley, C.M.; et al. Toxic pathological effects of the sunscreen filter, oxybenzone (benzophenone-3), on coral planulae and cultured primary cells and its environmental contamination in Hawaii and the U.S. Virgin Islands. *Arch. Environ. Contam. Toxicol.* **2015**, *70*, 265–288. [CrossRef]
9. Baker, L.A.; Horbury, M.D.; Greenough, S.E.; Coulter, P.M.; Karsili, T.N.V.; Roberts, G.M.; Orr-Ewing, A.J.; Ashfold, M.N.R.; Stavros, V.G. Probing the ultrafast energy dissipation mechanism of the sunscreen oxybenzone after A irradiation. *J. Phys. Chem. Lett.* **2015**, *6*, 1363–1368. [CrossRef]
10. Caspermeyer, J. New insights into coral bleaching. *Mol. Biol. Evol.* **2016**, *33*, 2479. [CrossRef]
11. Bellwood, D.R.; Hughes, T.P.; Folke, C.; Nyström, M. Confronting the coral reef crisis. *Nature* **2004**, *429*, 827–833. [CrossRef]
12. van Oppen, M.J.H.; Lough, J.M. Introduction: Coral bleaching-patterns, processes, causes, and consequences. In *Coral Bleaching Patterns, Processes, Causes, and Consequences*; van Oppen, M.J.H., Lough, J.M., Eds.; Springer: Berlin/Heidelberg, Germany, 2009; pp. 1–5.
13. Veron, J.E.N.; Hoegh-Guldberg, O.; Lenton, T.M.; Lough, J.M.; Obura, D.O.; Pearce-Kelly, P.; Sheppard, C.R.C.; Spalding, M.; Stafford-Smith, M.G.; Rogers, A.D. The coral reef crisis: The critical importance of <350 ppm CO_2. *Mar. Pollut. Bull.* **2009**, *58*, 1428–1436. [CrossRef]
14. Wilkinson, C.J. Executive summary. In *Status of Coral Reefs of the World: 2008*; Wilkinson, C.J., Ed.; Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre: Townsville, Australia, 2008; pp. 5–19.
15. Relating to Water Pollution, S.B. 2571 S.D. 2 H.D. 2 C.D. 1. 2018. Available online: https://www.capitol.hawaii.gov/session2018/bills/SB2571_CD1_.pdf (accessed on 28 May 2021).
16. State of Hawaii, Office of the Governor. Governor David Ige Signs Bill Making Hawaii First in the World to Ban Certain Sunscreens. Available online: http://governor.gov/newsroom/latest-news/office-of-the-governor-news-release-governor-david-ige-signs-bill-making-hawaii-first-in-the-world-to-ban-certain-sunscreens/ (accessed on 28 May 2021).
17. A Bill for an Act. The Senate 132 Thirty-First Legaslature. Hawaii State Legislature. 2021. Available online: https://www.capitol.gov/Archives/measure_indiv_Archives.aspx?billtype=SB&billnumber=132&year=2021 (accessed on 3 July 2018).
18. Cesar, H.S.J.; van Beukering, P.J.H. Economic valuation of the coral reefs of Hawai'i. *Pac. Sci.* **2004**, *58*, 231–242. [CrossRef]
19. Knowlton, N.; Jackson, J.B.C. Shifting baselines, local impacts, and global change on coral reefs. *PLoS Biol.* **2008**, *6*, 215–220. [CrossRef]
20. Hall-Spencer, J.; Allain, V.; Fosså, J.H. Trawling damage to Northeast Atlantic ancient coral reefs. *Proc. Biol. Sci.* **2002**, *269*, 507–511. [CrossRef]
21. Tsounis, G.; Rossi, S.; Grigg, R.W.; Santangelo, G.; Bramanti, L.; Gili, J.-M. The exploitation and conservation of precious corals. *Oceanogr. Mar. Biol. An. Annu. Rev.* **2010**, *48*, 161–212. Available online: https://www.jcoral.com/pdf/down/1290691375991.pdf (accessed on 16 May 2022).
22. Chabanet, P.; Adjeroud, M.; Andréfouët, S.; Bozec, Y.; Ferraris, J.; Garcìa-Charton, J.; Schrimm, M. Human-induced physical disturbances and their indicators on coral reef habitats: A multi-scale approach. *Aquat. Living Resour.* **2005**, *18*, 215–230. [CrossRef]
23. DiNardo, J.C.; Downs, C.A. Dermatological and environmental toxicological impact of the sunscreen ingredient oxybenzone/benzophenone-3. *J. Cosmet. Dermatol.* **2017**, *17*, 15–19. [CrossRef]
24. Lichman, J. Sunscreen Mist, Spray Sunscreen Booth to Be Featured at one of the Hottest Pools in Las Vegas. Cision PRWeb. 2007. Available online: https://www.prweb.com/releases/2007/05/prweb522379.htm (accessed on 22 June 2022).
25. Andaz Maui at Wailea Resort. Pool + Cabanas. 2018. Available online: https://maui.andaz.hyatt.com/en/hotel/our-hotel/pool.html (accessed on 28 May 2021).
26. Westin Hotels & Resorts. Moana Pool & Beach. 2018. Available online: https://www.marriott.com/en-us/hotels/hnlwi-moana-surfrider-a-westin-resort-and-spa-waikiki-beach/overview/ (accessed on 28 May 2021).

27. Forbes Travel Guide. We Verify Luxury. Forbes Travel Guide. 2018. Available online: https://www.forbestravelguide.com/about (accessed on 28 May 2021).
28. Forbes Travel Guide. We Verify Luxury. 2018. Available online: https://www.forbestravelguide.com/award-winners (accessed on 22 June 2022).
29. Tsui, M.M.P.; Lam, J.C.W.; Ng, T.Y.; Ang, P.O.; Murphy, M.B.; Lam, P.K.S. Occurrence, distribution, and fate of organic filters in coral communities. *Environ. Sci. Technol.* **2017**, *51*, 4182–4190. [CrossRef]
30. National Cancer Institute. Cancer Trends Progress Report Sun-Protective Behavior. 2017. Available online: https://www.progressreport.cancer.gov/prevention/sun_protection (accessed on 22 June 2022).
31. Wang, S.Q.; Balagula, Y.; Osterwalder, U. Photoprotection: A review of the current and future technologies. *Dermatol. Ther.* **2010**, *23*, 31–47. [CrossRef]
32. Chen, S.; Chen, H.H.; Zhang, K.Q.; Xu, X. A comprehensive theoretical framework for examining learning effects in green and conventionally managed hotels. *J. Clean. Prod.* **2018**, *174*, 1392–1399. [CrossRef]
33. Penny, W.Y.K. The use of environmental management as a facilities management tool in the Macao hotel sector. *Facilities* **2007**, *25*, 286–295. [CrossRef]
34. Robinot, E.; Giannelloni, J.-L. Do hotels' "green" attributes contribute to customer satisfaction? *J. Serv. Mark.* **2010**, *24*, 157–169. [CrossRef]
35. Kassinis, G.I.; Soteriou, A.C. Greening the service profit chain: The impact of environmental management practices. *Prod. Oper. Manag.* **2003**, *12*, 386–403. [CrossRef]
36. Choi, G.; Parsa, H.G.; Sigala, M.; Putrevu, S. Consumers' environmental concerns and behaviors in the lodging industry: A comparison between Greece and the United States. *J. Qual. Assur. Hosp. Tour.* **2009**, *10*, 93–112. [CrossRef]
37. Han, H.; Hsu, L.; Lee, J. Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers' eco-friendly decision-making process. *Int. J. Hosp. Manag.* **2009**, *28*, 519–528. [CrossRef]
38. Outrigger Hotels and Resorts. Outrigger's Waikiki Resorts OZONE Eco-Adventure Package. 2018. Available online: https://www.outrigger.com/specials/owk-orf/ozone-ecoadventure (accessed on 28 May 2021).
39. Outrigger Hotels and Resorts. Reef Conservation in Outrigger's Global Destinations. Outrigger Hotels and Resorts. 2018. Available online: https://www.outrigger.com/ozone (accessed on 28 May 2021).
40. Wu, N. Outrigger Launches Coral Reef Initiative. 2015. Available online: https://www.pressreader.com/usa/honolulu-star-advertiser/20150607/281960311367891 (accessed on 28 May 2021).
41. Jones, J. Don't Pack Sunscreen on Your Next Trip to These Hotels Will Make Sure You're Covered. Los Angeles Times. 2017. Available online: https://www.latimes.com/travel/deals/la-tr-hawaii-sunscreen-coral-reefs-20170809-story.html (accessed on 22 June 2022).
42. Lapan, T. Industry Steps up to Protect the Reefs in the ISLANDS. Travel Weekly. 2017. Available online: https://www.travelweekly.com/Hawaii-Travel/Insights/Industry-steps-up-to-protect-the-reefs-in-the-Islands (accessed on 22 June 2022).
43. Ajzen, I. From intentions to actions: A theory of planned behavior. In *Action Control from Cognition to Behavior*; Kuhl, J., Beckmann, J., Eds.; Springer: Berlin/Heidelberg, Germany, 1985; pp. 179–211. [CrossRef]
44. Kurz, T.; Gardner, B.; Verplanken, B.; Abraham, C. Habitual behaviors or patterns of practice? Explaining and changing repetitive climate-relevant actions. *WIREs Clim. Change* **2015**, *6*, 113–128. [CrossRef]
45. Guagnano, G.A.; Stern, P.C.; Dietz, T. Influences on attitude-behavior relationships. *Environ. Behav.* **1995**, *27*, 699–718. [CrossRef]
46. Ertz, M.; Karakas, F.; Sarigöllü, E. Exploring pro-environmental behaviors of consumers: An analysis of contextual factors, attitude, and behaviors. *J. Bus. Res.* **2016**, *69*, 3971–3980. [CrossRef]
47. Steg, L.; Vlek, C. Encouraging pro-environmental behavior: An integrative review and research agenda. *J. Environ. Psychol.* **2009**, *29*, 309–317. [CrossRef]
48. Dunlap, R.E.; Van Liere, K.D.; Mertig, A.G.; Jones, R.E. Measuring endorsement of the new ecological paradigm: A revised NEP scale. *J. Soc. Issues* **2000**, *56*, 425–442. [CrossRef]
49. *Qualtrics*; Version, 2018; Qualtrics Labs, Inc.: Provo, UT, USA, 2018.
50. *SPSS Statistics*; Version 24. IBM Corp: Armonk, NY, USA, 2016. Available online: https://www.ibm.com/products/spss-statistics (accessed on 15 May 2022).
51. Nugus, S. Chapter 5-Regression Analysis. In *CIMA Professional Handbook*, 2nd ed.; CIMA Publishing: London, UK, 2009; pp. 59–74. [CrossRef]
52. Girden, E.R. *ANOVA: Repeated Measures. Quantitative Applications in the Social Sciences*; No. 07-084; Sage Publications: Newbury Park, CA, USA, 1992.
53. Bamberg, S.; Moser, G. Twenty years after Hines, Hungerford, and Tornera: A new meta- analysis of psycho-social determinants of pro-environmental behavior. *J. Environ. Psychol.* **2007**, *27*, 14–25. [CrossRef]
54. Bissing-Olson, M.J.; Iyer, A.; Fielding, K.S.; Zacher, H. Relationships between daily affect and pro-environmental behavior at work: The moderating role of pro-environmental attitude. *J. Organ. Behav.* **2013**, *34*, 156–175. [CrossRef]
55. Hines, J.; Hungerford, H.R.; Tomera, A.N. Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *J. Environ. Educ.* **1987**, *18*, 1–8. [CrossRef]
56. Han, H. Consumer behavior and environmental sustainability in tourism and hospitality: A review of theories, concepts, and latest research. *J. Sustain. Tour.* **2021**, *29*, 1021–1042. [CrossRef]

57. Linder, N.; Giusti, M.; Samuelsson, K.; Barthel, S. Pro-environmental habits. *Ambio* **2021**, *51*, 546–556. [CrossRef]
58. Verplanken, B.; Roy, D. Empowering interventions to promote sustainable lifestyles: Testing the habit discontinuity hypothesis in a field experiment. *J. Environ. Psychol.* **2016**, *45*, 127–134. [CrossRef]
59. Verplanken, B.; Walker, I.; Davis, A.; Jurasek, M. Context change and travel mode choice: Combining the habit discontinuity and self-activation hypotheses. *J. Environ. Psychol.* **2008**, *28*, 121–127. [CrossRef]
60. Khazaei, Z.; Ghorat, F.; Jarrahi, A.; Adineh, H.; Sohrabivafa, M.; Goodarzi, E. Global incidence and mortality of skin cancer by histological subtype and its relationship with the human development index (HDI); an ecology study in 2018. *World Cancer Res. J.* **2019**, *6*, e1265. [CrossRef]
61. AAD. Confused about sunscreen? New American Academy of Dermatology Survey Shows Americans Need a Refresher on Sunscreen Application and SPF. American Academy of Dermatology. 2021. Available online: https://www.aad.org/news/aad-survey-shows-americans-need-sunscreen-education (accessed on 28 May 2021).
62. U.S. Census Bureau. Income and Poverty in the United States: 2018. 2018. Available online: https://www.census.gov/content/dam/Census/library/publications/2018/demo/p60-263.pdf (accessed on 28 May 2021).
63. Michelsen, G.; Fischer, D. Sustainability and education. In *Sustainable Development Policy: A European Perspective*; Hauff, M.V., Kuhnke, C., Eds.; Routledge: London, UK, 2017.
64. Lee, T.H.; Jan, F.H.; Hang, G.W. The influence of recreation experiences on environmentally responsible behavior: The case of Liuqiu Island, Taiwan. *J. Sustain. Tour.* **2015**, *23*, 947–967. [CrossRef]
65. Ünal, A.B.; Steg, L.; Gorsira, M. Values versus environmental knowledge as triggers of a process of activation of personal norms for eco-driving. *Environ. Behav.* **2017**, *50*, 1092–1118. [CrossRef]
66. Lee, J.; Hsu, L.; Han, H.; Kim, Y. Understanding how consumers view green hotels: How a hotel's green image can influence behavioral intentions. *J. Sustain. Tour.* **2010**, *18*, 901–914. [CrossRef]
67. Falk, J.; Ballantyne, R.; Packer, J.; Benckendorff, P. Travel and Learning: A Neglected Tourism Research Area. *Ann. Tour. Res.* **2012**, *39*, 908–927. [CrossRef]
68. Orams, M.B. The effectiveness of environmental education: Can we turn tourists into 'Greenies'? *Prog. Tour. Hosp. Res.* **1997**, *3*, 295–306. [CrossRef]
69. Ballantyne, R.; Packer, J. Using tourism free-choice learning experiences to promote environmentally sustainable behavior: What are the barriers to pro-environmental behavior? *Environ. Educ. Res.* **2011**, *8*, 239–260.
70. Kollmuss, A.; Agyeman, J. Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environ. Educ. Res.* **2002**, *17*, 201–215. [CrossRef]