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Does Eco-Hotels’ Direct Exposure to Green Spaces Provide Positive Benefits to the Visitors' Health?

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DOES ECO-HOTELS’ DIRECT EXPOSURE TO GREEN SPACES PROVIDE POSITIVE BENEFITS TO THE VISITORS’ HEALTH?

By
Eddie N. Sanchez

A THESIS

Submitted to the Faculty of the University of Miami in partial fulfillment of the requirements for the degree of Master of Arts

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During the last decade the ecotourism business has boomed in Puerto Rico. There are significant increases in eco-related businesses around the Island. The majority of eco-related businesses in Puerto Rico are tour guided adventures, canopy tours, surfing, biking, among others. All the activities mentioned above have the same purpose: physical activity and group interaction. These activities promote a healthier environment for the participants, which help increase their physical activity level and at the same time encourage the use of the green spaces. This study utilizes Dr. de Vries’ five direct contact mechanisms to identify their presence and potential impact at the eco-hotels and urban hotels in Puerto Rico: 1) reduce of stress and attentional fatigue, 2) promotion of physical activity, 3) enhancing positive social contact with neighborhood members, 4) healthy development of children, and 5) personal growth of adults and enhancement of quality of life. These mechanisms are associated with exposure to the green spaces.

Interaction with the green spaces will help promote a healthier living for the participants and give them an option to avoid a sedentary life style. The interaction with the green spaces and benefits of this interaction can promote an increase in knowledge and understanding of the importance of the natural environment. The significance of the study in Puerto Rico is that it can bring to light the overall benefits of eco-hotels to the visitors, hospitality industry and developers.
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Executive Summary

The purpose of the study is to determine if the green spaces direct contact mechanisms proposed by Dr. de Vries (2006) could be observed in the daily activities of visitors of eco-hotels and urban hotels. The study took place from July through October 2012 in the Caribbean Island of Puerto Rico. The observations were gathered while visiting two eco-hotels and two urban hotels.

Dr. de Vries proposed five direct contact mechanisms which were used drive the study: 1) reduce of stress and attentional fatigue, 2) promotion of physical activity, 3) enhancing positive social contact with neighborhood members, 4) healthy development of children, and 5) personal growth of adults and enhancement of quality of life. These mechanisms are associated with exposure to the green spaces.

A series of studies by Wiley (1998) and Mass (2003) concluded that even short periods of exposure in green spaces had favorable health benefits for the participants. Wiley (1998) researched that exposure to green spaces in public housing promotes greater physical activity than public housing without access to green spaces. Hartig (2003) conducted blood pressure research on people visiting green spaces and participants in an urban environment without access to green spaces. The conclusion of his research was that the participants with access to green spaces showed a better blood pressure reading than the participants in urban environments without access to green spaces.
The observation analysis conducted in Puerto Rico showed that visitors had similar odds of experiencing contact mechanism number one and five in either type of hotels. However, visitors had 8 times the possibilities of experiencing contact mechanism number 2, 16 times the possibilities of experiencing contact mechanism number 3, and 12 times the possibilities of experiencing contact mechanism number 4 in the eco-hotels utilized in the study.

The higher odds of experiencing direct contact mechanism number 2, 3, and 4 increased the possibility of the visitors receiving more health benefits. The direct contact mechanism number two (increase in physical activity) is very important for the healthy development of children and increases the chances of maintaining a healthy adulthood as well. Direct contact mechanism number three (enhancing positive social contact with other group members) also increased the chances of the visitors developing social skills. Lastly, direct contact mechanism number four (healthy development of children) offered interesting results. Including children in social and physical activities could help to reduce today’s main illnesses like obesity, diabetes, among others.
Chapter 1. Introduction

This assessment aims to prove that the visitors of eco-hotels find more health benefits than the visitors of urban hotels. Also, it defines the problems of environment degradation, health promotion and monetary revenues and describe their magnitude specifically in the island of Puerto Rico and worldwide. The main objective of this study aims to demonstrate that Dr. Sjerp De Vries’ (2006) green areas contact mechanisms are observed in selected eco-hotels in the island of Puerto Rico. The mechanisms to measure these benefits have been established based on De Vries (2006). These mechanisms are: reduction of stress and restoration of attentional fatigue, promoting more physical activity, enhancing positive social contacts with neighborhood members, healthy development of children, personal growth of adults/enhancing quality of life.

The research methodology used was observational. It was used to compare both types of hotels. There are many definitions of ecotourism in the academic and scientific community. For the purpose of this investigation, ecotourism is defined as ecologically sustainable tourism with a primary focus on experiencing natural areas and green spaces that foster environmental and cultural understanding, appreciation and conservation. It was of vital importance for this investigation to understand the differences of eco-hotels as a self-sustainable natural tourist destination and the eco-hotels that only provided direct contact with the green spaces. The definition of eco-hotel utilized for this investigation was the hotels that provide direct contact and access to green spaces. The green spaces offered to the visitors in the two eco-hotels are part of their property and within close proximity to the cabins and main buildings. Based on the observation results,
recommendations can be provided to the hotel industry of the island of Puerto Rico on how to maximize their natural resources and promote a sustainable development of the green spaces. Instead of only offering comfort, they can add a direct experience with nature that can provide health benefits to visitors.

A. Problem

1. Relevance

The purpose of this study was to summarize three important topics that have surface in the last 20 years. The topics of the study were related to the environment degradation, health promotion and monetary revenues. Because of the economic crisis of the last decade the government and individuals have been reacting to maximize all the available resources. The hospitality industry is moving to eco-tourism; therefore they are using the natural resources as part of their daily activities and offering direct contact with the green areas to visitors.

The tourism industry brings many economic and social benefits to host countries. Also, through tourism the tourist or visitors gain relaxation, education, and social interaction with different cultures. Despite the 2008 economic crisis, tourism industry has been stable and continues to show slow but stable growing patterns (UNWTO, 2012). Tourism has positioned itself as a stable economic industry in 2012. Many countries in the world rely on tourism as one of their major sources of income and employment. Multiple crises – in climate, biodiversity, fuel, food, water and the economy as a whole – have led to calls for a new development model: a “green economy.” A green economy is
one which is low carbon, resource efficient and socially inclusive. The United Nations Environment Programme (UNEP) defines a green economy as one that “results in improved human-wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities.”

Costa Rica is an excellent example of how government developed the tourist industry. Over twenty-seven percent of Costa Rica is designated as national park, biological reserve, wildlife refuge or some other category of protected area, both private and public. Many countries have been following Costa Rica’s ecotourism model and began to use their natural resources to increase tourism and capital. Ecotourism can be used as a sustainable tool that can help developing countries to increase their revenues. Sustainable ecotourism must begin as policies and laws to preserve the environment and at the same time provide the necessary tools to the developer to increase the natural resources’ availability and accessibility.

2. Relevance in Puerto Rico

Puerto Rico is the smaller of the Greater Antilles in the Caribbean. The Island climate and topography makes it ideal for the expansion of tourism and eco-tourism. Also, the political relationship with the United States facilitates accessibility for U.S citizens, which need neither visa nor passport to visit Puerto Rico. The geographical location of Puerto Rico makes it suitable for outdoor activities all year around. Puerto Rico’s temperature fluctuates from 80’s in winter to High 90’s during the summer season. During the last decade the ecotourism business has boomed in Puerto Rico. There are significant increases in eco-related businesses around the Island.
The majority of eco-related businesses in Puerto Rico are tour guided adventures, canopy tours, surfing, biking, among others. All the activities mentioned above have the same purpose: physical activity and group interaction. These activities promote a healthier environment for the participants, which help increase their physical activity level and at the same time encourage the use of the green spaces.

Interaction with the green spaces will help to promote a healthier living for the participants and give them an option to avoid a sedentary lifestyle. The interaction with the green spaces and benefits of this interaction can promote an increase in knowledge and understanding of the importance of the natural environment. The significance of the study in Puerto Rico is that it can bring to light the overall benefits of eco-hotels to the visitors, hospitality industry and developers.

B. Justification

According to the CDC (2010) 30.9% of Puerto Ricans stated that they have fair to poor health, a very high prevalence compared with 15.9% of Americans saying the same (CDC, 2010). The Continued Study of Health in Puerto Rico (2003) quantified that 27.5% of Puerto Ricans have said to have fair to poor health. The comparison of the studies shows an increase of 3.4% in the population that thinks this way. The observational study realized in Puerto Rico aimed to show that green spaces, part of the great diversity of natural resources found in the island of Puerto Rico, are useful to improve the health of Puerto Ricans and visitors alike.
The health of the population of Puerto Ricans has been affected by different diseases and conditions such as diabetes, heart disease, obesity and mental illness. The evidence that the amount of green space has a positive impact on the health of the population, presents the green spaces as an alternative to improve public health in Puerto Ricans. However, urban growth continues to decrease the amount of green space in cities; meaning that this natural resource is deteriorating and quickly disappearing.

A series of studies by Wiley (1998) and Hartig (2003), found that short term contact with green spaces have positive effects in the participants. Wiley (1998) research proved that exposure to green spaces in public housing promoted a greater physical activity than public housing without access to green spaces. Hartig (2003) conducted blood pressure research on people visiting green spaces and participants in an urban environment without access to green spaces. The conclusion of his research was that the participants with access to green spaces showed a better blood pressure reading than the participants in urban environment without access to green spaces. These two experiments are very important because they concluded that exposure in short periods of times to green spaces can improve the potential overall wellbeing of the participants. The eco-hotels used for this study promote direct contact with green spaces and therefore promote a potential gain of health to the visitors.

This research, conducted in Puerto Rico, also aimed to stimulate a visitor understanding for the importance of the green spaces in urban environment. The learning and positive experience gained from the gain in health and self-stem can improve the way
the green spaces are seen by the public and create a sense of responsibility for the protection of the environment.

C. Research Question

1. Are green spaces direct contact mechanisms of de Vries present in the Eco-hotels and urban hotels in Puerto Rico?

D. Objective:

i. Observe if the direct contact mechanisms are present during the visitor’s daily activities.

E. Operational Objectives

i. Visit two eco-hotels and two urban hotels, and observe the green spaces areas that are offered to the guests.

ii. Create a database of observations and descriptions of the visitor’s daily activities in the eco-hotels and regular hotels.

iii. Establish a connection between the eco-hotels green spaces and positive health benefits base on the contact mechanisms proposed by Sjerp de Vries, through analysis and description of the observations gathered in both types of hotels.

iv. Create an understanding of the importance of the green spaces to help protect the environment for future generations.
Chapter 2. Literature Review

This chapter outlines the literature review related to the possible health benefits of green spaces in eco-hotels. Also, describes the topics of tourism, eco-tourism and sustainable development. Furthermore, there will be a description of the most important studies or research of literature related to the effects of green spaces to health. It describes the five mechanisms established by De Vries (2006). These mechanisms are: reduction of stress and restoration of attentional fatigue, promoting (more) physical activity, enhancing positive social contacts with neighborhood members, healthy development of children, personal growth of adults/enhancing quality of life.

A. Tourism

Tourism includes activities that people do during their travels and stays in places other than their usual environment for a consecutive period of less than one year for the purpose of leisure, business, sports, and health among others. The Ministry of Economic Development of New Zealand (2011) explained that there are three basic forms of tourism: first, domestic tourism, which comprises the activities of a resident visitor within the country of reference, either a part of a domestic tourism trip or part of an outbound tourism trip. Second, inbound tourism, which comprises the activities of a non-resident visitor within the country of reference on an inbound tourism trip. Finally, outbound tourism, which comprises the activities of a resident visitor outside the country of reference, either as part of an outbound tourism trip or as part of a domestic tourism trip (Ministry of Economic Development of New Zealand, 2011).
Tourism is one of the most important forms of capital generators during the last decade. It is estimated that global income from international tourism in 2011 has been $1.03 billion, an increase from $928 million for 2010. This represents a record despite the economic difficulties of many issuers markets (WTO, 2012). Today tourism is celebrated as a critical global economic force and a huge global industry (Jafari, 2005). In the past years there has been a surge in tourism promotions across many social platforms. These promotions are targeting possible consumers to travel to the desired tourist destinations.

According to the World Organization of Tourism (WTO) (2012), during the past six decades the tourism experienced continuous expansion, growth and diversification, becoming one of the economic sectors of greater importance of the world. Tourism is a global business, a world industry without boundaries (Holjevac, 2003). The number of tourists in 2011 increased a 4.6% from 940 million in 2010 to 983 million (WTO 2012). Perhaps very few industries have experienced changes as tourism in the last decade. Tourism is the most important industry in the world in terms of the numbers of employees and its effects in the social and economic development of a region or country (Holjevac, 2003). Jafari (2005), stated that for decades Governments have recognized the importance of tourism. Although it is because of their economic potential, such recognition has helped improve its image among large and small, private and public groups (Jafari, 2005).

Human beings as travelers are the propelling force in the existence and development of tourist (Holjevac, 2003). The forecast made by the WTO in January 2012 points to growth between three and four percent in the international arrivals by 2012, it is
expected that for the first time this figure reaches the 1,000 million tourists. Tourism provides an important means of enhancing culture and creates income which can support and strengthen cultural heritage, cultural production and creativity. In particular from the 1980’s onwards culture tourism became viewed a major source of economic development for many destinations (OECD, 2009).

Jafar Jafari (2003) wrote about the scientification of tourism. The purpose of Jafari was to provide a series of considerations about the past and the future of tourism journey towards becoming a scientific discipline. Jafari identifies some of the causes that helped tourism to reach its current size and scientific depth has been formed to outline how this cognitive process and carefully select the new key socioeconomic issues it raises. In others, suggest research crossroads that may lead to tourism to new frontiers, showed some signs of intellectual wealth produced along with the challenges and opportunities posed recently, which in turn can guide planning and managing the present and functioning future of this industry.

Among the concepts discussed by Jafar are the benefits and negative aspects of tourism industry in society. Tourism has been a cornerstone to the economy, social and cultural areas in many nations. A set of benefits have been established by academics and scientists alike. During the last decade marked benefits from tourism had changed the way that individuals, organizations and the government perceive tourism. Economic benefits from tourism are defined by the business dictionary as the benefit quantifiable in terms of money, such as revenue, net cash flow, and net income. These benefits are:
increase in local employment, use of local products, uses existent infrastructure, facilitate economic development, and generate revenue.

Tourism also is noted because of the sociocultural benefits. Oxford dictionary defines sociocultural benefits as benefits that encompass the ideas, customs, and social behaviour of a given society. The incorporation of tourism develops sociocultural benefits that promote various positive effects in the wellbeing of the local population. These benefits are: improve education, reinforce values and local patrimony, increase local cultural appreciation, decrease language barriers, decreases religious barriers, decrease political barriers, among others.

An example of tourism benefits in Puerto Rico is the case study of the Las Salinas Interpretive Center in the coastal town of Cabo Rojo. Roblez (2007), mentions that the organization Caborrojeños for Health and Environmental founded the Interpretive Center of Las Salinas. It is a bird sanctuary, with hyper saline lagoons, mangrove forests, sea grass and coral reef. At the beginning this organization was created to protest against the development of the sector of Salinas, but they began to encourage ecologically sustainable development projects. They made an alliance with the U.S. Fish and Wildlife Service which made possible the development of the Environment Interpretive Center (EIC) of Las Salinas. The EIC has a strong commitment to educate the visitors, students and partners on the incalculable ecological, geological and historical haven emphasizing the area of Salinas. Quiñonez (2007) denoted that Las Salinas site is one of the most visited reserves in all the jurisdictions of the United States.
Some members of the scientific community, especially some public and private institutions are concerned with the adverse effects of tourism on culture and the natural environment in the countries where this activity takes place. It is mentioned that the tourism industry creates jobs mainly seasonal and low skilled, that benefits only big business and corporations, and does not provide economic stability and fringe benefits to employees. In other hand, it destroys the natural and scenic resources, and turns them into commodities to people and cultures and that upsets the structure of the host societies.

An important case in Puerto Rico is the Ecological Corridor at the northeast of the island between the towns of Fajardo and Loiza. The effort in the defense of this case was conducted by the Environmental Organization Sierra Club chapter of Puerto Rico. This corridor has 3,200 acres where there are rare plant and animal species, forests, wetlands, coral and communities (CSA group, 2003 and Estudios Científicos y Técnicos INC, 2002). Corridor beaches are one of the largest nesting leatherbacks sites in the United States, one of the turtle’s largest marine ecological places. The government of Puerto Rico during the four years 2004 to 2008 declared the Northeast Ecological Corridor as a nature reserve.

This declaration was signed by Gov. Anibal Acevedo Vila on October 4, 2007, closing the way for the construction of the San Miguel Resort, Four Seasons Hotels, and the Dos Mares Resort, Marriott International. These are two of the several projects, tourist and residential alike proposed for construction in and around the Corridor (Rivera, 2004). The incoming government disavowed this statement fragmenting the corridor to make way for development of tourist and residential complex. However, Gov. Luis
Fortuño in 2012 has had to return to legally protect these lands due to the actions of the people to repudiate its policy of development and destruction of this natural resource.

B. Ecotourism

Fennell (2003) defined ecotourism as traveling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its plants and animals, as well as any existing cultural manifestations. Ecotourism has been a growing industry since the mid 1980’s; countries like Costa Rica have been using their natural resources to attract tourists from around the world. Franciscus (2006) highlighted the case ecotourism in Costa Rica. The ecotourism boom in the country generated over $1.2 billion and over 1 million tourists in 2002. The term ecotourism has been traced back to 1965 when Hetzer (1965) used the term to explain the intricate relationship between tourist and the environment and cultures in which they interact. He identifies four fundamentals pillars for a more responsible form of tourism. The fours fundamentals are: minimum environmental impact, minimum impact on-and maximum respect for-host cultures, maximum economic benefits to the host country’s grassroots, and maximum recreational satisfaction to participant tourists.

The World Tourism Organization (WTO, 2002),defined ecotourism (a) is an all-nature-based form of tourism in which the tourists’ main motivation is the enjoyment of wilderness and of the traditional cultures inhabiting natural areas; (b) generally includes educational content; (c) is typically, albeit not exclusively, organized for small groups of tourists by small locally owned firms; (d) minimizes the potential negative impact of tourism on the natural and cultural environment; (e) generates economic benefits for the
local community; and (f) increases awareness of biodiversity conservation principles among locals and tourists. To summarize, ecotourism comprehends environmentally sustainable behavior, also the social, cultural, and economic development of the territory and the local population.

Ecotourism has been related with a series of advantages to the host country tourism industry workers. In Costa Rica generally possess a series of advantages over local residents; higher levels of wealth, education, and status and participation in broader, transnational institutional and social networks. Some critics overturned the benefits of ecotourism. They contend that ecotourism is at bottom green capitalism and as such is inextricably linked to unequal distributional impacts and practices and beliefs of competition, individualism, material accumulation, consumption, and commodification. Such processes may disempower local peoples, fragmenting communities, limiting collective action, and restraining imaginings of qualitatively different forms of development (Duffy, 2002).

C. Sustainable development

The rationale of sustainable development is based on having limited natural resources. The environment and natural resources is the source of all that sustains life on the planet (Mulder, 2007). This is the reason why we should care for and properly manage the natural resources. We should strive for not waste, exhaust or unevenly distribute them. Mulder (2007) mentioned that activities that promote unsustainable development are characterized by requiring a constant consumption of nonrenewable resources, more that the Earth system could generate. The mentioned activities degrade
the environment, produce extinction of species, poses risk of disasters and their management required amounts of resources that would never be available for entire populations. Robles (2007) mentioned that the intelligent and integrated use of natural resources is the essential basis for sustainable development. The report of the World Commission on Environment and Development (Brundtland, 1987) defined sustainable development as "meeting the needs of present generations without compromising the ability of future generations to meet their own needs," which promote the ideology of sustainable use of the natural resources.

The foundations of sustainable development concept emerged in the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. This conference was developed in the Rio Declaration, Agenda 21 and the authoritative statement regarding the management, conservation and sustainable development of forests. The Rio Declaration had the primary purpose of guiding the international community in the task of achieving sustainable development. The Earth Charter also presented comprehensive integration and understanding of the values and principles related to sustainability.

More broadly, sustainable development policies affect three areas: economic, environmental and social. Based on international documents described above one can conclude that economic sustainability is when the activity moves to the environmental and social sustainability is financially feasible and profitable. Social sustainability is based on the maintenance of social cohesion and its ability to work in pursuit of common goals. Environmental sustainability is the compatibility of the activity in question and the
preservation of biodiversity and ecosystems, preventing the degradation of source and sink services provided by ecosystems. Sustainable development has to consider the impacts of the activity undertaken considered in terms of flows, resource use difficult or slowly renewable resources and in terms of waste generation and emissions. This last pillar is required for the other two be stable.

D. Health Benefits of Green Spaces

The green spaces in communities, such as nature reserves, ecological corridors, forests, parks, cultivation or private forested areas are integral parts to the composition of these communities. To highlight the beauty of a nation by referring to the natural attributes of the regions that compose it provokes that people have great pride and sense of belonging. Green spaces are very important in tourism, economy, education, research, recreation, conservation and culture of a country. Green Tourism Association of Canada (2002) says that 85% of the people, who visit a city, attend to a park or green space in it. This brings a profit chain in the city's economy as job creation and direct benefits to communities; which allows for additional revenue to meet their needs.

To these benefits, add the ability to benefit the health of the population having access to them (Mass et al. 2006). Recently in Europe an increasing emphasis on research linking improved health and use of the natural environment has being observed in literature (Jardin, 1997). Many people perceive nature as an environment where they can rest and recuperate from the stress of daily routine (Mass et al. 2006). Green spaces as public parks or gardens provide primary contact between people and the natural
environment (Jorgense et al. 2002) (Figure 4). These spaces provide physical and mental wellbeing of individuals (Ulrich et al. 1991).

Wiley et al. (1998) studied 74 urban public housing residential, 27 in low vegetation areas and 37 in areas of high vegetation. These spaces were observed on four separate occasions to quantify and analyze access to places for outdoor activities. Access concerned the household distance to the green area, facilities for children and caregivers, as well as safe inputs and roads (trails). Of the 262 children observed, most (73%) were involved in some kind of game and most of the groups of children (87%) were somewhat supervised by adults. In places with less or no green area the level of play of the children was approximately half that were found in the spaces with more trees and grass, and the incidence of creative play was significantly lower in sterile spaces in relatively green spaces. This is important because children who play outdoors can perform a higher level of physical activity.

Hartig et al. (2003) conducted research that compared stress recovery scenarios in natural and urban field. This comparison was achieved and quantified through repeated measures of blood pressure measurement, methodologies to measure emotions and attention gathered by 112 individuals. Blood pressure tests were performed to a group in a room overlooking a green area and another in a closed room. Individuals in the room overlooking the green area had a decrease in diastolic blood pressure when compared to individuals in the closed room. Walks were realized in green areas in urban and demonstrated a significant change in reducing the feeling of anger in patients (p <0.01). A test that measured the ability to focus on the midpoint of both walks and when
compared with a pre-test the walkers exposed to green areas measured better than walkers in urban areas (p <0.01).

Individuals who were exposed to a view of trees had a lower diastolic blood pressure than those who were not exposed to any view (p = 0.01). The participants went on a walk, a group in green spaces and other in urban areas. After 30 minutes of walking they took blood pressure and found a difference of 6 mmHg less in individuals who were walking in green spaces (p <0.01). The walk through the green spaces also brought a positive change in the emotions of individuals (p <0.01) and in the attention process as well (p <0.01).

Pretty et al. (2005) conducted an investigation where several individuals conducted exercises exposed to pleasant images of green spaces and some to damaged green spaces. Also, he conducted the same experiment with images of nice urban spaces and not nice ones. In the experiment physiological variables such as blood pressure and psychological variables such as self-esteem and mood, among others were measured.

It was found that during the exercises exposed to pleasant images of green spaces, blood pressure of all participants was down compared to other exhibitions where blood pressure rose from 30% - 40% of participants. In the psychological area, exercise with pleasant images of green space and urban areas caused an increase in self-esteem. As tension-anxiety treatments every mood improved significantly. Exercise alone clearly reduced stress and anxiety (p> 0.01), but exercise combined with pleasant rural scenes (p <0.001) and urban pleasant scenes (p <0.001) reduced the tension even more. The improvement was most marked in the pleasant rural scenes being 11% more than in rural
unpleasant scenes and 47% higher than in the general urban category. In the area of physical activity on blood pressure was reduced in the pleasant rural scenes images (p> 0.05), and pleasant urban (p> 0.01).

Their findings suggested that exercise in pleasant surroundings can have a greater effect than exercise alone. Improved blood pressure, an important measure of cardiovascular health, and improves the conditions and diseases associated with mental health. The conclusions included that exercise in green areas has important implications for public and environmental health (Pretty et al. 2005).

Ulrich (1984) studied the recovery of patients undergoing cholecystectomy procedure at a hospital in Pennsylvania. The main factor examined was whether the presence of windows overlooking green areas in the postoperative recovery room of the hospital affected patient recovery somehow. The result obtained that the group of patients with access to a view of green areas had a shorter hospital stay, less negative evaluations from nurses, less moderate and strong analgesic doses and fewer postoperative complications. The analysis showed that access to a view of green spaces from the room for postsurgical recovery has a positive effect on the recovery of patients.

E. Evidence of the benefits of green spaces to health

Researchers such as Richard Mitchell and Frank Popham (2007), from England, have established an association that the larger amount of green spaces people perceive, the better health they have. Mass et al. (2009) conducted an investigation in which observed that there was a relationship between morbidity and green spaces around the
homes of people. Morbidity data were obtained from electronic medical records of 195 general practitioners in 96 clinics in the Netherlands for a population of 345,143 people. Morbidity was classified by physicians according to the International Classification of Primary Care and Care. They quantified the percentage of green space within one and three-kilometer radius around each household identified by zip code and logistic regression analyzes controlled for demographic and socioeconomic variables.

The aim of this study was to observe if having 10% more green space than the average population around homes would have an effect on morbidity of individuals. This was done in an area with a radius of 1 km and 3 km respectively. The study indicated that it has found a relationship between green space and a lower prevalence of specific diseases. Relationship was found for anxiety disorders (OR 0.95, at 1 km) and depression (OR 0.96, at 1km, 0.98 in 3 km). This study also highlighted the importance of green spaces for people of low socioeconomic level and children.

Mass utilized the participant’s educational level as an indicator of socioeconomic status. The study found that people with low education have a lower annual prevalence for obstructive lung diseases. This for the population with 10% of the average additional green space around their homes with an OR of 0.97 (1 km OR 0.97, 95% CI 0.95 to 0.99) compared with those of higher educational level (OR 0.98, 95% CI 0.96 - 1.00).

The analysis showed that for children the relationship was both the radius of one kilometer as the two miles. Diseases in which the relationship was strong were dizziness (1 km OR 0.81, 95% CI 0.74 to 0.90, 3 km OR 0.85, 95% CI 0.77 to 0.94) and intestinal problems (1 km OR 0.85, 95% CI 0.80 to 0.90, 3 km OR 0.89, 95% CI 0.84 to 0.94). But
the relationship was strongest for depression (1 km OR 0.79, 95% CI 0.72 to 0.88, 3 km
OR 0.84, 95% CI 0.78 to 0.9).

Ulrich (1984) studied the recovery of patients undergoing cholecystectomy
procedure in a hospital in Pennsylvania. The main factor studied was whether the
presence of windows overlooking green areas in the postoperative recovery room of the
hospital patient recovery affected in some way. The result obtained showed that the group
of patients with access to a view of green areas had a shorter hospital stay, lower negative
evaluations from nurses, fewer moderate and strong analgesic doses and fewer
postoperative complications. The analysis showed that access to a view of green space
from the postoperative recovery room had a positive effect on patient recovery.

Pretty et al. (2005) conducted an investigation where several individuals exposed
to images of pleasant green spaces and deteriorated ones, and nice looking urban and not
so nice. Physiological variables were measured as blood pressure and psychological
variables like self-esteem and mood, among others. The findings showed that during the
exercises exposed to pleasant images of green blood pressure of all participants was
down compared with the other exhibitions where blood pressure rose from 30% - 40% of
all participants. In the psychological area, exercise combined with the exposure to
pleasant images in both, the green spaces and urban areas, caused an increase in self-
esteeem. In the tension-anxiety measurement, all treatments improved the mood
significantly. The exercise alone clearly reduced stress and anxiety (p> 0.01), but
exercise combined with pleasant rural scenes (p <0.001) and urban pleasant scenes (p
<0.001) reduced the tension even more. The improvement was most remarkable in the
pleasant rural scenes being 11% more than in rural unpleasant scenes and 47% more than in the general urban category. In the area of physical activity decreased blood pressure in the images of pleasant rural scenes (p> 0.05), urban pleasant and (p> 0.01). These findings suggested that exercise in a pleasant environment can have a greater effect than exercise alone. Also, that it improves blood pressure, an important measure of cardiovascular health, and also improves the conditions related to mental health. In its conclusions, he included that exercise in green spaces has important implications for public health and environmental (Pretty et al. 2005).

Hartig et al. (2003) conducted an investigation in which compared the recovery of stress in natural and urban field scenarios. This comparison was achieved by quantifying repeated measures of blood pressure measurement methodologies emotions and care for 112 individuals collected. Blood pressure tests were conducted to a group in a room overlooking a green area and another in a closed room. Individuals in the room overlooking the green area had a decrease in diastolic blood pressure when compared to the individuals in the closed room. There were walking in grassy areas and in urban areas that showed a significant change in reducing the feeling of anger in patients who walked in the green area (p <0.01). A test was performed to measure the ability of attention at the midpoint of both walking, and when compared with a pre-test, the walkers in the green areas performed better than the walkers in urban areas (p <0.01).

Individuals who were exposed to a view of trees had a lower diastolic blood pressure than those who were not exposed to any view (p = 0.01). On a walk, individuals were divided in two groups, a group in parks and other in urban areas. After 30 minutes
of walk, the blood pressure was taken to find a difference of 6 mmHg less in individuals who were walking in green spaces (p <0.01). Walking through the green spaces also brought a positive change in the emotions of individuals (p <0.01) and in the process of care (p <0.01). Wiley et al. (1998) studied 74 urban public housing spaces outdoors, 27 in areas of low vegetation and 37 in areas of high vegetation. These spaces were observed on four separate occasions to quantify and analyze access to places for outdoor activities. Access was defined as the distance of households to green areas, the facilities for children and caregivers, as well as secured entrances and paths (sidewalks). Of the 262 children observed, the majority of them (73%) were involved in some kind of game and most groups of children (87%) were monitored to some extent by adults. In areas with less or no green the level of play of children was about half than that found in the spaces with more trees and grass, plus the impact of creative play was significantly lower in sterile spaces in relatively green spaces. This is important because children who play outdoors can do as much physical activity. The green areas benefit communities by serving as a place of focus, meeting and creating a sense of togetherness and belonging (Gemann-Chiari & Seeland, 2004). These areas are social benefits from the individual to the community level to promote national identity (Daniels, 1993).

Kuo & Sullivan (2001) conducted an investigation which asked whether places surrounded with more vegetation had a lower crime rate. He compared 98 apartment buildings surrounded by different amounts of green areas and reviewed the police reports of criminal cases in the study areas. The results indicated that the apartment buildings surrounded by more vegetation had lower crimes than in buildings surrounded by areas of lower vegetation. They performed a simple regression using vegetation as the
independent variable and crimes as the dependent. It showed that the vegetation was not significantly related to crime in the buildings’ area studied. The same analysis was performed controlling the confounding variable of empty apartments in each building and the relationship between vegetation and crime remained positive (p <0.01).

Mass et al. (2009) conducted research on the relationship of green spaces with the feelings of social security for over 8000 individuals in the Netherlands. The research concluded that these spaces have a positive impact in increasing feelings of social security, except in urban areas where they can create feelings of insecurity to be seen as most vulnerable places to be affected by crime (p <0.001). This perception could be reduced if these spaces are used in security strategies as lighting, sidewalks spacious, security cameras, community policing and police, among other options.

F. Researches that studied the relationship between amount of green space and health perception

Mass et al. (2006) found a positive relationship between the amount of green spaces and health perception of persons. The study of Mass is similar to the one presented here. It took place in Holland where the results showed that the amount of green spaces within a one kilometer radius (r = 0.005, p <0.001) and three kilometers (r = 0.006, p <0.001) respectively had a significant relationship with general health perception. The study included a population of 250.782 people, who completed a self-administered form for socio-demographic data and general health perception. In the perception of health, individuals were asked: "your health is”? Very good, good, fair, poor, or very poor. The percentage of green spaces (urban green space, farmland, natural green areas) was about
a mile and three mile radius around the postal code coordinates for every home of the interviewee. In places where 90% of the area around the houses was green space, 10.2% of the respondents stated not feel healthy. In comparison, areas that had only 10% of green space, 15.5% of respondents said not feel healthy. In extreme urban areas only the amount of green space within a radius of 3 kilometers were related to the perception of health. The relationship was present in all degrees of urbanity. The results of Maas et al. (2006) showed that the percentage of green spaces in the living environment of the population has a positive association with perceived general health of residents. One of the recommendations of Maas et al. (2006) was that public policies should give more importance to the development of green spaces in the ordinances for the use of land.

De Vries et al. (2003) conducted an exploratory analysis of the relationship between green spaces and health. His research question pursued to answer whether people who live in green areas are healthier than people living in less green areas. His research was conducted using health self-reported data of 17,000 individuals, combined with data on land use where information could be obtained of the amount of green spaces around the homes of individuals. The health information was obtained from general health interviews of 103 clinics around the Netherlands. De Vries et al. (2003) used three health indicators such as self-reported data for his study. He used the number of symptoms experienced in the last 14 days. The perception of general health was measured on a five-point scale from "very good" (1) to "very bad" (5). This score comes from the Dutch version of the General Health Questionnaire. Statistical analysis was controlled for socioeconomic variables and socio-demographic.
This study showed that people living in areas with more green spaces reported fewer symptoms of diseases than people living in urban areas (p <0.05). Also, people in these areas reported fewer illness symptoms. The results concluded that living in a green environment was positively related to better health perception (p <0.05). A subgroup analysis showed that this relationship was stronger for housewives, the elderly and people of less education (p <0.05). De Vries et al. (2003) mentioned that if you create new green areas, increasing the amount of them, the positive impact on the health of people living within three kilometers of these areas would be significant.

Mitchell & Popham (2007) conducted a study where determined the association between the percentage of green space in an area and the standardized rate of self-reported health perception. They used 2001 census data in England which included a question on health perception “Your health had been? good, very good or not good". For use in the database responses were divided into good or very good health, and no good health. In addition, they calculated a standardized morbidity rates by age and sex for the group said that their health was not good. Where if the resulting value was above 1 indicated a higher rate, and below 1, a rate lower than the average national population.

As a result, they found an association between greater amount of green spaces in an area and better perceived health (β = -0.021, p <0.000). This association was also found specifically in urban areas for people of higher economic level (β = -0.05, p <0.000) and people of lower economic level (β = -0.02, p <0.000). It was also found for people of lower economic status in rural areas (β = -0.06, p <0.002). Mitchell & Popham
(2007) concluded that the quality of green spaces as well as quantity, are important to achieve health benefits of the population.

G. Exposure to green spaces

De Vries (2006) reviewed the work of Owen et al. (2000) and the Pikora et al. (2003) and mentioned that both studies suggested that green spaces encourage the realization of physical activity. Spaces like the playgrounds are great places for children to play outdoors while exercising. The linear parks can promote walking, running and biking between adult populations. Jones et al. (2009) conducted an investigation which showed that people who live far from the green spaces tend to visit less these spaces do not meet physical activity recommendations and tend to be more obese. The findings of this study demonstrated that when you have green areas with good accessibility to the public are encouraged to make them more active.

De Vries (2006) also stated that green areas promote positive social contact and has been shown that this contact is good for maintaining good health. Mass et al. (2009) confirmed this and showed the social interaction that is promoted in green spaces as a possible mechanism for individuals to have a better perception of health. De Vries added that green spaces provide a full development of children. Green spaces are a place that allows children to explore nature, get in touch with her, learn, play and let your imagination run. Young people tend to use green spaces for picnics and share with groups of friends who share your interests (Mäkinen, 2008). Finally, De Vries (2006) pointed out that the green spaces can help people improve their quality of life and grow as individuals. This is because these spaces promote a process of reflection and
development of a sense of purpose. A number of activities such as photography, drawing and painting, education, research and implementation of sports can be done in natural areas. They also serve to train professional athletes and teams to practice agriculture.

Recently the scientific community has been conducting a series of investigations to establish whether there is evidence of a positive relationship between green spaces and health of people (Mass et al. 2009, Mass et al., 2006; De Vries et al. 2003; Barbosa, 2007; Barnett, 2004; Boone-Heinonen, 2010; Butler, 2006; Coombes, 2010; Couttsa, 2010; Chiar Germann, 2004). There have been studies from the seventies linking green spaces to health, but it was in the 2000s that have made every effort to gather scientific evidence of a comprehensive and more complete conceptual framework to explain the relationship between green space and its effects on health and welfare.
Chapter 3. Methodology

This chapter presents the methodology utilized in this investigation. This chapter also describes the observational process and specific observations, and the statistics analysis that were used to answer the investigation question. Also, the definition of eco-hotels and green spaces utilized in this specific study are provided. Furthermore, the analysis variables are defined.

A. Research design

The investigation designed for this study is an observational descriptive design. An observational study is a study in which the researchers only observe behavior in a systematic manner without influencing or interfering with the behavior of the participants (Gordis, 2004). Observational studies can involve naturalistic observation or laboratory observation. A naturalistic observation was conducted in this study. These observations are the ones that involve observing behaviors in the natural environment.

This observational study was conducted in a determined time frame and with a determined population. This observational study was composed by two groups, were one group has the possibility of direct exposure to the green spaces and the other group not. There was a comparison between visitors of eco-hotel and urban hotels daily activities. The observations were taken in a programmed time frame of July 25, 2012 to October 16, 2012. The population used for the study was the visitors of selected eco-hotels and urban hotels in the Caribbean island of Puerto Rico.
B. Observational methodology advantages:

i. Observations are usually flexible and do not necessarily need to be structured around a hypothesis. The researcher can have first-hand experience of their study.

ii. In terms of validity, observational research findings are considered to be strong. Validity is the best available approximation to the truth of a given proposition, inference, or conclusion. Observational research findings are considered strong in validity because the researcher is able to collect a depth of information about a particular behavior. The ability to record and report all findings that are true to the topic at hand.

C. Observational methodology disadvantages:

i. There are issues with reliability and generalizability. Reliability refers to the extent that observations can be replicated. Seeing behaviors occur over and over again may be a time consuming task. Generalizability, or external validity, is described as the extent that the study's findings would also be true for other people, in other places, and at other times. In observational research, findings may only reflect a unique population and therefore cannot be generalized to others.

ii. There are also problems with researcher bias. Often it is assumed that the researcher may "see what they want to see." Bias, however, can often be overcome with training or electronically recording observations. Hence, overall, observations are a valuable tool for researchers. The viewer's or
researcher's own perception of what is it, will give bias to the end recorded result.

a. To reduce the researcher bias, an observation matrix was developed and used with the incorporation of training for the observers on how to standardize the observations.

D. Study area

Puerto Rico, officially the Commonwealth of Puerto Rico, is an unincorporated territory of the United States, located in the northeastern Caribbean, east of the Dominican Republic and west of both the U.S. Virgin Islands and the British Virgin Islands. Puerto Rico is 100 miles long by 35 miles wide, and it is the smallest island of the Greater Antilles. Puerto Rico consists of an archipelago that includes the main island of Puerto Rico, Vieques, Culebra, Mona and numerous islets. The 2010 Census estimated the population of Puerto Rico in 3,725,789 habitants (US Census Bureau, 2010).

Figure 1: A- Central America and the Caribbean. B- Puerto Rico. C- Study Area
Tourism has been a growing industry in Puerto Rico for a number of decades. It is host to diverse natural resources, culture and history, excellent Caribbean food and hospitality. The main groups that visit Puerto Rico are tourist from the United States. Other groups of tourists that visit Puerto Rico in significant numbers include Mexicans, Dominicans, Venezuelan, Spaniards, French, German and Asian tourists (Puerto Rico Tourism Company 2010).

Puerto Rico is divided into eight tourist areas: 1. Metro San Juan includes the Capital that has over five hundred years of history and it is the largest capital city in the Caribbean. 2. Vieques is a municipally island located in the east cost of Puerto Rico and it is known by its beaches and a bio-luminance bay. 3. Culebra is also a municipally Island of Puerto Rico located near Vieques and is known for Flamenco beach. 4. Porta Atlantico area is form by the municipalities of Camuy, Hatillo, Arecibo, Barceloneta, Manati, Vega Baja, Vega Alta, Dorado and Toa Alta. The most known tourist attractions are the Cuevas de Camuy and the Arecibo Observatory. 5. Porta Caribe tourist area is form by the municipalities of Guayanilla, Ponce, San Isabel, Salinas, Arroyo, and Patillas. This area is known by their secluded and calm waters and boats marinas. 6. Porta Antillas is the area conformed by Yunque rain forest as its main attraction with 240 trees species with waterfalls, hiking trails and panoramic vistas (Tourism Office, 2012). 7. Porta Cordillera is the tourist area that includes the mountainous central area of Puerto Rico and is famous for “ruta del lechon” that is a gastronomic journey of restaurants dedicated to roast pig. The Cordillera Central is the longest mountain group in Puerto Rico. Casa Grande Mountain Retreat and Hotel el Jibarito are located in this tourist area. 8. Porta del Sol tourist area is conformed of small municipalities towns that include
Aguadilla and Mayaguez which includes the urban hotels utilized in the study. Porta del Sol is mostly composed of the west coast of the Island and its known by its surfing beaches (Tourism Office, 2012). The most commonly known surfing beaches in the area are Tres Palmas, Wilderness, and Middles beach that will host the 2012 World bodyboard competition in November 13, 2012.

1. Eco-hotels facilities description

   i. Hotel hacienda el Jibarito

   Hacienda El Jibarito in San Sebastian, PR. is the first agro-tourist complex in the west area intended for green spaces appreciation and combines cultural and historical elements to offer a direct experience with past agricultural systems used in the Island and the rural life. It is located in one of the mountainous areas of Puerto Rico, there will enjoy the natural environment that combines planting and cultivation, mountains, rivers and vegetation.

   The hotel has a pool that can accommodate 40 visitors and Jacuzzi accommodates 5. “Las Delicia”s Restaurant Gastronomic Culture and “Toro Al'Diente” restaurant offers guests and general public a varied menu with creole and fine dishes. You can also visit the “Café Hacienda El Jibarito”, developed at the resort as a Roasting Coffee Bar. Also, the Alembic has an excellent view of the natural landscape and accommodates up to 100 guests. Hacienda El Jibarito offers three trails that range from easy to high physical intensity. The trails are located around the hotel and offer excellent exposure to the area’s green spaces.
ii. Casa Grande Mountain Retreat

The hotel is set in a stunning valley in the municipally of Utuado, PR it has over 200 lush tropical acres and is less than two hours from San Juan. Casa Grande Mountain Retreat was created as an oasis of peace and tranquility. The former coffee plantation, now exquisitely landscaped, has 20 rooms scattered up the mountainside, each with private bath, balcony, and hammock. A fresh-water swimming pool is cradled beneath a green mountain vista. A fully equipped yoga center is used for individual and group practice. The “café” serves local and international dishes. Casa Grande Mountain retreat offers two trails that provide an excellent direct contact with the green spaces in the area. The short trail is 1.6 miles and rated easy to moderate physical level requirements and the long trial is 4.5 miles and rated medium to high physical activity trail.

2. Urban Hotels facilities description

i. Holiday Inn in Mayaguez, PR

The hotel is very stylish, well-lit lobby welcomes you to your Caribbean vacation in Puerto Rico at the Holiday Inn Mayaguez and El Tropical Casino. It is situated in Mayaguez, the hotel's location provides you with easy access to attractions of the west side of the Island. Leisure guests headed to Mayaguez will enjoy the proximity to attractions like the Dr. Juan A. Rivero Zoo. The area is surrounded by beaches, including Rincon and Boqueron no further than 20 to 40 minutes away. Since Mayaguez plays host to a number of events, travelers have a chance to see the Mango Festival, among other festivals in the area.
The Holiday Inn Mayaguez caters to business patrons as well. It is near PRTEC, VITEC and several industrial parks. It features a boardroom and a 3,747-sq-ft ballroom with state of the art equipment, catering and a capacity for up to 250 guests. The hotel also provides complimentary high-speed Wi-Fi access. With an outdoor pool, children's pool and a Fitness Center, you can relax and recharge. The hotel prides in its restaurant, Holly's Cafe gives you a unique taste of Caribbean and International cuisine (Holiday Inn Mayaguez 2012). This hotel also has one of the few casinos on the west side of the Island and provides nightlife environment to tourist and locals alike.

ii. Marriott country yard in Aguadilla, PR

The Marriott country yard hotel is located inside Ramey Base in Aguadilla, PR. It is located in the north-west side of Puerto Rico and near one of the most visited surfing beaches in the area. The hotel offers modern stylish guests rooms with flat screen TVs and its luxury interiors. The hotel has event facilities and casino on site. The main attractions are golf, tennis, beach, sightseeing and shopping nearby. Resort-like setting offers pools, aquatic playground, fitness center, restaurant, and bars around the property.

E. Population and Sample

The sample was gathered from four hotels, two eco-hotels and two urban hotels in the central and west area of the Island of Puerto Rico. The sample was taken during the tourism high season and was observed that most of the visitors were locals. There were children, young people, adults, and senior citizens in the sample. The only requirement to be part of the sample was to be inside the hotels enjoying its facilities.
F. Measurement instruments (See Annex 1)

1. The instruments utilized to gather the observations were conformed of three areas.

The instruments are described as follow:

a. Identification
   i. Hotel type (Eco-hotel or Urban Hotel), Hotel name, Hotel location (Municipally)
   ii. Time of the observation, date
   iii. Observer’s ID
   iv. Hotel area:
      1. Lobby/Terrace
      2. Dining rooms
      3. Swimming pools
      4. Coffee shops
      5. Trails
      6. Room area
      7. Picnic areas
      8. Parking lot
      9. Casino

b. Socio-demographic data
   i. Number of members in the groups
   ii. Gender
   iii. Age
c. This is the main part of the study and its objective is to observe the presence or absence of the contact mechanisms between visitors and green spaces (De Vries, 2006) in the hotel facilities. The definition of the mechanism applied to the study are:

i. Reduction of stress and restoration of attentional fatigue - This mechanism was identified when the visitors were conducting activities like:
   1. Reading books in green spaces areas
   2. Photographing the green spaces
   3. Talking among group members
   4. Dining in the presence of green spaces
   5. Resting in green spaces areas like terraces, pools, gardens, etc.

ii. Promoting physical activity - This mechanism was identified when the visitors were conducting activities like:
   1. Hiking in trails
   2. Swimming in pools and ponds
   3. Conducting sport activities
   4. Children conducting high intensity games
   5. Walking around the gardens and green spaces areas

iii. Enhancing positive social contact with neighborhood members - This mechanism was identified when the visitors were conducting activities like:
   1. Interaction between people
   2. Interaction between different group members
3. Children playing among different group members

iv. Healthy development of children- This mechanism was identified when the visitors were conducting activities like:

1. Using the green spaces as a method of education and valuation of the natural environment
2. Sight seeing
3. Promoting the imagination and children’s curiosity
4. Children physical activity

v. Personal growth of adults/ enhance quality of life- This mechanism was identified when the visitors were conducting activities like:

1. Interaction between couples at the green spaces
2. Interaction between groups at the green spaces

G. Variable definition

1. Dependent variable: Description and observation of the contact mechanisms as defined in Part F, (measurement instrument part). This variable is a categorical one that defines the observed presence of absence of each individual contact mechanism.
   a. Reduction of stress and restoration of attentional fatigue
   b. Promoting (more) physical activity
   c. Enhancing positive social contact with neighborhood members
   d. Healthy development of children
   e. Personal growth of adults/ enhance quality of life
2. Independent variable: Type of hotel- The variable was identified as Hotel or Eco-hotel. This variable is a categorical one that defines the type of hotel between urban hotels with limited access to green spaces and eco-hotel that provide direct contact with the green spaces.

3. The socio-demographic variables utilized in this study are the basic ones used in the majority of the scientific and sociology studies. The variables were:
   a. Number of members in the groups: This is a numerical continuous variable that defines the number of group members at the observation time.
   b. Gender: This is a categorical variable that defines the gender of the visitors between female and male.
   c. Age: This is a numerical continuous variable that defines the estimated age of the visitor by the observer. For the analysis this variable was categorized in quartiles. The quartiles were stipulated as follow:
      1- Q1: 1 – 25 years 
      2- Q2: 26 – 40 years 
      3- Q3: 41 – 55 years 
      4- Q4: 56 ≥
   d. Area where the observation took place: The variable is a categorical one and defines the hotel’s areas were the observation was taken. For the analysis this variable was categorized in four areas. The areas are:
      1- Dining room and coffee shop 
      2- Trails, picnic areas, cabin areas, terraces, swimming pools 
      3- Parking
4- Casino

H. Human rights and confidentiality

This research was conducted using the fundamental ethical principles established by the Universal Declaration of Human Rights Law of 1948. Respect the participants, their autonomy and protected for the disabled. The study does not involve a personal benefit and not harm to the participant. This study took in consideration all rights, approaching the research from what is considered morally right and proper.

I. Observational methodology

The research took place in the municipally towns of Aguadilla, Mayaguez, San Sebastian and Utuado, PR. The observations were taken during the months of July through October 2012. All the observations were recorded during weekends and between the hours of 0700 to 1600. The observations included descriptive information on the groups and individuals visiting one of the hotels selected for the study. The areas were the observations were taken are:

1. Lobby/Terrace
2. Dining rooms
3. Swimming pools
4. Coffee shops
5. Trails
6. Cabin/Room area
7. Picnic areas
8. Parking lot

9. Casino

The areas were designated in previous visits to the hotels to select the areas that had the most persons and groups gatherings. The study had four observers that were trained to reduce the bias of the observations. At the end of observation gathering the data was moved to an electronic database in order to check the data quality and then perform pertinent descriptive statistical analysis.

J. Data descriptive analysis

To observe the behavior of the study variables were performed descriptive statistical analysis. These analyzes reflect differences of the use of the hotel areas and the presence of the direct contact mechanisms for gender and age. In addition, it allows visualizing in which type of hotel the direct contact mechanism were observed with more frequency. Also, it presents each of the mechanisms and its presence in reference on gender, age, type of hotel.

Also the study assessed the statistical association between the following variables:

a. Age and hotel type
b. Gender and hotel type
c. Age and presence or absence of at least one direct contact mechanism
d. Gender and the presence or absence of at least one contact mechanism
e. The presence or absence of at least one contact mechanism and hotel type
f. The presence or absence of each individual contact mechanism and hotel type

Bivariate Analysis involves the analysis of two variables, for the purpose of determining the empirical relationship between them. The purpose is to see if the variables are related to one another. It is common to measure how those two variables simultaneously change together. To evaluate these associations, a Pearson’s chi-square test was conducted. Pearson’s Chi-square is any statistical hypothesis test in which the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. A logistic regression model was used to access the magnitude of the association between the presence of each contact mechanism and hotel type. The result obtained were defined in terms of odds ratio (OR) and all the analysis performed used a significance confidence level of output of (α) of 0.05.
Chapter 4: Results

This chapter summarizes the results of the study conducted. The gathered data was taken between July and October 2012. This study is an observational and descriptive one. The database consisted of observations that included 56 groups or 120 individuals. All participants were participants in one of the nine designated activities at their respective hotels.

The observations measured the presence of one or more direct contact mechanisms. Hotel Haceinda el Jibarito and Casa Grande Mountain Retreat have in common the direct access to green spaces. Both eco-hotels offer hiking trails starting a few meters from their lobbies. In the other hand, the other hotels had no visible green spaces and most of their attractions were offsite. The interaction with the natural environment was evident in the eco-hotels. The observations took place in various hotel locations. Most of the observations were taken at the pools, lobbies and casinos.

A. Facilities and area description:

Figure two (2) is a map view of Hotel Hacienda el Jibarito in San Sebastian, PR. The eco-hotels is mostly surrounding by green spaces. The arrow number one displays the location of the main lobby and restaurant. This area offers an excellent view to the green spaces nearby. The second arrow show the horseback riding trail, this trail offer direct contract with the green spaces and provide contact with the surrounding ecosystem. Arrow number three points to the cabins that are surrounded by the area’s green spaces. Finally, arrow number four points to the main trail of Hacienda el Jibarito. There are
three trails that interconnect to each other and have access to multiple ponds and green spaces in the area. During the research period, thirty observations were taken in different areas of the eco-hotel. The majority of the observations took place at the pool, cabins and trails.

Figure 2. Hotel Hacienda el Jibarito San Sebastian, PR

Figure three (3) is a map view of the Hotel Casa Grande Mountain Retreat in the municipally town of Utuado, PR. Casa Grande Mountain Retreat is located in a very seclude location. Arrow 1 in Figure 2 displays two of the eco-hotel’s cabins. All the cabins have direct view and access to the area’s green spaces. The cabins have neither air conditioner nor television. Arrow 2 shows the main lobby and restaurant. The restaurant has a view to nearby mountains and the vintage landscape which offers a relaxing
opportunity for the visitors. Arrow 3 shows the area of the trails in the northeast side of the Mountain Retreat. The trails are completely covered by trees. Arrow 4 points to a very narrow road that is the only access point for the property. Finally, arrow 5 points to the mountainous area. The retreat offers an access point for the mountains with a guided tour upon request. During the research period thirty two observations were taken at the eco-hotel. The majority of the observations took place at the pool, cabins and restaurant.

Figure 3. Casa Grande Mountain Retreat Utuado, PR

Figure 4 is a map view of Holiday Inn hotel located in the municipally town of Mayaguez, PR. During the research period twenty nine observations were taken. The vast majority of the observations took place in the casino; this is the hotel area were the guest frequented the most. The overlay in Figure 4 shows the main areas of interest in the hotel.
The arrow number one points to the hotel’s location and main building. Arrow number two is PR 2, the main road on the west coast in the Island. The PR 2 is the main road that communicates Mayaguez with all west municipalities. The arrow with the number three shows a green spaces area in the hotel’s vicinity, however, this green space is neither part of the hotel nor accessible to the visitors. Arrow number four points to the swimming pool, it has some direct contact with green spaces and partial view to forested areas nearby. The last arrow, number five, shows some green spaces in the hotel’s vicinity. These areas are not part of hotel and belong to the government.

![Image of Holiday Inn Mayaguez](image)

Figure 4. Holiday Inn Mayaguez, PR

Figure 5 is a map view of Marriot Hotel in the municipally town of Aguadilla, PR. This hotel is located near the northwest coast. It is located in Ramey Base, near the Aguadilla
international airport. During the research, there were twenty nine observations. The concentration of the observations was in the casino and pool areas were the visitors gathered the most.

The overlay in figure 5 shows the main areas in the vicinity of the hotel. Arrow number one points to the hotel’s main building. This area includes the rooms, casino, restaurants, and swimming pool. Arrow number two points to a green area patch located north of the hotel. This area is fenced in is not part of the hotel. Arrow number three points to another guest house in the area. The landscape of the area has been man made. Arrow number four shows a view of the beach. This beach is widely used by surfers and its home to surfing competitions year round.

Figure 5. Marriott Courtyard Aguadilla, PR
B. Tables and Frequencies.

Table 1 displays the observations recorded in each individual hotel. The first column is the name of the hotels. Second column is the type of hotel. The sample was divided between eco-hotel and regular urban hotel. The third column is the frequency of the observation and the fourth column displays the percentage.

Table 1: Observations recorded in each hotel

<table>
<thead>
<tr>
<th>Hotels</th>
<th>Eco-Hotel</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hacienda el Jibarito</td>
<td>Yes</td>
<td>30</td>
<td>25.00</td>
</tr>
<tr>
<td>Casa Grande Mountain Retreat</td>
<td>Yes</td>
<td>32</td>
<td>26.67</td>
</tr>
<tr>
<td>Holiday Inn, Mayaguez</td>
<td>No</td>
<td>29</td>
<td>24.17</td>
</tr>
<tr>
<td>Marriott Courtyard, Aguadilla</td>
<td>No</td>
<td>29</td>
<td>24.17</td>
</tr>
</tbody>
</table>

Table 2 shows the distribution of the hotel areas where the observations were recorded. The first column is the area of the hotel that the observations were recorded. The second column shows the frequency of the observations. The third column is the percentage of the observations in each particular area.
Table 2: Distribution of the areas where the observations were recorded.

<table>
<thead>
<tr>
<th>Area of the hotel</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lobby/Terrace</td>
<td>11</td>
<td>9.17</td>
</tr>
<tr>
<td>Dining Room</td>
<td>32</td>
<td>26.67</td>
</tr>
<tr>
<td>Swimming Pool</td>
<td>22</td>
<td>18.33</td>
</tr>
<tr>
<td>Coffee Shops</td>
<td>8</td>
<td>6.67</td>
</tr>
<tr>
<td>Trails</td>
<td>10</td>
<td>8.33</td>
</tr>
<tr>
<td>Cabin/Room areas</td>
<td>7</td>
<td>5.83</td>
</tr>
<tr>
<td>Picnic areas</td>
<td>6</td>
<td>5.00</td>
</tr>
<tr>
<td>Parking Lots</td>
<td>2</td>
<td>1.67</td>
</tr>
<tr>
<td>Casinos</td>
<td>22</td>
<td>18.33</td>
</tr>
</tbody>
</table>

Table 3: Hotel type and observation area.

<table>
<thead>
<tr>
<th>Hotel Type</th>
<th>Dining rooms/ Coffee shops</th>
<th>Trails, Cabins, Swimming pools, Picnic areas, Terrace</th>
<th>Parking lot</th>
<th>Casinos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>21 (36.21 %)</td>
<td>15 (25.86 %)</td>
<td>0 (0.0 %)</td>
<td>22 (37.93 %)</td>
</tr>
<tr>
<td>Eco-hotel</td>
<td>19 (30.65 %)</td>
<td>41 (66.13 %)</td>
<td>2 (3.23 %)</td>
<td>0 (0.0 %)</td>
</tr>
</tbody>
</table>

(Fisher’s exact) P Value < 0.001
C. Socio-demographic characteristics of the studied sample:

Table 4 present the description of the gender of the participants. The first column presents the gender of the individuals observed. The second describes the frequency of the sample and the third column the percentage. There were twelve more females than males during the period of study.

Table 4: Description of the gender frequencies among the observed individuals

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>66</td>
<td>55.00</td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>45.00</td>
</tr>
</tbody>
</table>

Table 5 presents the approximate age of the individuals observed for the study. The first column displays the age in brackets of ten years. The second column shows the frequency that the particular age bracket was observed. The third column is the percentage per age bracket. The age brackets with more frequencies were 51-60 with 25 and 31-40 with 21.
Table 5: Description of the approximate age among the observed individuals

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>16</td>
<td>13.33</td>
</tr>
<tr>
<td>11-20</td>
<td>7</td>
<td>5.84</td>
</tr>
<tr>
<td>21-30</td>
<td>18</td>
<td>15.00</td>
</tr>
<tr>
<td>31-40</td>
<td>21</td>
<td>17.40</td>
</tr>
<tr>
<td>41-50</td>
<td>17</td>
<td>14.16</td>
</tr>
<tr>
<td>51-60</td>
<td>25</td>
<td>20.84</td>
</tr>
<tr>
<td>≥61</td>
<td>16</td>
<td>13.33</td>
</tr>
</tbody>
</table>

Table 6 denotes the number of persons per group in the first column. The second column displays the numbers of groups with each group size. The main reason for single visitors was because the activity they were performing at the time of the observations. These individuals were mostly observed in the casino.

Table 6: Distribution of the quantity of individuals that conforms the groups

<table>
<thead>
<tr>
<th>Group members</th>
<th>Number of Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (one individual)</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 7 is the association between the visitor’s age and the type of hotel they were visiting. The first column displays the age of the participants in quartiles from one to twenty-five years. The second column is the amount of observations in the particular age group in the regular urban hotels. The observations for the age group 56 years and above showed a significant increase of this group in the urban hotels. The third column shows the amount of observations recorded in the particular age group in the eco-hotels. The observations presented that the majority of young visitors were guests in the eco-hotels. This relation was statistically significant (P Value < 0.05).

Table 7: Association between visitor’s age and type of hotel

<table>
<thead>
<tr>
<th>Age</th>
<th>Hotel</th>
<th>Eco-hotel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 25 years</td>
<td>9 (34.62%)</td>
<td>17 (65.38%)</td>
</tr>
<tr>
<td>26 – 40</td>
<td>6 (20.00 %)</td>
<td>24 (80.00 %)</td>
</tr>
<tr>
<td>41 – 55</td>
<td>18 (54.55 %)</td>
<td>15 (45.45 %)</td>
</tr>
<tr>
<td>≥ 56</td>
<td>25 (80.65 %)</td>
<td>6 (19.35 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 8 presents the association between visitor’s gender and the type of hotel. The distribution of gender between the types of hotels was equitable. The relationship between the gender and the type of hotel wasn’t statistically significant (P Value > 0.05)
Table 8: Association between visitor’s gender and type of hotel

<table>
<thead>
<tr>
<th>Gender</th>
<th>Hotel</th>
<th>Eco-hotel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>31 (46.97%)</td>
<td>35 (53.03%)</td>
</tr>
<tr>
<td>Male</td>
<td>27 (50.00%)</td>
<td>27 (50.00%)</td>
</tr>
</tbody>
</table>

P Value = 0.741

Table 9 displays the association between the observations of at least one direct contact mechanism in each type of the hotels. The relation between at least one contact mechanism and the type of hotel was statistically significant (P Value < 0.01).

Table 9: Association between the presence of at least one contact mechanism and type of hotel

<table>
<thead>
<tr>
<th>Contact mechanisms</th>
<th>Hotel</th>
<th>Eco-Hotel</th>
</tr>
</thead>
<tbody>
<tr>
<td>No mechanism observed</td>
<td>26 (100 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td>At least one mechanism observed</td>
<td>32 (34.04 %)</td>
<td>62 (65.96 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 10 shows the association between visitor’s age and the presence of at least one direct contact mechanism. The relation showed that at least one mechanism was present in younger visitors (P Value < 0.01). There are a marked number of visitors of the first 3 age quartiles showing at least one contact mechanism.
Table 10: Association between visitor’s age and the presence of contact mechanisms

<table>
<thead>
<tr>
<th>Age</th>
<th>No mechanism observed</th>
<th>At least one mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 25 years</td>
<td>0 (0.00 %)</td>
<td>26 (100%)</td>
</tr>
<tr>
<td>26 – 40</td>
<td>1 (3.33 %)</td>
<td>29 (96.67 %)</td>
</tr>
<tr>
<td>41 – 55</td>
<td>3 (9.09 %)</td>
<td>30 (90.91 %)</td>
</tr>
<tr>
<td>≥ 56</td>
<td>22 (70.97 %)</td>
<td>9 (29.03 %)</td>
</tr>
</tbody>
</table>

P Value < 0.01

Table 11 presents the association between visitor’s age and the presence of at least one direct contact mechanism. There was no relationship between gender and at presence of least the one direct contact mechanism (P Value > 0.05).

Table 11: Association between visitors’ gender and the observation of at least one direct contact mechanism.

<table>
<thead>
<tr>
<th>Gender</th>
<th>No mechanism observed</th>
<th>At least one mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>13 (19.70%)</td>
<td>53 (80.30 %)</td>
</tr>
<tr>
<td>Male</td>
<td>13 (24.07 %)</td>
<td>41 (75.93 %)</td>
</tr>
</tbody>
</table>

P Value = 0.563

Table 12 is the relation between gender and the observed presence of direct contact mechanism number one. The contact mechanism is the Reduction of stress and restoration of attentional fatigue. During the research the contact mechanism number one was equally distributed in both genders and hotel type. The study reflected that there wasn’t a statistical association between variables (P value > 0.05).
Table 12: Gender and the observed presence of contact mechanism number one.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mechanism number one not observed</th>
<th>Mechanism number one observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>24</td>
<td>42</td>
</tr>
<tr>
<td>Male</td>
<td>26</td>
<td>28</td>
</tr>
</tbody>
</table>

P Value = 0.193

Table 13 displays the relation between gender and the observed presence of the contact mechanism number two. The mechanism number two is the promotion of physical activity. The study reflected that there wasn’t a significant statistical association between the two variables (P value > 0.05).

Table 13: Gender and the observed presence of contact mechanism number two.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mechanism number two not observed</th>
<th>Mechanism number two observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>52</td>
<td>14</td>
</tr>
<tr>
<td>Male</td>
<td>41</td>
<td>13</td>
</tr>
</tbody>
</table>

P Value = 0.709

Table 14 denotes the relation between gender and the observed presence of the contact mechanism number three. The mechanism number three is enhancing positive social contact with neighborhood members. The study reflected that there wasn’t a statistical association between variables (P value > 0.05).
Table 14: Gender and presence of contact mechanism number three.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mechanism number three not observed</th>
<th>Mechanism number three observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>42</td>
<td>24</td>
</tr>
<tr>
<td>Male</td>
<td>40</td>
<td>14</td>
</tr>
</tbody>
</table>

P Value = 0.221

Table 15 displays the association between gender and the observation of direct contact mechanism number four. The contact mechanism number four is healthy development of children. The study reflected that there wasn’t a statistical association between variables (P value > 0.05).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mechanism number four not observed</th>
<th>Mechanism number four observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>45</td>
<td>21</td>
</tr>
<tr>
<td>Male</td>
<td>42</td>
<td>12</td>
</tr>
</tbody>
</table>

P Value = 0.242

Table 16 presents the association between gender and the observed presence of direct contact mechanism number five. Contact mechanism numbers five is personal growth of adults and enhance their quality of life. The study reflected that there wasn’t a statistical association between variables (P value > 0.05).
Table 16: Gender and the presence of contact mechanism number five.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mechanism number five not observed</th>
<th>Mechanism number five observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>25</td>
<td>41</td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>35</td>
</tr>
</tbody>
</table>

P Value = 0.761

Table 17 is the relationship between gender and the observation area in the hotels. The data gathered showed that there was not a relation between the variables of gender and observation area in the hotels. The observation areas in this table were arranged by the type of activity relationship.

Table 17: Gender and observation area.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Dining rooms/ Coffee shops</th>
<th>Trails, Cabins, Swimming pools, Picnic areas, Terrace</th>
<th>Parking lot</th>
<th>Casinos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>27 (40.91 %)</td>
<td>26 (39.39 %)</td>
<td>2 (3.03 %)</td>
<td>11 (16.67 %)</td>
</tr>
<tr>
<td>Males</td>
<td>13 (24.07 %)</td>
<td>30 (55.56 %)</td>
<td>0 (0.0 %)</td>
<td>11 (20.37 %)</td>
</tr>
</tbody>
</table>

P Value = 0.109

Table 18 displays the association between age and the presence of mechanism number one. Mechanism number one is the reduction of stress and restoration of attentional fatigue. The data showed that the first quartile has the overall chance of
visiting an eco-hotel and the fourth quartile displayed the opposite by having the older visitors having the opportunity of visiting a regular urban hotel.

Table 18: Association between age and the presence of contact mechanism number one.

<table>
<thead>
<tr>
<th>Age</th>
<th>Mechanism number one</th>
<th>Mechanism number one</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not observed</td>
<td>observed</td>
</tr>
<tr>
<td>1-25 (Q1)</td>
<td>6 (23.06 %)</td>
<td>20 (76.92 %)</td>
</tr>
<tr>
<td>26-40 (Q2)</td>
<td>9 (30.00 %)</td>
<td>21 (70.00 %)</td>
</tr>
<tr>
<td>41-55 (Q3)</td>
<td>11 (33.33 %)</td>
<td>22 (66.67 %)</td>
</tr>
<tr>
<td>≥ 56 (Q4)</td>
<td>24 (77.42 %)</td>
<td>7 (22.58 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 19 presents the association between age and the presence of contact mechanism number two. Contact mechanism number two is the promotion of physical activity. The data analysis showed a relation between the variables. The observations displayed that age group quartile number four was performing sedentary activities during the time of the observation. The other age group quartiles displayed an even number of frequencies.
Table 19: Association between age and the presence of contact mechanism number two.

<table>
<thead>
<tr>
<th>Age</th>
<th>Mechanism number two not observed</th>
<th>Mechanism number two observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-25 (Q1)</td>
<td>18 (69.23 %)</td>
<td>8 (30.77 %)</td>
</tr>
<tr>
<td>26-40 (Q2)</td>
<td>21 (70.00 %)</td>
<td>9 (30.00 %)</td>
</tr>
<tr>
<td>41-55 (Q3)</td>
<td>23 (69.70 %)</td>
<td>10 (30.30 %)</td>
</tr>
<tr>
<td>≥ 56 (Q3)</td>
<td>31 (100.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
</tbody>
</table>

P Value = 0.007

Table 20 shows the association between age and the presence of contact mechanism number three. Contact mechanism number three is enhancing positive social contact with neighborhood members. There was a relation between the variables where mechanism number three was observed with more frequency in the second age group quartile. The data also showed that age group quartile number four had the least amount of observations having the direct contact mechanism three. The reason for the lower number in this age group was that the integrant of the age group were conducting activities not requiring more members.
Table 20: Association between age and the presence of contact mechanism number three.

<table>
<thead>
<tr>
<th>Age</th>
<th>Mechanism number three not observed</th>
<th>Mechanism number three observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-25 (Q1)</td>
<td>16 (61.54 %)</td>
<td>10 (38.46 %)</td>
</tr>
<tr>
<td>26-40 (Q2)</td>
<td>14 (46.67 %)</td>
<td>16 (53.33 %)</td>
</tr>
<tr>
<td>41-55 (Q3)</td>
<td>24 (72.73 %)</td>
<td>9 (27.27 %)</td>
</tr>
<tr>
<td>≥ 56 (Q3)</td>
<td>28 (90.32 %)</td>
<td>3 (9.68 %)</td>
</tr>
</tbody>
</table>

P Value = 0.003

Table 21 is the association between age and the presence of contact mechanism number four. Contact mechanism number four is the healthy development of children. The data showed a relation between the variables and displayed that the age group quartile number one. The reason for the higher number of frequencies in the observation of mechanism number three was that the children were accompanied mostly by individuals in the age group quartile number one as well.

Table 21: Association between age and the presence of contact mechanism number four.

<table>
<thead>
<tr>
<th>Age</th>
<th>Mechanism number four not observed</th>
<th>Mechanism number four observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-25 (Q1)</td>
<td>11 (42.31 %)</td>
<td>15 (57.69 %)</td>
</tr>
<tr>
<td>26-40 (Q2)</td>
<td>21 (70.00 %)</td>
<td>9 (30.00 %)</td>
</tr>
<tr>
<td>41-55 (Q3)</td>
<td>25 (75.76 %)</td>
<td>8 (24.24 %)</td>
</tr>
<tr>
<td>≥ 56 (Q3)</td>
<td>30 (96.77 %)</td>
<td>3 (3.23 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001
Table 22 is the association between age and the presence of contact mechanism number five. Contact mechanism number five is personal growth of adults and enhancement of quality of life. The statistical analysis showed that there was a relation between the variables of age and contact mechanism number five. The main reason for the observation results was because the visitors in the age groups quartile number four were conducting activities by themselves and not participating in activities requiring physical activity or interaction with others. These observations were mostly captured in the hotel’s casinos.

Table 22: Association between age and the presence of contact mechanism number five.

<table>
<thead>
<tr>
<th>Age</th>
<th>Mechanism number five not observed</th>
<th>Mechanism number five observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-25 (Q1)</td>
<td>13 (50.50 %)</td>
<td>13 (50.50 %)</td>
</tr>
<tr>
<td>26-40 (Q2)</td>
<td>5 (16.67 %)</td>
<td>25 (83.33 %)</td>
</tr>
<tr>
<td>41-55 (Q3)</td>
<td>4 (12.12 %)</td>
<td>29 (87.88 %)</td>
</tr>
<tr>
<td>≥ 56 (Q3)</td>
<td>22 (70.97 %)</td>
<td>9 (29.03 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 23 shows the association between the type of hotel and the presence of contact mechanism number one. Contact mechanism number one is the reduction of stress and restoration of attentional fatigue. The statistical data showed that there was no significant relation between the variables.
Table 23: Association between hotel type and the presence of contact mechanism number one.

<table>
<thead>
<tr>
<th>Hotel Type</th>
<th>Mechanism number one not observed</th>
<th>Mechanism Number one observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>25 (43.10 %)</td>
<td>33 (56.90 %)</td>
</tr>
<tr>
<td>Eco-hotel</td>
<td>25 (40.32 %)</td>
<td>37 (59.68 %)</td>
</tr>
</tbody>
</table>

P Value = 0.451

Table 24 displays the relationship of the hotel type and the presence of contact mechanism number two. Contact mechanism number two is the promotion of physical activity. The statistical analysis showed that there was a relation between the variables. The mechanism number two has greater opportunity to be present in the studies eco-hotels in part by the eco-hotels promotion of hiking and the participation in the natural environment.

Table 24: Association between type of hotel and contact mechanism number two.

<table>
<thead>
<tr>
<th>Hotel Type</th>
<th>Mechanism number two not observed</th>
<th>Mechanism Number two observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>54 (93.10 %)</td>
<td>4 (6.90 %)</td>
</tr>
<tr>
<td>Eco-hotel</td>
<td>39 (62.90 %)</td>
<td>23 (37.10 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 25 presents the association between the type of hotel and the presence of contact mechanism number three. Contact mechanism number three is enhancing positive
social contact with neighborhood members. The statistical analysis showed the relation between the variables. The observations showed that there was a greater opportunity of observing contact mechanism number three in eco-hotels. The higher number of frequencies denoted that eco-hotels related activities were tailored toward interaction with others and the promotion of physical activity (Table 24).

Table 25: Association between the type of hotel and the presence of contact mechanism number three.

<table>
<thead>
<tr>
<th>Hotel Type</th>
<th>Mechanism number three not observed</th>
<th>Mechanism Number three observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>54 (93.10 %)</td>
<td>4 (6.90 %)</td>
</tr>
<tr>
<td>Eco-hotel</td>
<td>28 (45.16 %)</td>
<td>34 (54.84 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 26 presents the association between the type of hotel and the presence of contact mechanism number four. Contact mechanism number four is the healthy development of children. The statistical analysis showed the relation between the variables. The data showed that there is a greater opportunity of observing contact mechanism number four in the studied eco-hotels. This result is in par with the fact that more visitors of the age group 1 to 25 were in the eco-hotels. This promote that the younger visitors were conducting the activities in the eco-hotels.
Table 26: Association between the type of hotel and the presence of contact mechanism number four.

<table>
<thead>
<tr>
<th>Hotel Type</th>
<th>Mechanism number four</th>
<th>Mechanism Number four</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not observed</td>
<td>observed</td>
</tr>
<tr>
<td>Hotel</td>
<td>54 (93.10 %)</td>
<td>4 (6.90 %)</td>
</tr>
<tr>
<td>Eco-hotel</td>
<td>33 (53.23 %)</td>
<td>29 (46.77 %)</td>
</tr>
</tbody>
</table>

P Value < 0.001

Table 27 shows the association between the type of hotel and the presence of contact mechanism number five. Contact mechanism number five is personal growth of adults and enhancement of quality of life. The statistical data showed that there is no significant relation between the variables.

Table 27: Association between hotel type and the presence of contact mechanism number five.

<table>
<thead>
<tr>
<th>Hotel Type</th>
<th>Mechanism number five</th>
<th>Mechanism Number five</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not observed</td>
<td>observed</td>
</tr>
<tr>
<td>Hotel</td>
<td>26 (44.83 %)</td>
<td>32 (55.17 %)</td>
</tr>
<tr>
<td>Eco-hotel</td>
<td>18 (29.03 %)</td>
<td>44 (70.97 %)</td>
</tr>
</tbody>
</table>

P Value = 0.073

Table 28 displays the odd ratio that each contact mechanism has the opportunity to be observed in an eco-hotel than in a regular urban hotel. Contact mechanism number two had 8 times the opportunity to be observed in an eco-hotel than in an urban hotel.
Also, mechanism number three had 16 times the opportunity to be observed in the eco-hotels as well. This high odds were because the observation of many visitors conducting activities by themselves at the urban hotels. Lastly, the odds for contact mechanism four had 12 times the likelihood of being observed at the eco-hotel. As commented in the previous tables, most children were accompanied by young adults in the first age group quartile.

Table 28: Magnitude of the association between contact mechanism and hotel type

<table>
<thead>
<tr>
<th>Variables</th>
<th>P Value</th>
<th>Odd Ratio</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanism number 1</td>
<td>0.758</td>
<td>1.12</td>
<td>.54 – 2.31</td>
</tr>
<tr>
<td>Mechanism number 2</td>
<td>&lt; 0.001</td>
<td>7.96</td>
<td>2.54 – 24.86</td>
</tr>
<tr>
<td>Mechanism number 3</td>
<td>&lt; 0.001</td>
<td>16.39</td>
<td>5.28 – 50.85</td>
</tr>
<tr>
<td>Mechanism number 4</td>
<td>&lt; 0.001</td>
<td>11.86</td>
<td>3.82 – 36.7</td>
</tr>
<tr>
<td>Mechanism number 5</td>
<td>0.074</td>
<td>1.98</td>
<td>.93 – 4.22</td>
</tr>
</tbody>
</table>
Chapter 5: Discussion

This chapter presents the discussion of the data gathered during the observations in the selected hotels, as well as the limitations of this study and the recommendation for the Puerto Rican hospitality sector and the government. The data was obtained by observing the daily activities of the visitors of the selected urban hotels and eco-hotels. The purpose of the observations was to determine the presence or absence of at least one direct contact mechanism. The observation of a direct contact mechanism is in reference to previous mentioned studies that revealed the benefits to the participants’ health.

A. Study benefits

Observational studies are very important as the first stage of any investigation. Observational studies can highlight a set of patterns and trends in the observed population. The data gathered and results can be utilized in future studies as a baseline. With the utilization of this study certain expectation on the behavior of the visitors can be predicted. For example, the behavior of certain age groups can be further studied as well. There is a pattern of inactivity with the visitors of Q4 (56 years and above).

The analyzed data showed a possible problem in the near future for the health of this population because it appears to engage in a sedentary lifestyle pattern, which promotes illnesses like obesity and diabetes. In many cases these types of diseases can be prevented or delayed with the choice of a healthier, more physically engaging life. This study offers recommendations to the hospitality industry to address the issue of sedentary lifestyles with the intention of preventing this problem in our society.
In economy terms, two important benefits can be derived from this study: the possible increase in monetary revenues and the creation of jobs in the hospitality industry. As an example, with the implementation of guided tours to the trails and natural resources of the Island of Puerto Rico, the hospitality sector can increase revenues by providing access to these important attractions to visitors. The implementation of this single recommendation can potentially aid, in the short range and long range, areas of job creation, expansion and revenues for the hotels.

B. Study limitations

This study was conducted utilizing an observational methodology. During the planning phase of the study, time constrictions prevented the submission of an Institutional Review Board (IRB) in order to use survey and interview data gathering methods. The use of the observational methodology provided only qualitative data instead of quantitative data that could have provided an in-depth statistical analysis. There are certain limitations to observational studies, including reliability and generalizability of the data. The results obtained from the analyzed data cannot be generalized to another population. The results are only representative of the visitors and hotels in that particular time period.

The eco-hotel definition integrated in the study deviates from the general understanding of an eco-hotel. The most assertive definition of the eco-hotel for this particular study was the exclusive access to green spaces and small footprint on the environment. Also, the eco-hotels own the access and green spaces utilized for the
visitors’ enjoyment. The sustainability (solar power, water wells, production of crops, etc.) of the eco-hotel were not used or measured for the study.

C. Results Analysis

The results of the observations gathered for the research showed that there were twelve more female (66) than male (54) visitors (Table 4). The data also showed that there was not a significant relationship between the gender and the type of hotel (P Value = 0.741). The results displayed that there were 31 females and 27 males in the urban hotels and 35 females and 27 males in the eco-hotels. The age variable was equally distributed in the observed sample.

The age distribution of the observed sample displays that the age groups with more frequencies were the 51-60 years, 31-40 years, 21-30 years and 0-10 years (Table 5). The observed groups ranged from one to six members. The observations that involved individual visitors were the ones with highest frequencies for a total of 23. The reason for the higher quantity of single individuals was because most of these visitors were in the casino, mostly playing the slot machines. The high number of visitors in the casinos coincided with fewer observations of contact mechanisms number two and three, which denoted no physical activity was observed and no enhancement of positive social contact (Tables 12-16).

The difference in attractions between the urban hotels and eco-hotels increased the chances for a dissimilar number of visitors in the age range 56 years and above. The attractions provided in the urban hotel promoted a more tranquil environment that
encouraged the visitor to engage in a more sedentary lifestyle. On the other hand the attractions in the eco-hotels promoted the visitors of all age groups to engage in physical activities.

During the data analysis, the age variable was associated with the presence or absence of at least one of the five direct contact mechanisms. In Table 18, there was a marked difference between the presence of contact mechanism number one in the Q1 and Q4 (P < .001). This result showed that younger visitors were performing activities that helped them to reduce their stress level and the restoration of attentional fatigue. Table 19 shows that the relation between age and the presence of contact mechanism number two was evenly distributed in the first three quartiles (P = 0.007), which denotes that these age groups had similar opportunities to enjoy more physical activity than the visitors 56 years and above. This result is very important because it highlights the need of this group to engage in some type of physical activity. In most cases the promotion of physical activity was observed in combination with other groups’ interaction. This result can be linked to the attractions types provided in the eco-hotels. These attractions promoted group interaction during the process of completing the trails.

The association between age and contact mechanism number three shows a relation of the variables (P = 0.003). Table 20 shows that the results displayed a significant number of visitors engaged in activities that enhance positive social contact in the Q2. The analysis concluded that Q1 and Q2 were the age quartiles displaying the presence of contact mechanism number three. Positive social contact is vital still for individuals of all ages. The eco-hotels used in the study provided an atmosphere that
created social interaction among the visitors. Finally, Table 22 displays the association between age and the presence of contact mechanism number five. The presence of contact mechanism number five was marked in the Q2 and Q3. This is most likely because these visitors were engaging in group activities and not in activities by themselves.

The distribution of the hotels’ areas where the observations were recorded (Table 2) shows the different activities that the visitors of eco-hotels and urban hotels performed. In urban hotels the casino was a constantly visited attraction. The visitors to the casinos usually were alone or in groups of two. The interaction between these groups was minimal or non-existent at the moment of the observations. It is worth mentioning that the casinos in both urban hotels allow smoking in their facilities, which increases possible health problems for visitors. During the observations in the casinos almost no direct contact mechanism was observed because the vast variety of entertainment targets individuals, not groups of visitors.

Contact mechanisms number two and three were widely observed in places like trails, swimming pools and picnic areas. These areas promote physical activity and interaction with others. These contact mechanism are very important in terms of health promotion because they increase physical activity and social interaction as well. The results showed in Table 19 denote that out 31 observations of the visitors 56 years or more were not performing any activities that required moderate to high physical activity.
D. Future Studies

A series of possible future researches can be undertaken from this study. This study identified some trends and patterns that showed how the absence of a contact mechanism can possibly affect a determined population. The fact that the eco-hotels utilized in the study provided exclusive access to the green spaces surrounding their locations can drive future studies of the health benefits that this type of hotel promotes by owning the green spaces and nearby attractions.

Other future studies can use the direct contact mechanisms in areas that are being deforested to measure the benefits of the green spaces to the residents and nearby communities. This type of study can help to protect green spaces by measuring the importance of these areas to human beings. As an example, the study can measure the amount of physical activity in a forested area versus a deforested areas, this could provide relevant information on the importance of green spaces in the promotion of physical activity. The results can be used to link green spaces and physical activity to a healthier population and the need of less medical intervention for that specific population.

In conclusion, the higher number of direct contact mechanisms observed in eco-hotels was consistent with my expectations. Eco-hotels offer a different array of attractions that promote physical activity and group interaction. The difference between eco-hotels and urban hotels was the way their attractions are arranged. Urban hotels cater to the needs of the business community in order to accomplish their expected job productivity. On the other hand, the visited eco-hotels target the visitors that want to have a different vacation experience which includes interaction with the natural environment
and green spaces. Both types of hotels accomplished contact mechanism number one by decreasing stress and reducing the visitors’ attentional fatigue. Reduction of stress and attentional fatigue can be argued to be the main reason of tourist staying in hotels.

The results of this observational study revealed that visitors of eco-hotels are most likely to receive health benefits. The direct access to the green spaces of the eco-hotels promoted physical activity in higher rates than urban hotels. The attractions of the eco-hotels are focused on the need of physical activity. The visitors of the eco-hotels must engage in physical activity from the moment they leave the cabins in the morning to enjoy breakfast, also when visiting the trails and ponds around the property. Therefore, these hotels have a greater possibility of preventing the illnesses that have been attacking our society in the last twenty years. An increase in visitors’ physical activity can help to prevent obesity and related diseases like diabetes, heart problems, and hypertension, among others.

E. Recommendations

This study recommends conducting further research in this area utilizing a survey methodology. The results obtained from the observations yielded very important data in terms of the activities the visitors engage in the different type of hotels and the exposure to green spaces. The data analysis showed that older visitors tend to be in urban hotels engaging in activities that do not require physical activity or interaction with others. The recommendations for the hotels’ managers will be in reference to environmental degradation prevention, management of their footprint, attraction of visitors 56 years or more, and increase of revenues and job creation.
The eco-hotel environmental footprint must be minimized in order to prevent the green spaces in the area from deteriorating. Also, it is very important to maintain the access trails small and prevent the use pavement. The use of pavement or concrete can exacerbate the degradation of the environment that surrounds the trails by defragmenting the natural water flow and creating the dispersal of the native species.

The eco-hotels utilized in the study own the green spaces and their access. The managers can use this important resource to provide guided tours of the green spaces. The managers can create jobs by providing tour guides to enhance the visitors’ experience while in the trails and swimming ponds. The administration can use this resource to promote environmental protection and education. The tour guides will be the perfect ambassadors to promote the protection of the natural resources. This way the eco-hotels can promote the protection of their natural resources for the enjoyment of future generations.

In the urban hotel sector, the managers should target young visitors and provide activities that promote physical activity and interaction between members of different groups; for example, offering guided tours to eco-tourist destinations. Puerto Rico has many ecological sites and most of the areas are free of charge for visitors. Puerto Rico is home for some renowned beaches in the world. These beaches offer activities from surfing in the north of the Island to tranquil waters for relaxing in the west side of the Island. Some of the attractions in Puerto Rico are:

- Cueva Ventanas
- La Cueva del Indio
The urban hotels can continue to improve their surroundings with landscaping that mimics green spaces. These efforts can help to increase the attendance of younger visitors and provide green spaces interaction. The possible attraction of a different segment of the population to the hotels can increase the revenue which can promote the creation of more jobs in the hospitality industry.

The government plays an important role in the promotion of health, protection of the environment and stimulation of job creation. Government agencies can cooperate with the hospitality industry to promote existent environment educational programs. The promotion of physical activity should be a top priority because it can help lead to a healthier population. Physical activity can help to reduce the health cost in the near future. The relationship is simple; the healthier the population the less medical service the population will require. The promotion and inclusion of activities like kayaking, biking, running, swimming, and canopy tours, among others, are the backbone of a healthy population.
The preservation of the environment and healthy development is a responsibility of all human beings. The knowledge the visitors gain from the interaction with green spaces though tour guides and educational programs can impulse an understanding of the importance of environmental protection. However, the government, urban hotels and eco-hotels can work together to address significant issues in our society.

- Job creation and monetary revenue
- Environment degradation
- Healthier population
References


CSA Group Inc. (2003). *Preliminary updated environmental impact statement for the San Miguel-four seasons resort, Luquillo, Puerto Rico.* (No. GCA-01-0030 (CT)).


Ministry of Economic Development. (2011). *Tourism data domain plan.* (). New Zealand:


Annex 1. Data Matrix

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Hour</th>
<th>Observer</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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**Number of visitors in the group**

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**Genders**

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**Age**

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</table>

**Area where the activity took place and hour**

<p>| | | | | | |</p>
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<tr>
<th></th>
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</table>

**Activity description / Time**

<p>| | | | | | |</p>
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<tr>
<th></th>
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</table>

**Contact mechanism and description**

<p>| | | | | | |</p>
<table>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

- a- Reduction of stress and restoration of attentional fatigue (art, family activities, reading)
- b- Promotion of physical activity (trails, games, running, swimming)
- c- Enhancing positive social contact (contact between different groups)
- d- Healthy development of children (exercise, education, imaginative games)
- e- Personal growth of adults/ enhancing quality of life (personal relations, education, self-esteem)

<p>| | | | | | |</p>
<table>
<thead>
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