Human Connection to Nature within the Built Environment: An Exploration of Office Employee Perception of Nature Connectedness

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HUMAN CONNECTION TO NATURE WITHIN THE BUILT ENVIRONMENT:
AN EXPLORATION OF OFFICE EMPLOYEE PERCEPTION OF NATURE
CONNECTEDNESS

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For Mom, Dad, and Petra
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ABSTRACT

Since research has shown a connection to nature is beneficial to human well-being, it is problematic that human connections to nature are under-represented within built environments in the United States. The objective of this qualitative study was to define what constitutes a human connection to nature within the built environment using Stephen R. Kellert’s framework of biophilic design. This study took place at Interface’s Showroom and Offices in Atlanta, Georgia, a Leadership in Energy and Environmental Design (LEED) Commercial Interior (CI) platinum-certified office environment.

Emergent themes resulting from the data indicated the following: (a) participants felt connected to nature and felt the connection positively affected their health, attitude, job performance and job satisfaction; (b) outside views and natural daylight facilitated a number of nature-connections; (c) more subtle nature-connections were valued by participants, but not overtly recognized as connections to nature; (d) the surrounding community development created positive experiences for participants within the interior environment; and (e) vernacular connections (relating to Interface’s mission as a company) were also found to be a valued part of the interior environment. Additionally, author review of the LEED-CI Version 2.0 Rating System (which guided Interface’s Showroom renovation) indicated the system is not yet fully addressing the issue of a human connection to nature. Hopefully this research will serve to inform others on varied ways to create human connections to nature within the built environment using a framework of biophilic design. It is also hoped these research findings could inform empirical research on the human-centered and financial benefits of creating human connections to nature within the built environment.
CHAPTER 1

INTRODUCTION

The interior design profession is standing on the brink of a paradigm shift. While the urgent need to design and build with a focus on nature has been identified by many authors, the design and construction professions have veered off this course recently (Kellert, Heerwagen & Mador, 2009). Over the last 100 years the philosophy for designing the built environment has resulted in various forms of environmental degradation such as exploited and depleted natural resources, polluted air and water, unprecedented amounts of waste, unhealthy indoor air quality, alienation of people from nature, and a sense of “placelessness” within the built environment (Kellert et al., 2009).

In the United States (US) low environmental impact design principles (analogous to sustainable design principles) have recently been employed within the design and construction communities as solutions to correct the trend of environmental degradation. For example, a prominent organization in setting the standard for low environmental impact design principles, the US Green Building Council (USGBC), was founded in 1993 and has grown to 136,444 Leadership in Energy and Environmental Design (LEED) professionals as of March 2010 (Beeke, 2007; USGBC, 2010). The USGBC’s green building certification program employs low environmental impact design principles such as alternative transportation, reduced resource use, material recycling, energy efficiency, and improved indoor environmental quality (USGBC, 2006). Some would suggest these prevailing low environmental impact design principles have lessened the negative impact on nature, but have failed to foster a connection between people and nature in the built environment (Mendler, Odell & Lazarus, 2006). For the purpose of this study, nature is defined as elements of the natural world, such as mountains, trees, plants, animals, and bodies of water.

Connecting people with nature within the built environment is an idea that has been largely ignored in the commercial design and construction communities in recent years. Researchers suggest ignoring this connection is a problem because humans have a need to experience a connection to nature which is necessary for psychological
well-being (Kellert & Wilson, 1993). The logic of this argument is thus: for more than 99 percent of human history humans have lived in hunter-gatherer bands and interacted intimately with the natural world (Kellert & Wilson, 1993). The brain, which shapes human behavior, evolved within the natural world. Therefore, some writers believe that human nature is adapted to these ancient environments even though the current environments in which humans spend much of their time are separate from the natural world (Symons, 1992). A connection to nature is important because nature still provides the same basic needs that were important to human ancestors millions of years ago: protection from predators and inclement weather as well as resources such as food, water and other materials that are essential for survival (Orians & Heerwagen, 1992).

Nature likely also provides for the emotional needs of people such as comfort, safety, intrigue, and beauty. Furthermore, a number of recent empirical studies suggest that connections with nature can benefit the emotional and physical needs of people, such as providing them with restorative experiences, expediting healing processes, and reducing sick building syndrome symptoms (Beauchemin & Hays, 1996; Fjeld, Veiersted, Sandvik & Levy, 1998; Hartig, Mang & Evans, 1991; Heerwagen & Orians, 1986; California Energy Commission, 2003; Kaplan, 1993; Kaplan & Kaplan, 1989; Larsen, Adams, Dal, Kweon & Tyler, 1998; Ulrich, 1984).

The human connection to nature as a concept is also related to and supported by the theory of biophilia which states that humans have an innate tendency to focus on life and lifelike processes (Wilson, 1984). This theory describes humans’ need for nature beyond what nature provides them at a physical level, and encompasses the human craving for aesthetic, intellectual, cognitive, and even spiritual needs (Kellert & Wilson, 1993). Biophilic design principles can foster a human connection to nature within the built environment. Coupled with low environmental impact design principles, the two can create a new design paradigm termed “restorative environmental design” which delivers holistic design solutions mutually benefiting people and the environment (Kellert, 2005).

Qualitatively studying the human connection to nature within the built environment is appropriate given that there is insufficient attention currently paid to people’s perceived connection to nature (Kaplan, 1993). Little research has yet occurred on this topic, and there is a need to widen the breadth of knowledge about
how and why people feel personal and emotional connections to nature. Since LEED-certified structures represent a national benchmark for low environmental impact design principles in the US, this study was an opportunity to discover if this certification program is addressing the human need for nature in the context of a commercial retail and office environment. This qualitative study, which gave users of the built environment control over what they assess as connections to nature, will potentially increase the knowledge base of biophilic design and move the design community closer to reconnecting people to nature in the context of the built environment.

**Purpose and Justification of Study**

The overall purpose of this study was to describe the essence of human connections to nature within the built environment. More specifically, the research objective was to identify pleasurable, nature-connected, and/or nature-removed experiences within the built environment which are experienced by office users. Office users were chosen as research subjects since they would likely be in need of restorative environments due to the mentally fatiguing nature of their work and the amount of time spent engaging in their office environment each day. According to an American Time Use Survey conducted by the Bureau of Labor Statistics (BLS), an employed worker in the US worked an average of 7.6 hours per day in 2008 (BLS, 2009). Given the large amount of time people spend in work environments daily, it was logical to study biophilic design within the context of this environment.

This study took place at Interface’s Showroom and Offices (Interface’s Showroom) in Atlanta, Georgia, a LEED Commercial Interiors (CI) platinum-certified facility. This office was an appropriate place to study the human connection to nature because it afforded the opportunity to analyze whether a high-ranking LEED facility was addressing the human connection to nature. It also was likely that participants were experiencing a connection to nature in its various forms, and thereby provided observable data for analysis.

The justification for this study emanated from the work of researchers including Kellert and Frumkin (Kellert et. al, 2009). That is, a review of Kellert’s work suggests: low environmental impact design, while fundamental and essential, fails to
address the equally critical needs of diminishing human separation from nature, enhancing positive contact with environmental processes, and building within a culturally and ecologically relevant context, all basic to human health, productivity, and well-being. (Kellert et al., 2009, p. viii)

The lack of emphasis on a human connection to nature in the current low environmental impact design movement is problematic because this connection is necessary to human psychological well-being (Kellert & Wilson, 1993).

Studying the degree to which people experience connections to nature inside a LEED-certified structure encompassing low environmental impact design strategies was an opportunity to assess whether the current LEED green building certification program is achieving or falling short of biophilic design objectives. Moreover, identifying what constitutes a human connection to nature as well as the frequency of these connections may bring more visibility to the importance of these connections. Utilizing an existing classification system of biophilic design developed by Stephen Kellert as a way to deconstruct nature connections provided a framework to study this potentially ambiguous subject. Furthermore, the method of deconstructing nature contact that was used here serves as a means to measure the extent of nature contact, a tactic suggested by Howard Frumkin, an internist, environmental and occupational medicine specialist and epidemiologist (Kellert et al., 2009). Specifically, using Kellert’s classification system of direct, indirect, and symbolic connections to nature will serve to deconstruct and categorize the multiple opportunities for nature-connected experiences that exist within the built environment. It is hoped this research may emphasize the importance of a human connection to nature, potentially leading others to include this quality in green building assessment systems such as the USGBC’s LEED green building certification program.

**Research Questions**

The overall research question was thus: What are the characteristics of office users’ perceived experiences regarding feeling connected to or removed from nature while they are in their office environment?
Specifically, there were five research subquestions that addressed the overall research objective:

1. To what degree do participants feel connected to nature or removed from nature at Interface’s Showroom?

2. What aspects of the built environment do participants perceive create the feeling of being either connected to or removed from nature?

3. Which perceived connections to nature are created by aspects of the built environment which are the result of meeting a LEED-CI prerequisite or credit?

4. What are participants’ perceived resulting effects of experiencing a connection to nature at Interface’s Showroom?

5. What are participants’ perceived resulting effects of feeling removed from nature at Interface’s Showroom?

**Limitations**

Limitations to this study were anticipated but could not be entirely mitigated. They included but were not constrained to the following:

1. Personal experiences and attitudes of participating employees. That is, these perceptions were personal to each individual, and therefore may have limited generalizability to larger populations. However, identifying and understanding these personal perceptions was one of the goals of this study.

2. Effect of the study inquiry. The author acknowledges the knowledge of a study being conducted on participants may have falsely heightened their perceptions of their interactions with the built environment.

3. Small sample size. This sample size was specifically chosen to enable in-depth data gathering. However, the conclusions drawn from this study will not be able to be generalized to larger office user populations.

These limitations will be explained in greater detail in Chapter 3.
Definition of Terms
The following definitions applied to this study. The source for these definitions is cited where appropriate.

**Biophilia**: the inherent human inclination to affiliate with natural systems and processes, especially life and life-like features of the nonhuman environment (Kellert et al., 2009, p. 3).

**Biophilic Design**: The deliberate attempt to translate an understanding of biophilia into the design of the built environment which results in beneficial contact between people and nature within modern buildings and landscapes. Biophilic design is composed of two basic dimensions (organic or naturalistic and place-based or vernacular) and six biophilic design elements (environmental features, natural shapes and forms, natural patterns and processes, light and space, place-based relationships, and evolved human-nature relationships). Each of these six biophilic design elements are expressed with specific biophilic design attributes. There are a total of 72 biophilic design attributes which fall under the six biophilic design elements (Kellert et al., 2009, p.3, 5-6).

**Human contact with nature**: Any form of direct, indirect, or symbolic expression of the nonhuman world that is integral to people’s lives (Kellert, 2005, p.11).

**Direct experience of nature within the built environment**: relatively unstructured contact with self-sustaining features of the natural environment such as views of the exterior environment, daylight, natural ventilation, plants, animals, natural habitats, and ecosystems (Kellert, 2005, pp.136-137, Kellert et al., 2009, p.5).

**Emotional affinity towards nature**: motivating contact and sensual experiences with nature (Kals, Schumacher & Montada 1999).

**Indirect experience of nature within the built environment**: controlled or manipulated contact with the natural environment that requires ongoing human input to survive such as a potted plant, a water fountain, natural materials, or an aquarium (Kellert, 2005, p. 143, Kellert et al., 2009, p.5).

**Low environmental impact design**: avoiding, minimizing, and mitigating the adverse effects of building and landscape development on natural systems and human health. Low environmental impact design strategies include: promoting energy efficiency, creating renewable energy, reducing resource use, eliminating pollution, minimizing
waste, maintaining healthy indoor environments, and avoiding habitat destruction and loss of biological diversity (Kellert, 2005).

**Nature**: elements of the natural world, such as mountains, trees, plants, animals, and bodies of water.

**Organic/naturalistic dimension of biophilic design**: shapes and forms in the built environment that directly, indirectly, or symbolically reflect the inherent human affinity for nature (Kellert et al., 2009, p.5).

**Placelessness**: diminishing a distinctive local and regional identity and replacing it with uniformity and anonymity (Kellert, 2005).

**Restorative environmental design (RED)**: A design strategy which utilizes two separate design principles: low environmental impact (or sustainable) design principles which minimize negative effects on natural systems and human health and biophilic design principles which facilitate positive contact between people and nature within modern buildings and landscapes (Kellert et al., 2009).

**Symbolic or vicarious experience of nature**: involves no actual contact with real nature, but rather the representation of the natural environment through image, picture, ornamentation, video, metaphor, and other techniques (Kellert, 2005; p.143, Kellert et al., 2009, p.6).

**Theory of biophilia**: theory which states that humans have an innate tendency to focus on life and lifelike processes (Wilson, 1984).

**Vernacular dimension of biophilic design**: buildings and landscapes that connect to the culture and ecology of a locality or geographic area (Kellert et al., 2009).

Chapter 2 will review background information on relevant topics related to the human connection to nature. These varied topics will explain the multifaceted quality of reconnecting people with nature within the built environment. Chapter 3 will outline the study’s methodology. Chapter 4 will convey the study’s results and emergent themes. Lastly, Chapter 5 will discuss conclusions and potential avenues for further research.
CHAPTER 2

REVIEW OF LITERATURE

As introduced and identified in Chapter 1, reconnecting humans and nature within the built environment is a complex challenge and opportunity. Thus, this challenge is logically best addressed by those from multiple disciplines who understand different aspects of the problem and solution. This author suggests that knowledge of human history, evolutionary psychology, low environmental impact design principles, and biophilic design principles should be employed to reach holistic design solutions that mutually benefit the well-being of both humans and the environment. Furthermore, these solutions can reconnect humans and nature in the context of the built environment, a worthy topic given that building interiors are where Americans spend an average of 90 percent or more of their time (US EPA, 2009). In addition to the topics stated above, types of connections to nature within the built environment (direct, indirect, and symbolic), vernacular connections, the restorative and performance-enhancing benefits of connections to nature, a connection to nature as an impetus for environmental stewardship, and office environments will be considered. These topics will be discussed within this chapter to provide an informative foundation about the multifarious issue of a human connection to nature within the built environment.

I. Human History

Looking to human evolutionary history to understand current human behavior is appropriate because humans have lived immersed within the natural environment for the majority of human history. Specifically, humans have lived in hunter-gatherer bands and interacted intimately with the natural world for more than 99 percent of human history (Kellert & Wilson, 1993). The brain, which shapes human behavior, evolved within the natural world, and therefore, some authors believe that human nature is adapted to these ancient environments even though the current environments in which humans live are separate from the natural world (Symons, 1992).
Following this line of thinking, it is likely that humans currently make unconscious decisions about the environment that are influenced by their evolutionary past, even though the environments in which they currently live are vastly different from the ones they evolved within (Orians & Heerwagen, 1992). The separation from nature within the built environment began around 5,000 years ago. Kellert et al. (2009) elaborate on this separation and how human behavior is still largely programmed to respond to natural environments:

The emergence during the past roughly 5,000 years of large-scale agriculture, fabrication, technology, industrial production, engineering, and the modern city constitutes a small fraction of human history, a period that has not substituted for the benefits of adaptively responding to a largely natural environment (p. 3).

Viewing humans’ connection to nature within the context of human history puts into perspective the relatively short amount of time humans have been living in modern environments and the large amount of time humans have spent intimately interacting with nature, as illustrated in Figure 2.1.

*Figure 2.1: Human history relative to time spent living within the natural environment and built environments (Klein & Edgar, 2002; Kellert et al., 2009).*
II. Evolutionary Psychology

Understanding human psychological responses to the natural environment over the course of human history is helpful when considering how people currently respond to the modern built environment. Evolutionary psychology can explain the physical and emotional needs the natural world has provided people over time. It can also provide clues to what qualities of the natural environment people currently need and how those qualities can be replicated in the context of the built environment.

Origins of Evolutionary Psychology

Evolutionary psychology is a science that blends modern psychology and evolutionary biology. The goal of evolutionary psychology is to understand how the human brain evolved over time, how the human brain is designed, and how inputs from the current environment interact with the brain to produce human behavior (Buss, 2004). One subfield of evolutionary psychology, evolutionary biology, has its foundation in Charles Darwin’s theory of natural selection which was published in *On the Origin of Species* in 1859. The theory of natural selection states that populations evolve over generations due to hereditary variables that increase or decrease an individual’s chance of survival and reproduction (Buss, 2004). Evolutionary psychology is the link between applying Darwin’s theory of natural selection to humans’ adaptation in relation to their biological make-up (Symons, 1992).

Evolutionary Psychology and the Human Connection to Nature

Throughout history humans have connected with nature while obtaining basic physical and emotional needs from the environment that were essential for their survival and well-being. The desire to fulfill the same basic needs such as seeking protection from predators and inclement weather and seeking resources such as food, water, and shelter was present in humans living millions of years ago as well as in people living today (Orians & Heerwagen, 1992). These basic human needs have physical components (food, water, and shelter) and emotional components (comfort, safety, mystery, and beauty).

Researchers have used evolutionary psychology to inform the design of empirical research about current human visual landscape preference. Research studies have found that evolutionary psychology is an accurate scientific method that can be used as
a frame of reference for studying general human behavior (Hartmann & Apaolaza-Ibáñez, in press). Stephen Kaplan found that in order to ensure the long-term survival of the human species, people needed to be able to obtain information about the landscape and process that information efficiently (Balling & Falk, 1982). Ulrich (1977) utilized Kaplan’s knowledge to design a study that measured visual landscape preference in American and Swedish participants. The study found that people prefer environments with a relatively high degree of complexity, a clear focal point, an even ground texture, a good depth of field and a sense that new and predictable information would be available when moving through the landscape (Balling & Falk, 1982). These physical landscape characteristics provide one or two forms of basic human need: they either aid in warning people of hazards and threats or they give people information about opportunities and resources that support life and provide comfort (Orians & Heerwagen, 1992).

Not only is visual landscape preference an innate function of evolutionary psychology, Helson (1964) found that experience also has a marked impact upon human perception and preference (Balling & Falk, 1982). Balling and Falk validated Helson’s conclusion in their study testing 580 subjects’ preferences of five biomes: tropical rain forest, desert, savanna, temperate deciduous forest, or coniferous forest (1982). Overall, subjects preferred the savanna, deciduous and coniferous forest biomes, and the tropical rain forest and desert biomes were disliked. However, the younger subjects (third- and fifth-grade children) rated savanna scenes significantly higher than other biomes, but no statistically significant preferences were found between the savanna and the deciduous and coniferous biomes in the older subjects. Therefore, the researchers concluded that innate psychological landscape preference coupled with one’s experience likely produces an individual’s visual landscape preference (Balling & Falk, 1982).

The result of Balling and Falk’s study provides limited support for the savanna hypothesis which states that modern humans have retained an innate propensity to visually prefer savanna-like environments with spatial openness, scattered trees or small groupings of trees, and relatively uniform grassy ground surfaces (1982), such as the example in Figure 2.2. Evidence suggests that millions of years of early human evolution took place on the savannas of East Africa, an area that would have had high
resource providing potential (Balling & Falk, 1982). In a savanna environment nutritious food was easy to obtain, trees offered protection from the sun and could also be used to climb to avoid predators, and long, unimpeded views permitted the detection of predators. Also, frequent changes in elevation allowed people to orient themselves in space (Orians & Heerwagon, 1992). Therefore, the savannah hypothesis is an evolved landscape preference with greater influence in younger children who have not experienced as many environments as adults.

Another theory which emerged after studying humans’ evolved landscape preference is the prospect-refuge theory. This theory predicts that people are likely to prefer environments which give them the opportunity to survey the environment without being seen. Thus, people prefer the edge over the central portion of an area because the edges provide the most visual access to an area. People will judge an environment as more preferable if it offers a balance between prospect and refuge, allowing them to survey the landscape and escape if necessary (Orians & Heerwagon, 1992). The savannah environment offers general opportunities for prospect and refuge by the abundant trees and variations in landscape elevation.

Figure 2.2: An African savanna environment offered resource providing potential and prospect and refuge opportunities (http://www.wilton.k12.ct.us/whs/lib/student_work/Final%20Folder/Fossil%20Locations.htm).
Opposition to Evolutionary Psychology

Some people are opposed to using evolutionary psychology to explain human behavior. Hilary and Steven Rose (Rose & Rose, 2000), a sociologist and neuroscientist respectively, warn of evolutionary psychology’s claim that human nature, and thus culture, are shaped by biology:

Evolutionary psychology claims to explain all aspects of human behavior, and thence culture and society, on the basis of universal features of human nature that found their final evolutionary form during the infancy of our species some 100,000 - 600,000 years ago. Thus, for evolutionary psychology, what its protagonists describe as the architecture of the human mind which evolved during the Pleistocene is fixed, and insufficient time has elapsed for any significant subsequent change. (p. 17)

As leaders of the anti-evolutionary psychology camp, Rose and Rose argue that evolutionary psychologists believe human heredity is human destiny (2000). However, Buss counters that Rose and Rose fail to acknowledge the role of human adaptive traits and environmental influence that are crucial to evolutionary psychologists’ arguments about how humans have the ability to respond to and alter their genetic predispositions (2004).

In summation, evolutionary psychology is a framework to study how both the savannah hypothesis and the prospect-refuge theory encompass the physical and emotional needs people seek in their environment. Evolutionary psychology forms the basis for a series of assumptions that some researchers take as givens today, namely:

- The savannah hypothesis and prospect-refuge theory were applicable to humans living thousands of years ago in hunter gatherer populations and they still apply to humans living in modern environments (Balling & Falk, 1982).

- Nature can provide for humans’ physical and emotional needs and remains an essential ingredient of the human experience (Kellert & Wilson, 1993).

While numerous recent empirical studies have illustrated the multiple and varied ways connecting with nature positively benefits humans (Beauchemin & Hays, 1996;
California Energy Commission, 2003; Fjeld et al., 1998; Hartig et al., 1991; Heerwagen & Orians, 1996; Kaplan, 1993, Kaplan & Kaplan, 1989; Larsen et al., 1998; Ulrich, 1984), the nuances of the specific benefits that a connection to nature provides humans demands further exploration and explanation. This is the basis for this study. Before discussing the relevant empirical studies about a human connection to nature it is important to explore a current strategy being employed in an attempt to reconcile humanity with the natural environment. This strategy, called ‘low environmental impact design’ (or ‘sustainable design’), is a relatively recent acknowledgement that the modern built environment has harmed the natural environment and is an attempt to redirect this questionable path.

III. Low Environmental Impact Design Principles

The following section will offer a concise history of low environmental impact design principles, discuss how these principles relate to the interior design profession, and illustrate two missing components of these principles.

History of Low Environmental Impact Design Principles

Low environmental impact design principles have governed the way of life throughout the majority of human history according to James Wines (2000). Wines states that ethics of low environmental impact design were present in early societies through passing cave dwellings from one generation to the next, in aboriginal cultures when hand-building shelters, and in ancient Egyptian cultures when building tombs with exceptional durability to honor spirits. However, these ethics slowly eroded with the Agricultural and Industrial Revolutions. These two revolutions have caused enormous population growth to the world’s current population of 6.8 billion people as well as environmental exploitation (Meadows, Meadows & Randers, 1992; US Census Bureau, 2010). Historian Donald Worster describes the Industrial Revolution of the 1800’s impact on human interaction with the environment as a time of philosophical change: “As wants multiplied, as markets grew more and more far-flung, the bond between humans and the rest of nature was reduced to the barest instrumentalism” (Meadows et al., 1992).
The overarching philosophy of environmental instrumentalism present during and subsequent to the Industrial Revolution began to shift in the mid 1900’s. A key impetus towards a resurging ethic of environmental stewardship in the US was the release of Rachel Carson’s book *Silent Spring* in 1962. *Silent Spring* was an expose on the widespread use of pesticides and their harmful effects on people and the environment. Nearly all environmental historians agree that the modern environmental movement began with Carson’s book (Waddell, 2000). Shabecoff notes, “*Silent Spring* by Rachel Carson is now recognized as one of the truly important books of this century. More than any other, it changed the way Americans, and people around the world, looked at the reckless way we live on this planet” (Waddell, 2000). *Silent Spring* launched a Kennedy Administration investigation into the use of pesticides, the formation of the Environmental Protection Agency (EPA) in 1970, and the EPA’s ban of DDT in 1972 (Waddell, 2000).

The United Nations propelled further environmental awareness in 1987 when they formally asserted a theoretical global commitment to sustainability at the Brundtland Commission by defining sustainable development as “[Meeting] the needs of those present without compromising the ability of future generations to meet their own needs” (Kellert et al., 2009). This event took place at the beginning of environmental awareness in the US, and since then, people have steadily become more aware of global environmental problems. However, despite this awareness, an attitude of environmental instrumentalism still exists today in the US, which is apparent by the enormous amount of resources and energy buildings in the US currently consume which will be illustrated in the following section.

**The Interior Design Profession and Low Environmental Impact Design Principles**

Unfortunately, the interior design profession has contributed to environmental degradation. Kellert et al. indicate that over the last 100 years the philosophy for designing the built environment has resulted in exploitation and depletion of natural resources, polluted air and water, produced unprecedented amounts of waste as well as unhealthy indoor air quality, alienated people from nature, and instilled a sense of placelessness within the built environment (2009). Furthermore, according to the
Worldwatch Institute, buildings in the US use a significant quantity of resources and energy as the following statistics reveal:

- US buildings consume 17 percent of total freshwater flows and 25 percent of harvested wood;
- They produce 50 percent of chlorofluorocarbons (CFCs);
- They use 40 percent of total energy flows;
- They generate 33 percent of carbon dioxide emissions; and,
- They generate 40 percent of landfill material as a result of construction waste (Mendler et al., 2006).

Low environmental impact design principles are one strategy being employed by the design and construction professions to reduce the amount of resources and energy the built environment consumes. These design principles are analogous to those utilized by the USGBC’s LEED certification program for commercial interiors which has become increasingly utilized within the interior design profession since the LEED Green Building Version 2.0 (v2.0) Rating System was released in March 2000 (USGBC, 2006). These low environmental impact design principles employed in the LEED Rating System include strategies such as integrating alternative transportation into site design; reducing water, energy, waste and resource use; material recycling; utilizing energy efficient technologies and improving indoor environmental quality (Mendler et al., 2006; USGBC, 2006).

Even though these low environmental impact design principles are an improvement over more wasteful strategies utilized in the past, they are what McDonough and Braungart call a “being less bad” approach to environmentalism which merely reduces the harmful effects of ineffective models. McDonough and Braungart propose creating a new model which is 100 percent good: a healing architecture (2005).

McDonough and Braungart explained components of healing architecture when they introduced new sustainable design principles in their seminal publication, *Cradle to Cradle*, in 2002. They challenged designers to rethink the concept of waste as ideally nonexistent. Instead, they advocated creating materials and products that can become biological nutrients when the material or product is no longer of use to humans. McDonough and Braungart challenged the design profession to think beyond the
current implementation of low environmental impact design principles (which are “less bad” solutions) to create solutions which are 100% good, causing no harm to natural processes.

**Missing Components of Low Environmental Impact Design Principles: Human Connections to Nature and Place**

Some suggest that the overarching goals of low environmental impact design principles are lost if the design does not offer human-centered benefits such as health, well-being, comfort and safety (Childs & Croxton, 2005). Two key factors which can foster these human-centered benefits are authentic connections to the surrounding natural environment and to the culture and ecology of the places people live and work. Kellert et al. (2009) expand on this point stating that the use of low environmental impact design principles alone fails to foster a crucial connection between people, nature, and culture within the built environment:

> Low environmental impact design, while fundamental and essential, fails to address the equally critical needs of diminishing human separation from nature, enhancing positive contact with environmental processes, and building within a culturally and ecologically relevant context, all basic to human health, productivity, and well-being. (p. viii)

In order to create environments that attain lasting sustainability, these authors suggest people must garner positive benefits from buildings and develop an attachment to them which will subsequently foster a sense of stewardship towards the built environment. Another leader within the design community, Sim Van der Ryn (2005), advocates for this human-, nature- and culture-centered approach to designing the built environment and comments on the holistic nature of this approach:

> The mission of green building and sustainable design is to bring architecture and urban planning back to our lives and back to the flows and cycles of nature. We need to reconnect buildings to their roots in climate, land, place, and our human genetic need to be connected to living natural environments. Let’s take the pulse of our architecture and lower its metabolism by reducing the obscene, mindless consumption and waste in the name of design. Let’s make building whole
through commonsense design intelligence that incorporates life-enhancing technologies. (p. 9)

This holistic approach to design Van der Ryn advocates also incorporates low environmental impact design principles, but does so in conjunction with a human-centered approach which embraces a connection to nature and place.

IV. The Theory of Biophilia, Biophilic Design, and Restorative Environmental Design

Other theories, too, call attention to the need for a human reconnection to nature. For example, the theory of biophilia by Edward O. Wilson (1984) and the notion of ‘restorative environmental design’ (RED) introduced by Stephen Kellert (2005, 2009) provide a context in which to reconnect people to nature within the built environment. These authors’ conclusions are discussed in further detail below.

The Theory of Biophilia

The theory of biophilia was introduced in 1984 by sociobiologist Edward O. Wilson in his book of the same name. However, the first time the notion of biophilia was mentioned was in the late 1900s by Erich Fromm, a German social psychologist. Fromm hypothesized that people have a “passionate love of life and all that is alive; it is the wish to further growth, whether in a person, a plant, an idea, or a social group” (Fromm, 1973, p. 366). Wilson takes Fromm’s notion further and explains biophilia more completely. Wilson’s theory of biophilia states that humans have an innate tendency to focus on life and lifelike processes. To elaborate, this theory purports humans have a need for nature beyond what nature provides them at a physical level, and encompasses the human craving for aesthetic, intellectual, cognitive, and even spiritual needs (Kellert & Wilson, 1993). Nature is essential to healthy human development in that it facilitates development of intellectual capacity, and immersion in nature satisfies human’s desire for curiosity, discovery and imagination (Kellert, 1997).

Specifically, biophilia is the inherent human inclination to affiliate with natural systems and processes, especially life and life-like features of the nonhuman environment (Kellert et al., 2009). Wilson (1984) poetically summarizes biophilia thus: “To explore and affiliate with life is a deep and complicated process in mental
development. To an extent still undervalued..., our existence depends on this propensity, our spirit is woven from it, hope rises on its currents” (p. 1).

Wilson and Kellert emphasize how the brain evolved in a biocentric world and not a machine regulated world. Wilson argues that as a result of living separately from the natural world and in artificial built environments for the past one-hundred to two-hundred years, humans’ biophilic learning rules have become atrophied (1984). Despite human separation from the natural world, a need to connect with nature remains an essential component to healthy human development (Kellert & Wilson, 1993). Not only is a connection to nature essential for healthy human development, the biologically-based aesthetic attraction to nature is universal and something that unites humans despite differences such as race, economic status, geographic region and religion (Kellert, 1997). Additionally, reconnecting people with the natural environment can coincide with living in a modern-day urban society (Kellert, 1997). Thus, the theory of biophilia is a multi-disciplinary framework to analyze humanity’s universal need for nature and to discuss the numerous ways humans crave interaction with the natural world.

**Biophilic Design**

Steven Kellert, a Professor of Social Ecology at Yale, has taken the biological theory of biophilia and applied it to the built environment, coining the term ‘biophilic design.’ The goal of biophilic design is to translate an understanding of biophilia into the design of the built environment, resulting in beneficial contact between people and nature within modern buildings and landscapes (Kellert et al., 2009). Furthermore, biophilic design contains two main dimensions: what Kellert terms the ‘organic or naturalistic’ dimension (organic dimension) and the ‘place-based or vernacular’ dimension (vernacular dimension).

**Organic dimension of biophilic design.** The organic dimension of biophilic design is shapes and forms in the built environment that directly, indirectly, or symbolically reflect the inherent human affinity for nature (Kellert et al., 2009, p.5). Kellert indicates nature can be experienced directly, indirectly, and symbolically under this dimension of biophilic design. Specific ways nature can be experienced these three ways will be discussed later in chapter 2.
Vernacular dimension of biophilic design. The vernacular dimension of biophilic design is buildings and landscapes that connect to the culture and ecology of a locality or geographic area (Kellert et al., 2009). Vernacular design is a means of creating spaces that reflect the places people live and work and avoid the placelessness prevalent in the built environment today. The poet and conservationist Wendell Berry lends justification to avoiding placelessness, stating that “…without a complex knowledge of one’s place, and without the faithfulness to one’s place on which such knowledge depends, it is inevitable that the place will be used carelessly and eventually destroyed” (Kellert et al., 2009, p. 6).

Furthermore, Kellert has classified four different types of vernacular dimensions of biophilic design. These include design which:

- relates to the ecology of a place
- relates to the culture and history of a place
- fuses culture and ecology, and

The nature of these four types of vernacular design and how they relate to the built environment will be discussed later in chapter 2.

Elements of biophilic design. These two main dimensions of biophilic design (the organic and the vernacular) contain six main elements of biophilic design which are ways in which biophilia can be integrated into the design of the built environment. These elements are environmental features, natural shapes and forms, natural patterns and processes, light and space, place-based relationships, and evolved human-nature relationships (Kellert et al., 2009). Furthermore, these six elements of biophilic design contain 72 biophilic design attributes which are practical examples of how the larger element can be expressed within the built environment. These dimensions, elements and attributes of biophilic design are illustrated in Table 2.1 and Figure 2.3. It is important to note that this list of biophilic elements and attributes will evolve as the knowledge and practice of biophilic design becomes more complete.

The dimensions, elements and attributes of biophilic design were used as a framework to further classify participants’ experiences within the built environment in this study. For example, Benyus identified one experience in Interface’s Showroom as
“sunlight streaming in through windows and shadow effect created by Interface’s ‘Mission Zero (logo).’” Two biophilic design attributes the author identified in Benyus’ experience were natural light and spirit of place. The attribute ‘natural light’ is an ‘organic dimension’ of biophilic design and a ‘light and space’ element of biophilic design. The attribute ‘spirit of place’ is a ‘vernacular dimension’ of biophilic design and an ‘evolved human-nature relationship’ element of biophilic design. The specific methods the author used to arrive at these classifications of each participant’s experience will be outlined in Chapter 3.

Table 2.1. The six main elements of biophilic design and their attributes* (Kellert et al., 2009).

<table>
<thead>
<tr>
<th>1. Environmental Features</th>
<th>2. Natural Shapes and Forms</th>
<th>3. Natural patterns and processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Botanical motifs</td>
<td>Sensory variability</td>
</tr>
<tr>
<td>Water</td>
<td>Tree and columnar supports</td>
<td>Information richness</td>
</tr>
<tr>
<td>Air</td>
<td>Animal (mainly vertebrate) motifs</td>
<td>Age, change, and the patina of time</td>
</tr>
<tr>
<td>Sunlight</td>
<td>Shells and spirals</td>
<td>Growth and efflorescence</td>
</tr>
<tr>
<td>Plants</td>
<td>Egg, oval, and tubular forms</td>
<td>Central focal point</td>
</tr>
<tr>
<td>Animals</td>
<td>Arches, vaults, domes</td>
<td>Patterend wholes</td>
</tr>
<tr>
<td>Natural materials</td>
<td>Shapes resisting straight lines and right angles</td>
<td>Bounded spaces</td>
</tr>
<tr>
<td>Views and vistas</td>
<td>Simulation of natural features</td>
<td>Transitional spaces</td>
</tr>
<tr>
<td>Façade greening</td>
<td>Biomorphology</td>
<td>Linked series and chains</td>
</tr>
<tr>
<td>Geology and landscape</td>
<td>Geomorphology</td>
<td>Integration of parts to wholes</td>
</tr>
<tr>
<td>Habitats and ecosystems</td>
<td>Biomimicry</td>
<td>Complementary contrasts</td>
</tr>
<tr>
<td>Fire</td>
<td></td>
<td>Dynamic balance and tension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fractals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hierarchically organized ratios</td>
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<tr>
<td></td>
<td></td>
<td>and scales</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Light and Space</th>
<th>5. Place-based relationships</th>
<th>6. Evolved human-nature relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Light</td>
<td>Geographic connection to place</td>
<td>Prospect and refuge</td>
</tr>
<tr>
<td>Filtered and diffused light</td>
<td>Historic connection to place</td>
<td>Order and complexity</td>
</tr>
<tr>
<td>Light and shadow</td>
<td>Ecological connection to place</td>
<td>Curiosity and enticement</td>
</tr>
<tr>
<td>Reflected light</td>
<td>Cultural connection to place</td>
<td>Change and metamorphosis</td>
</tr>
<tr>
<td>Light pools</td>
<td>Indigenous materials</td>
<td>Security and protection</td>
</tr>
<tr>
<td>Warm light</td>
<td>Landscape features that define</td>
<td>Mastery and control</td>
</tr>
<tr>
<td>Light as shape and form</td>
<td>building form</td>
<td>Affection and attachment</td>
</tr>
<tr>
<td>Spaciousness</td>
<td>Landscape ecology</td>
<td>Attraction and beauty</td>
</tr>
<tr>
<td>Spatial variability</td>
<td>Integration of culture and ecology</td>
<td>Exploration and discovery</td>
</tr>
<tr>
<td>Space as shape and form</td>
<td>Spirit of place</td>
<td>Information and cognition</td>
</tr>
<tr>
<td>Spatial harmony</td>
<td>Avoiding placelessness</td>
<td>Fear and awe</td>
</tr>
<tr>
<td>Inside-outside spaces</td>
<td></td>
<td>Reverence and spirituality</td>
</tr>
</tbody>
</table>

*An attribute is an example of how the larger element can be expressed within the built environment.
Figure 2.3. The two main dimensions and six main elements of biophilic design (Kellert, 2005; Kellert et al., 2009).
Restorative Environmental Design

Biophilic design and its dimensions, elements and attributes in turn can be classified under a larger design paradigm termed restorative environmental design (RED). This design paradigm, introduced by Stephen Kellert, consists of two parts. It employs low environmental impact design principles which minimize negative effects on the natural environment (for example, recycling plastics) along with biophilic design principles (discussed above) which facilitate positive contact between people and nature within modern buildings and landscapes (Kellert et al., 2009). Kellert is not introducing entirely new concepts. However, he is offering a fresh perspective by integrating varied existing knowledge to construct the built environment in a way that mutually benefits people and the environment. The complexities of both low environmental impact and biophilic design principles that culminate in RED can compliment each other to reach holistic design solutions. Kellert’s RED paradigm is as illustrated as Figure 2.4.

Figure 2.4. Kellert’s proposed design paradigm, Restorative Environmental Design, and its two main components: low environmental impact design and biophilic design (Kellert et al., 2009).
V. Types of Human Connections to Nature within the Built Environment

Designers can facilitate nature-connected experiences within the built environment by utilizing the organic dimension of biophilic design. Kellert defines human contact with nature as “…any form of direct, indirect, or symbolic expression of the nonhuman world that is integral to people’s lives” (2005). Kellert also describes these expressions of the nonhuman world as experiences with direct, indirect, or symbolic forms of nature. It is this author’s opinion that a distinction should be made between experiencing something and making a connection to the said “thing” after experiencing it. As it relates to this study, Kellert’s terms of direct, indirect, and symbolic ‘experiences’ of nature will be referred to as direct, indirect, and symbolic ‘connections’ to nature. How this distinction affects the value one places upon feeling connected to nature will be further discussed in chapter 4.

Kellert uses a direct, indirect and symbolic classification system to simplify the many ways people can connect to nature within the built environment. This framework is further discussed below.

Direct Connections to Nature

Direct connections to nature within the built environment are relatively unstructured contacts with self-sustaining features of the natural environment such as views of the exterior environment, daylight, natural ventilation, plants, animals, natural habitats, and ecosystems (Kellert, 2005, p. 136-137; Kellert et al., 2009, p.5). Immediate views of nature out a window are also classified as direct connections to nature. Kellert et al. (2009) emphasizes that the design quality of a direct experience with nature within the built environment affects the impact of the connection on users. For instance, a singular palm tree in a mall does not have a marked psychological effect on a person. However, a diverse atrium that incorporates a range of natural features such as natural light, vegetation, soil and water would constitute biophilic design that has the power to stimulate a person’s senses, emotions, and intellect, according to Kellert. A rich direct connection to nature within the built environment is illustrated as Figure 2.5, an atrium in an office building for the Houses of Parliament in London designed by Hopkins Architects.
Indirect Connections to Nature

Indirect connections to nature within the built environment are controlled or manipulated contact with the natural environment that requires ongoing human input to survive, such as a potted plant, a water fountain, natural materials, or an aquarium (Kellert, 2005, p. 143; Kellert et al., 2009, p.5). Classifying indirect experiences with nature within the built environment typically are not black and white and involve a degree of personal judgment. Usually elements of nature have been manipulated in some way, such as vegetation, animal life, light, air, water, materials such as wood, stone, cotton, leather, and wool, and natural processes such as aging, weather, and climate. Some examples of indirect experiences with nature include potted plants, fish in an aquarium, formally designed fountains, and stone walls. An example of an indirect connection to nature within the built environment is illustrated as Figure 2.6.
Symbolic Connections to Nature

Symbolic connections to nature within the built environment involve no actual contact with real nature, but represent the natural environment through image, picture, ornamentation, video, metaphor, and other techniques (Kellert, 2005, p. 143; Kellert et al., 2009, p.6). Kellert indicates nature can be symbolically experienced within the built environment in a variety of ways, such as decoration, ornamentation, pictorial expression, and shapes and forms that simulate and mimic nature (2005). Moreover, these symbolic representations of nature can appear in a wide diversity of building features such as walls, doors, entryways, columns, trim, casements, fireplaces, furnishings, carpets, fabrics, art, and sometimes even an entire façade.

The symbolic expression of nature within the built environment can be experienced in both obvious ways and subtle ways. An obvious expression of a symbolic connection to nature could be the application of a pattern utilizing organic shapes. An obvious symbolic connection to nature is illustrated as Figure 2.7. A subtle connection to nature could be inconspicuous organic shapes and forms utilized...
throughout an interior space. Symbolic connections to nature are not as easy to identify as direct and indirect connections to nature within the built environment because they can take on a multitude of different forms, but they have the ability to enrich the human experience within a structure just as much as direct and indirect connections, according to Kellert (2005). A subtle connection to nature is illustrated as Figure 2.8.

Kellert has identified characteristics of the built environment that create connections to nature in more subtle ways. These characteristics are based upon the work of Jay Appleton and Grant Hildebrand which identify six paired elements that reflect characteristics of nature: prospect and refuge, enticement and peril, and order and complexity (Kellert, 2005). These elements create situations and feelings that are analogous to the same feelings one would experience in the natural environment. These elements are similar to characteristics of the natural environment that are important to humans as discussed previously with environmental psychology. These six paired elements which illustrate subtle symbolic connections to nature are illustrated as Figures 2.9 through 2.11.

![Figure 2.7 An obvious symbolic connection to nature at the Ronald Regan National Airport](http://www.bloomerstudio.com/projects/reagan/1.php4).
Figure 2.8. A subtle symbolic connection to nature through the use of organic forms at the David S. Ingalls Rink by Eero Saarinen in New Haven, CT (http://www.worthpoint.com/wp-content/uploads/2008/03/eero-saarinen-ingalls-hockey-rink-yale.jpg).

Figure 2.9. Prospect and Refuge: The café in Mithun’s office in Seattle offers a comfortable refuge to employees while providing them a view overlooking the water (http://mithun.com/projects/project_detail/pier_56/).
Figure 2.10. Enticement and Peril: At Frank Lloyd Wright’s Fallingwater, the intriguing view entices the user to the edge of the balcony, while the cantilevered balcony creates a feeling of danger by hanging over the water (http://www.wright-house.com/frank-lloyd-wright/fallingwater-pictures/fallingwater-1.jpg).

Figure 2.11. Order and Complexity: The bamboo is arranged in an orderly fashion, but the arrangement contains detail and variability which prevents the composition from becoming mundane (http://cubeme.com/blog/2009/10/23/great-bamboo-wall-by-kengo-kuma-associates).
Evidence of symbolic connections to nature utilized by humans is evident throughout history and across cultures. In Owen Jones’ classic 1910 cross-cultural study of ornamentation, *The Grammar of Ornament*, he discovers a universal preference for nature as a model in ornamentation: “…whenever any style of ornament commands universal admiration…it will always be found to be in accordance with the laws which regulate the distribution of form in nature” (Kellert 2005). This concept of using nature as a design model is echoed by art critic John Ruskin in his treatise on architectural theory, *The Seven Lamps of Architecture*. Here, Ruskin praises nature as inspiration for architecture. One of his 33 aphorisms on architecture includes commentary on nature that indicates “…all beauty is founded on the laws of natural forms” (Ruskin, 1889). Additionally, Jones’ and Ruskin’s historical studies of ornament and architecture led them to identify an underlying theme of inspiration from nature in design. Furthermore, architect Louis Sullivan drew heavily from natural motifs on the building facades he designed in cast iron in the early 1900’s. These notable people from architectural history illustrate how nature plays an integral role in design. Nature can be symbolically interpreted and represented in a variety of ways. Furthermore, empirical evidence illustrates that people receive benefits from symbolic connections to nature as subsequent sections describe.

VI. Types of Vernacular Connections within the Built Environment

As discussed previously, Kellert has identified four different types of vernacular dimensions of biophilic design (2005). Various ways these types of vernacular connections relate to the built environment will be illustrated in the following subsections.

Vernacular Design Relating to Ecology of a Place

Vernacular design which connects to the ecology of place does so at a large scale, being sensitive to the building site, the surrounding ecosystems, and the watershed (Kellert, 2005). Such a design requires intimate knowledge of the physical site characteristics (water flow, geology) and biological characteristics (species composition). Vernacular design which makes connections to the ecology of a place
should even strive to restore or enrich ecological functions whenever possible (Kellert, 2005).

**Vernacular Design Relating to Culture and History of a Place**

Vernacular design can connect to the culture of a place by creating spaces which reflect the architecture of its geographic region. It can create social traditions relating to place by encouraging traditions and shared relationships within these spaces. The goal of creating vernacular connections within the built environment is to foster a sense of loyalty and commitment between people and the environments in which they live. Architect Tom Bender notes the value of creating spaces which reflect the culture and history of the people in that area: “A building, like a person…can help restore to our surroundings a sense of sacredness and honoring of people, place, and diverse traditions” (Kellert, 2005, p. 169).

**Vernacular Design Fusing Culture and Ecology**

Vernacular design which effectively connects culture and ecology recognizes the continual interaction between and interdependence of culture and nature. Vernacular design which fuses these two produces a space which reflects the specific culture and ecology of the specific local, which ideally form a respectful partnership. Rene Dubos expands on the interaction between culture and nature: “[People] always add something to nature, and thereby transform it, but [their] interventions are successful only to the extent that [they] respect the genius of the place” (Kellert, 2005, p. 170).

**Vernacular Design Avoiding Placelessness**

Placelessness is diminishing the distinctive local and regional identity and replacing it with uniformity and anonymity. Regrettably, the modern built environment too often embodies this characteristic. Conversely, designing the built environment to avoid placelessness involves connecting people to the various aspects of vernacular design previously discussed (ecology, culture and history) in order to foster a connection and attachment to the places people live and work (Kellert, 2005).
VII. Positive Benefits of a Human Connection to Nature within the Built Environment

Although nature has been a source of healing for centuries, recent empirical studies have suggested the positive benefits of connections to nature within the built environment. Two principal ways nature can satisfy human physical and emotional needs is through restorative and performance-enhancing experiences. These two types of experiences will be discussed in the next sections, and specifically, how these experiences can be elicited through Kellert’s aforementioned direct, indirect, and symbolic connections to nature within the built environment will also be discussed.

Direct Connections to Nature

Direct connections to nature can offer restorative experiences to people experiencing physical and mental stress. Rachel and Stephen Kaplan developed the attention restoration theory to explain how significant directed attention is needed to engage in mentally demanding and stressful tasks. When the mind is overworked, an attention deficit is created and it becomes difficult to concentrate. Kaplan and Kaplan found that periods of effortless attention, defined as involuntary, interest-based attention, are a means of restoring mental capacity (Kopec, 2006). Restorative settings promote involuntary, interest-based attention by eliciting fascination, giving a sense of being away, and promoting the notion of extent and compatibility (Hartig et al., 1991). Kaplan and Kaplan state these four characteristics (fascination, being away, extent, and compatibility) are found to a high degree in natural environments (1989). Fascination involves being consumed with involuntary, interest-based attention. Being away involves immersing oneself in an environment completely different from his or her usual environment. Extent is the notion or feeling the environment one is immersed in is a small part of a larger whole (Hartig et al., 1991). Compatibility is when “the person’s inclinations match the demands imposed by the environment as well as the environmental supports for intended activities” (Hartig, Evans, Jamner, Davis & Garling, 2003).

A study conducted by Hartig et al. (1991) empirically tested attention restoration theory and found physically immersing oneself in nature (a direct connection to nature) was mentally restorative. They gave three groups of people mentally fatiguing tasks for
forty minutes and then immersed them in three different environments for forty minutes: a walk in a park, a walk in an urban setting, or relaxing and reading magazines in a quiet room. Hartig et al. found people that took a walk in a park experienced being away, fascination, extent and compatibility to a greater extent than a person walking in an urban setting or relaxing in a room. Additionally, the group that walked in a park had overall higher ratings of happiness and were the most accurate when completing a mental task after being immersed in their respective environment. This study partially builds upon the findings of R. Kaplan and S. Kaplan's review of literature, conducted in 1989, which found that gardening and other local contacts with nature offer restorative experiences.

Direct sunlight exposure is another direct connection to nature that has restorative effects. In a study conducted in a Canadian psychiatric inpatient hospital, Beauchemin and Hays monitored the length of stay of patients admitted for depression treatment (1996). Out of this sample of patients, one half of the patients resided in east-facing rooms that received strong morning sunlight and had an average lux of 5000 on a bright day (the ‘sunny’ rooms). The other half of the patients in north-facing or interior indoor courtyard-facing rooms (the ‘dull’ rooms) received an average lux of 300 on a bright day. The group of patients in the sunny rooms had an average length of stay of 16.9 days, while the group in the dull rooms had an average length of stay of 19.5 days (Beauchemin & Hays, 1996).

Another landmark study related to the restorative effects of a direct connection to nature was conducted by Robert Ulrich in 1984. He reviewed records of patients who were recovering from gallbladder surgery at a Pennsylvania hospital from 1972 to 1981. Out of the patient sample Ulrich reviewed, 23 patients recovered in rooms facing a brick wall and 23 patients recovered in rooms with views of the natural environment. The patients with views of the natural environment had shorter hospital stays, required less medication, and received less negative evaluations in nurses’ notes than patients recovering in rooms with views of the brick wall (1984).
Indirect and Symbolic Connections to Nature

Empirical studies have also been conducted which relate to the positive effects of indirect and symbolic connections to nature within the built environment. A study involving a performance-enhancing indirect connection to nature within the office environment was conducted at a Norwegian oil company (Fjeld et al., 1998). Self-reported measures of health were monitored among 51 office employees during two separate periods: a period with a significant amount of potted plants in the office and a period without plants in the office. The researchers found an overall 21 percent reduction in reported sick building syndrome symptoms among employees when the potted plants were present in the office environment.

A study conducted on visual décor within an office setting provides knowledge about office workers creating symbolic connections to nature within the built environment (Heerwagen & Orians, 1996). Researchers compared use of employees' personal wall décor at the University of Washington. One group of employees had offices with windows of views to the natural environment and the other group of employees had windowless office spaces. Researchers found employees with windowless offices were twice as likely to decorate their offices with visual material dominated by nature-related content. These empirical studies give further traction to the theory of biophilia and provide evidence of practical benefits of and inclination towards creating human connections to nature within the built environment.

VIII. Human Connection to Nature as a Means of Protecting Nature

Researchers are also exploring the effects a connection to nature has on a person’s sense of environmental stewardship. An empirical study conducted by Dutcher, Finley, Luloff and Johnson (2007) found that a person’s connection to nature was positively associated with environmental concern and environmental behavior. Furthermore, a study by Kals, Schumacher, and Montada (1999) found that a person’s emotional affinity towards nature was a powerful predictor of nature-protective behavior. Additionally, Kals et al. noted that 39% of a person’s emotional affinity towards nature is shaped by his or her past and present experiences in natural environments.
An authentic emotional connection between people and nature would more effectively create a long-term desire to protect nature, rather than forcing an environmental ethic. David Orr, an environmentalist, and Robert Pyle, a conservation ecologist, explain how a personal choice to protect nature naturally stems from authentically appreciating nature: “People with the right kinds of education and experience, accordingly, will be more likely to protect nature having come to bond with it and perhaps even to love it” (Kellert et al., 2009, p.222).

Beyond simply developing the impulse to protect nature, having an emotional connection to nature may also be an integral component of practicing sustainable design. Specifically, Cathy Steig, a leader in the field of sustainable interior design identifies a “sustainability gap” that exists between sustainable design knowledge and actual practice (2006). She emphasizes a connection to nature as being the first of five steps towards practicing truly sustainable interior design: connection, knowledge, process, practice and commitment. Steig asserts, “The first step toward understanding what sustainable design is and why it is now a critical aspect of practice is to make the connection, intellectually and emotionally, to the natural environment” (2006, p. ix-x).

Orr, Plye, and Steig make crucial points about the importance of personally connecting with nature before one makes an individual commitment to protect nature. It is this author’s opinion that someone begins authentically appreciating nature when he or she makes a personal, emotional connection to nature. Thus, identifying these type of connections within the built environment is what drove this study.

IX. Office Environments

Previous discussion has concerned biophilic design which mutually benefits people and the environment. When designing an office environment a third stakeholder is introduced: the company’s bottom line. It is fairly well established that a quality designed office space is an important determining factor of employee productivity, and hence, company profitability. For example, Franklin Becker, a leader in the field of human-environment relations and facility planning, indicates the importance of well-designed facilities in the workplace: “It’s about understanding how space, the second most expensive resource an organization has (its people being the first), can be
leverage to help those people work more effectively, and to attract and retain the right people in the first place” (Becker & Steele, 1995, p. 6). Becker emphasizes the important role office design plays in an organization’s bottom line.

Other researchers have completed empirical studies concerning connections to nature within office environments. The California Energy Commission (2003), under the direction of the Heschong Mahone Group, extensively studied windows and day lighting at the Sacramento Municipal Utility District in California and found the following results:

- a better view out a window (judged primarily by size of window and secondarily by amount of vegetation outside the window) was consistently associated with enhanced employee performance;
- employees processed calls 6% to 12% faster when they had the best possible view out a window as opposed to employees with no window view;
- employees performed 10% to 25% better on mental functioning and memory recall tests when they had the best possible view out a window as opposed to employees with no window view;
- employees reported better health conditions when they had better views; and,
- reports of increased fatigue were most strongly associated with a lack of view.

A study on an indirect connection to nature within an office environment involved indoor plants. Researchers measured employees’ responses to differing amounts of plants in an office environment: no plants, a moderate amount of plants, and large amounts of plants (Larsen et al., 1998). Employees assessed the office as more comfortable, more attractive, and thought they performed better when the office had the highest number of plants. However, employees actually performed lower on productivity tests with the large amount of plants in the office. This surprising result indicates there may be a threshold to the amount of vegetative stimulation which is optimal for employee performance in the work environment. Kellert et al. (2009) suggest creating restorative environments in break rooms nearby employees’ desks where they can visit for a respite if they need restoration from their mentally fatiguing tasks.

Since the workplace is an environment where people spend a majority of their day, it is crucial the environment serves employees’ best interest. As noted here,
creating connections to nature within the built environment may in fact enhance a corporation’s financial bottom line by creating healthier environments for employees. It follows that biophilic design is a possible strategy that could be employed in the office environment to make these connections.

Conclusion

This review of literature has covered the following broad range of topics: human history, evolutionary psychology, low environmental impact design principles, the theory of biophilia, restorative environmental design, the positive benefits of connections to nature, and office environments. In this review the way human history and evolution have shaped people’s current visual preference for landscapes was explored. The separation of humans from the natural environment and the recent attempt to reverse the effects of environmental degradation caused by this separation using low environmental impact design principles was discussed. Furthermore, low environmental impact design principles and how they have been applied to the design of the built environment were considered. The theory of biophilia was introduced as a basis for the argument that people need nature on an aesthetic, intellectual, cognitive, and spiritual level. Restorative environmental design was introduced as a new design paradigm with its two main components: low environmental impact design and biophilic design. The two main dimensions of biophilic design, organic design and vernacular design, along with the six main biophilic design elements (environmental features, natural patterns and processes, place-based relationships, natural shapes and forms, light and space, evolved human-nature relationships) were explored. Research studies which offered empirical evidence for the restorative and performance-enhancing benefits of direct, indirect, and symbolic connections to nature were examined and a human connection to nature facilitating a desire to protect the environment was discussed. Lastly, the importance of design and creating connections to nature within the office environment was considered. The theoretical framework in this review of literature was used to inform the research design introduced in Chapter 3. As stated previously, its purpose was to assess office users’ perception of their connection to nature at the study’s location, the Interface Showroom in Atlanta.
CHAPTER 3

PROCEDURE

The review of literature suggests that a human connection to nature is an essential component of the built environment. Low environmental impact design principles have lessened the impact on nature, but have failed to foster a connection between people and nature in the built environment (Mendler et al., 2006). The lack of a human-nature connection is a problem because humans have a psychological need to experience a connection to nature which is necessary for psychological well being (Kellert & Wilson, 1993). Furthermore, nature likely provides for the emotional needs of people such as comfort, safety, intrigue, and beauty. Additionally, empirical studies suggest that connections with nature can benefit the emotional and physical needs of people, such as provide them with restorative experiences, expedite healing processes, and reduce sick building syndrome symptoms (Beauchemin & Hays, 1996; California Energy Commission, 2003; Fjeld et al., 1998; Hartig et al., 1991; Heerwagen & Orians, 1996; Kaplan, 1993; Kaplan & Kaplan, 1989; Larsen et al., 1998; and Ulrich, 1984).

The goal of this study was to describe the essence of human connections to nature within the built environment and to explore the nature of the human-environment connection and its perceived effects on office users. More specifically, the research objective was to identify pleasurable and/or nature-connected experiences within the built environment which were experienced by office users. Additionally, others call for further research in this area. For example, Howard Frumkin, an environmental and occupational medicine specialist, states “…we need to establish a tradition of health research within the community of scientists interested in nature contact” (Kellert et al., 2009, p. 113).

The challenge in this study lied in understanding those specific aspects of the built environment that can create authentic connections between people and nature. Identifying what constitutes a human connection to nature as well as the frequency of these connections inside a facility will hopefully bring more visibility to the importance of these experience types. This study was also an opportunity to discover if the LEED
green building certification program is addressing the human need for nature in the context of a commercial retail and office environment. Thus, it appeared logical to study human-nature connections in a built environment that employs low environmental impact design strategies. Utilizing Kellert’s framework for biophilic design as a classification system to deconstruct nature connections provided a strategy by which to study this potentially ambiguous subject.

Past studies regarding a human connection to nature have dictated those variables participants react to within the built environment (Beauchemin & Hays, 1996; California Energy Commission, 2003; Fjeld et al., 1998; Hartig et al., 1991; Heerwagen & Orians, 1996; Larson et al., 1998 & Ulrich, 1984). However, this study gave participants the freedom to identify their own variables within the built environment they believed represented important connections to nature. This was done in order to discover varied ways different people personally experience nature connections within the built environment. Moreover, this method of giving participant’s control was an exploration into whether or not they would notice biophilic design attributes within the built environment and experience them as nature connections while not being led by the author. Ultimately, this study sought to increase the knowledge base of biophilic design principles. This study could also be a productive way to inform medical researchers about the ways humans personally connect with nature.

Qualitatively studying the human connection to nature within the built environment was appropriate given that there is insufficient attention currently paid to people’s perceived connection to nature, and little research has yet occurred on this topic in an office environment (Kaplan, 1993). There is a need to widen the breadth of knowledge about how and why people feel personal and emotional connections to nature, specific characteristics that qualitative methodologies can address. It is hoped this research may emphasize the importance of a human connection to nature, potentially leading others to include this quality in green building assessment programs such as the USGBC’s LEED green building certification program.
Setting

The research study was conducted at the Interface Showroom, located at 75 5th Street North West (NW), Suite 100, in Atlanta, Georgia. Interface, Inc. is the world’s largest manufacturer of modular carpet. The Interface Showroom is a 7,000 square foot commercial office and showroom tenant space located in the Centergy building in midtown Atlanta.

The Interface Showroom was strategically chosen for this study. Interface’s vision for the showroom was “to incorporate the highest level of environmental strategies and technologies” (USBC, n.d.). Subsequently, this location earned the distinction of becoming the nation’s first LEED-CI platinum-certified interior upon completion in April 2004. Interface’s Showroom was chosen as the location for this research study because it represents the application of the national benchmark for low environmental impact design and technology strategies currently recognized in the US. As such, it was reasonable to conclude it had the potential to contain more direct, indirect, and symbolic connections to nature than other buildings that did not utilize these strategies. Some of these low environmental impact design strategies utilized in the showroom include reduced water use, extensive day lighting and access to views, efficient artificial lighting, selection of materials with recycled or rapidly renewable content and low volatile organic compounds (VOCs), and building system commissioning (a process of inspection and testing to ensure that building systems are performing to their design intent).

The Interface Showroom contains eight permanent workspaces, a reception area, showroom space, product presentation areas, and storage space for samples and sales collateral. The interior space consists of general showroom (70%), office (15%), other (9%), kitchen (3%) and conference (3%). A floor plan depicting the major functions of the space as well as Interface employee desk locations is provided as Figure 3.1. Views of the showroom and kitchen are provided as Figures 3.2 and 3.3.
Figure 3.1. Floor plan of the Interface Showroom in Atlanta. Not to scale.
Figure 3.2. The general showroom area at Interface (http://www.h2ecodesign.com/images/interface_1large.jpg).

Figure 3.3. The kitchen at Interface, looking toward the drop-in stations (http://eere.buildinggreen.com/process.cfm?ProjectID=409).
Permission was obtained from Interface to access their employees and facility for this study. Appendix A provides the required Human Subjects approval documentation obtained from Florida State University (FSU).

**Sample**

Participants in this study were selected via a purposive sample. There were seven full-time employees at the Interface Showroom at the time of this study and five of these individuals volunteered to participate. The participants at Interface’s Atlanta Showroom were chosen because there was a greater likelihood that they would experience connections to nature due to working in a LEED-CI platinum-certified work environment. These participants were able to offer the author personal accounts of their interactions with a facility that has been designed and constructed with the national benchmark for low environmental impact design strategies. There were no limitations placed on variables such as age, job category or length of time working for Interface as the intent of the study was to gather the impressions of a cross-section of office workers ‘as-is’ within a given office/organization. Rather, the goal was to report these natural variations and provide comments where themes emerged.

**Research Questions**

The overall research question that guided the study and its methodology was thus: What are the characteristics of office users’ perceived experiences regarding feeling connected to or removed from nature while they are in their office environment? Specifically, five subquestions addressed this overall question:

1. To what degree do participants feel connected to nature or removed from nature at Interface’s Showroom?

2. What aspects of the built environment do participants perceive create the feeling of being either connected to or removed from nature?

3. Which perceived connections to nature are created by aspects of the built environment which are the result of meeting a LEED-CI prerequisite or credit?
4. What are participants’ perceived resulting effects of experiencing a connection to nature at Interface’s Showroom?

5. What are participants’ perceived resulting effects of feeling removed from nature at Interface’s Showroom?

The author asked subquestion one in order to gauge the overall feeling of nature-connectedness or feeling of being removed from nature within the showroom. This subquestion was asked with the knowledge that it would be answered in two varying ways: through participant’s self-assessment of nature-connectedness and through the author’s classification of participants nature-connected or nature–removed experiences within the showroom. The purpose of asking subquestions two and three was to determine the sources (design elements and/or strategies within the built environment) of the nature-connected or nature–removed experiences within Interface’s Showroom and the degree to which complying with the LEED certification program facilitated these design elements and/or strategies. Subquestions four and five were asked to determine the effects a nature-connection (or the lack thereof) has on the well-being of office users within Interface’s Showroom. These subquestions were answered through an analysis of annotated photographs taken by the participants as well as the content of follow-up questionnaires and interviews with the participants. These methods are identified in further detail below.

**Methods**

This qualitative study evaluated the frequency of and the characteristics of office users’ connection to nature in a commercial office and retail environment. Data gathering included three methods in order to triangulate findings: photoethnography, whereby participants took and annotated photographs of office experiences, and follow-up interviews, and questionnaires. Photoethnography was chosen as a key data collection method in order to more accurately understand office users’ daily experiences within and connection to the built environment. Follow-up methods of interview and questionnaire served to fill in gaps present in the annotated photograph information on the Experience Documentation Forms (EDFs) crafted for this study. An example of an EDF in which the participant noted observations about his or her photograph is provided.
in Appendix B. Questionnaires provided the means to gather demographic information as well as determine participants' perceptions of nature. An example of the Biographical and the Nature Affinity and Experience Questionnaire are provided in Appendices C and D, respectively.

McFall and Beacham (2006) note the effectiveness of combining photoethnographic and interview research methodologies: “…the combination of these method and analysis tools, provides an integrated and well-organized set of qualitative data representing the participants’ views on the topic addressed” (p. 33). Integrating photoethnography, personal interview and questionnaire was an opportunity to use a variety of methods to more richly describe the nuances of what constituted a human connection to nature within the built environment.

**Procedures**

The procedures the author utilized to conduct this study included remote and in-person orientation of the participants to the study at the Interface’s Showroom, data collection via participants’ annotated photographs of the facility on the EDFs, participant interview and questionnaire, and content analysis of resulting data. These steps are further detailed below.

**Introduction of study**

The author introduced the study to seven full-time employees (participants) at the Interface Showroom via e-mail two weeks prior to the study’s commencement (Appendix E: E-mail Script). Two weeks after the study was thus introduced, the researcher met with the participants in person to describe the study in greater detail. At this time five employees decided to volunteer to participate in the study and signed a FSU Behavioral Consent Form in advance of the study’s commencement (See Appendix F: FSU Behavioral Consent Form).

**Data Collection**

At the beginning of the study the author orally explained the research study to the participants and explained the photoethnographic component of the research. The author also provided written directions for each participant (See Appendix G: Directions for Participants). The author provided a disposable camera to each of the five
participants for him or her to carry for a total of five full business days. Each participant was instructed to photograph a minimum of 10 experiences inside the building when they encountered the following:

a) An aspect of the building that creates a pleasing or enjoyable moment for the participant;

b) An aspect of the building that makes the participant feel connected to nature; or,

c) An aspect of the building that makes the participant feel removed from nature

The reason for providing participants the option of photographing an aspect of the built environment that created a pleasing/enjoyable moment was because pleasing moments could actually be indirect or symbolic connections to nature according to the framework developed by Kellert (2005, 2009). Indirect and symbolic connections to nature are more subtle connections and often not recognized as related to the natural environment. Thus, participants were not overly directed in making observations, and the author avoided the need to overtly identify ‘direct, indirect and symbolic’ categories to the participant. Participants were also given the option to identify an aspect of the building that made them feel removed from nature so that they were not looking for only nature-connected experiences within the building. Thus, this option was provided in order to create an atmosphere which promoted an honest depiction of participant experiences within the showroom.

Each participant documented his or her experiential moment by filling out an EDF when the photograph was taken. The participant provided a brief description of the photograph he or she took, identified which type of experience he or she had (pleasing/enjoyable moment, nature-connected experience, or removed-from-nature experience) and described the aspect of the built environment that caused this experience. The photographs were taken and the EDFs were completed by each participant on his or her own time from any location within Interface’s Showroom over five typical eight-hour work days. When each participant finished documenting experiences within the showroom he or she mailed the camera to the author along with the EDFs in a pre-addressed package. A summary of each participant’s EDFs is included as Tables A.1 through A.5 in Appendix H. The author created anonymous code names for each participant (Benyus, Braungart, Kellert, McDonough and Wilson) as well
as the other employees in the office which the participants mentioned (Carson, Fuller, Heerwagen, Kaplan and Van der Ryn) in order to protect the identities of all Interface employees.

The author then conducted a follow-up interview with each participant in person. The author and participant discussed the experiential photographs and the responses in the EDFs. The interview questions allowed the author to more deeply understand the nature of the participants’ connections and those aspects of the built environment which facilitated the connections, or caused participants to feel removed from nature. Interview transcriptions with each participant are provided in Appendix I.

At the end of the interview each participant verbally completed two final short questionnaires: a biographical questionnaire and a nature affinity and experience questionnaire. The biographical questionnaire asked questions regarding age, education, and work experience in order to gather demographic information for study replication and characteristics of participants for analysis (See Appendix J). The author administered the nature affinity and experience questionnaire in order to understand each participant’s emotional affinity towards nature, their interest in nature (as expressed through educating themselves about nature-related issues), and their present and past interactions with nature, as these variables could have affected how each participant perceived nature inside Interface’s Showroom (See Appendix K).

**Data Analysis**

The author conducted content analysis of participants’ responses in the EDFs and to the interview questions (See Appendix L). This data was coded based on Kellert’s classification system of biophilic design which served as a way to categorize and simplify the many ways people can experience nature and which was depicted as Figure 2.3 on page 22 (2005, 2009). Participants’ connections within the built environment were classified as being one of the two main dimensions of biophilic design: organic or vernacular. If classified as organic, the connection was further classified based on the type of connection to nature (direct, indirect, or symbolic). The response was also examined to see if it made a vernacular connection. Furthermore, the author identified the specific biophilic design attribute(s) which facilitated the organic
and vernacular connection(s) (which also fall within one of six categories depicting six elements of biophilic design).

The author identified overall themes emerging out of participants' individual experiences as well as the perceived effects that a presence of an overall connection to nature within the showroom had on the participants. The author was open to other classification schemes organically emerging during the data coding, and as a result, began classifying vernacular connections participants experienced within the showroom. Frequencies of responses were recorded. Finally, the author arrived at qualitative conclusions based upon emerging themes in the data.

Instrumentation

Data from participants' commentary of their experiences within the built environment was collected via four main instruments: disposable cameras with EDFs, personal interview, biographical questionnaire and a nature affinity and experience questionnaire. A dedicated disposable camera was given to each participant along with EDFs to document a suggested minimum of 10 experiences he or she had within the built environment. The biographical questionnaire was developed by the researcher as a means to understand the general demographics of the study sample, along with each participant's past experience in an office environment and also at Interface’s Showroom. The nature affinity and experience questionnaire was adapted from an instrument utilized in a study by Kals et al., (1999) that was used to measure subjects' emotions and interest in nature as well as their experiences with nature. Permission was obtained from the author to adapt the instrument for the purpose of this study. The author collected the questionnaires and interview data in an office setting (at Interface’s Showroom) with each participant in a one-on-one interview during regular business hours.

Limitations

Limitations to this study were anticipated, but could not be entirely mitigated. They included, but were not limited to the following:

1. Personal experiences and attitudes of participating employees.
It would have been impossible to control for the past experiences of each Interface employee which has shaped his or her attitude about nature. Participant attitudes and experiences undoubtedly influenced the types of connections noticed within the Interface Showroom. However, participant perceptions represented an important aspect of the results sought in this study. The author administered the nature affinity and experience questionnaire to better understand the extent each participant felt an affinity towards nature and if that affinity affected their responses to the built environment. Although this is a limitation, the nature of this qualitative study and the limited number of participants allowed the author to deeply investigate how an employee’s experience affected his or her personal, non-quantifiable perception of the built environment.

2. Effect of the study inquiry.

The author acknowledges that the knowledge of a study being conducted on the participants may have in fact falsely heightened their perceptions of their interactions with the built environment. This was recognized as an unavoidable aspect of the study methodology.

3. Small sample size.

This qualitative study did not include a large sample size. This was by design and enabled in-depth data gathering. However, it also did not lend itself to reliable capture of the office user population perceptions in general as an empirical study might. Thus, the conclusions drawn from this study are not able to be generalized to larger office user populations. However, this study may serve as a helpful exploratory study that might assist future empirical studies’ design.

**Conclusion**

Studying an elusive topic such as the human connection to nature within the built environment required a multidisciplinary approach to research design in order to depict the topic as accurately as possible. A qualitative study lended itself to this thorough and multidisciplinary approach. Utilizing phoethnography, interview and questionnaire
enabled an in-depth visual, oral, and written description of the nature of participants’
connection to nature as well as their perceived benefits or consequences of those
connections. By strategically choosing a LEED-CI facility to conduct a study of a human
connection to nature, the author increased the likelihood that direct, indirect, and
symbolic connections to nature may be present in the facility. Moreover, since LEED-
certified structures represent the benchmark for low environmental impact design
strategies in the country, conducting this study in such a facility enabled the author to
assess whether the prevailing LEED green building certification program is adequately
addressing the need for a human connection to nature within the built environment.
CHAPTER 4

RESULTS AND DISCUSSION

This chapter will describe the results obtained from participants’ assessments of their experiences within Interface’s Showroom. Specifically, it will describe how and why participants felt connected to nature within Interface’s Showroom. It will also discuss the author’s assessment of implications of those results and emergent themes. Chapter 5 will discuss conclusions gathered from the results discussed here as well as potential avenues for future research.

Methodology and Demographics

To review, the participants’ results were obtained through photographs, EDFs, follow-up interviews, and questionnaires (a nature affinity and experience questionnaire and a biographical questionnaire). These methods served to answer the main research question: What are the characteristics of office users’ perceived experiences regarding feeling connected to or removed from nature while they are in their office environment? These methods also specifically answered the five subquestions which addressed the main research question:

1. To what degree do participants feel connected to nature or removed from nature at Interface’s Showroom?

2. What aspects of the built environment do participants perceive create the feeling of being either connected to or removed from nature?

3. Which perceived connections to nature are created by aspects of the built environment which are the result of meeting a LEED-CI prerequisite or credit?

4. What are participants’ perceived resulting effects of experiencing a connection to nature at Interface’s Showroom?

5. What are participants’ perceived resulting effects of feeling removed from nature at Interface’s Showroom?
The resulting data was coded based on Kellert’s classification system of biophilic design which served as a way to categorize and simplify the many ways people can experience nature (2005). Participant’s connections within the built environment were classified as being one of the two main dimensions of biophilic design: organic or vernacular. If classified as organic, the connection was further classified based on the type of connection to nature (direct, indirect, or symbolic). The response was also examined to see if it made a vernacular connection. Furthermore, the author identified the specific biophilic design attribute(s) which facilitated the organic and vernacular connection(s). Table 4.1 summarizes the demographics of the participants as well as where they spent their time within Interface’s Showroom.

Table 4.1. Participant demographic information and time spent within Interface’s Showroom. 'NR' indicates data was not reported.

<table>
<thead>
<tr>
<th></th>
<th>Benyus</th>
<th>Braungart</th>
<th>McDonough</th>
<th>Kellert</th>
<th>Wilson</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
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<td>39</td>
<td>45</td>
<td>45</td>
<td>44</td>
</tr>
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<td>Female</td>
<td>Male</td>
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<td>Female</td>
</tr>
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<td>Title</td>
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<td>Sales Analyst</td>
<td>Regional Vice-President</td>
<td>Director of Product Styling</td>
<td>Business Development Specialist</td>
</tr>
<tr>
<td>Highest level of education</td>
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<td>Bachelors Degree</td>
<td>Bachelors Degree</td>
<td>Bachelors Degree</td>
<td>Bachelors Degree</td>
</tr>
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<td>Speech Communication</td>
<td>Industrial Engineering</td>
<td>Interior Design</td>
<td>English</td>
</tr>
<tr>
<td># Years working for Interface</td>
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<td>9</td>
<td>14</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td># Years working at showroom</td>
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<td>6</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Average hours per week spent in showroom</td>
<td>40</td>
<td>28-30</td>
<td>25</td>
<td>32</td>
<td>30-40</td>
</tr>
<tr>
<td>Continuous hours spent in showroom per day</td>
<td>8</td>
<td>NR</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Field of work prior to working at Interface</td>
<td>Antique Sales</td>
<td>Sales</td>
<td>Sales &amp; Engineering</td>
<td>Commercial Interior Design</td>
<td>Marketing</td>
</tr>
<tr>
<td>Time spent in and outside of showroom during average work week (out of 100%)</td>
<td>Showroom</td>
<td>85</td>
<td>minimal</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Office Area</td>
<td>5</td>
<td>80</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Kitchen</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Conference Room</td>
<td>0</td>
<td>10</td>
<td>12.5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Outside of Showroom (traveling, etc)</td>
<td>0</td>
<td>rare</td>
<td>37.5</td>
<td>20</td>
</tr>
</tbody>
</table>
Overall, participants exhibited many similar characteristics. All were within the ages of 39 and 45, all had bachelor’s degrees, and all had been working at Interface’s Atlanta Showroom for at least three years. It is worthy to note that where people spent the most of their time in the showroom likely affected the type of pictures they took. For instance, Wilson did not have a permanent work space. Therefore, she worked from a variety of locations throughout the showroom and as assessed by her comments, valued the different work environments present throughout the showroom.

Results

The resulting data was organized to address each research subquestion. Collected data was grouped according to which research subquestion it answered. The fifth subquestion was not discussed because none of the participants reported feeling removed from nature in an overall sense at Interface’s Showroom. Even though Braungart reported feeling removed from nature during one experience, as a whole she reported feeling connected to nature in Interface’s Showroom.

Subquestion 1. To what degree do participants feel connected to nature or removed from nature at Interface’s Showroom?

In the following section, the author will relate the participants’ experiences with and attitudes towards nature in order to discover what may have influenced the degree to which participants felt connected to or removed from nature at Interface’s Showroom. Then, participants’ perceptions of nature-connectedness inside Interface’s Showroom will be reported and discussed.

Participants’ affinity for nature, interest in nature and experience with nature. Participants’ answers to the nature affinity and experience questionnaire are described below in Table 4.2. With the first two statements, participants were asked to self-assess their appreciation for and interest in nature based upon a likert scale. The first statement served to measure participants’ emotional affinity towards nature which, as mentioned in Chapter 2, is a powerful predictor of nature-protective behavior (Kals et al., 1999). Moreover, since Kals et al. (1999) indicate that 39% of a person’s emotional
affinity towards nature is shaped by past and present experiences in natural environments, questions three and four were asked to discover this information.

The second question determined the participants’ current interest in nature as demonstrated by how much effort they feel they are putting into educating themselves about nature-related issues. Kals et al. (1999) notes that one can feel an emotional affinity towards nature and not have an interest in nature and vice versa.

Table 4.2. Likert-scale gauging participants’ emotional affinity for nature (statement 1), interest in nature (statement 2) and current and past experience interacting with nature (statements 3 and 4).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benyus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braungart</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kellert</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilson</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*nature = elements of the natural world, such as mountains, trees, plants, animals, and bodies of water
*nature-related issues = examples include water resources, plant or animal species, community parks, composting
*interacting with nature = examples include: hiking in the wilderness, road biking through forested roads, being in a park, playing outdoor sports, being outside in a garden
*childhood = 7 to 18 years

Overall, participants felt an emotional affinity towards nature (statement 1). This may have been shaped by past and present time spent interacting with nature, as all participants reported spending a substantial amount of time interacting with nature both
as a children and adults (statements 3 and 4). However, in the follow-up interview Kellert and Wilson reported that their time spent interacting with nature is dependent on the weather (spending less time in nature in the winter).

The effort participants made toward educating themselves about nature-related issues (statement 2) varied, with three participants making an effort (Benyus, McDonough and Kellert) to educate themselves and two with slightly less or much less effort (Braungart and Wilson). It’s notable that Braungart and Wilson reported a high emotional affinity for nature although they reported ‘Undecided’ and ‘Disagree’ to this question. It is valuable to discuss possible motivations of Benyus, McDonough and Kellert who answered either ‘Agree’ or ‘Strongly Agree’ to this question. Benyus indicated that she read National Geographic and also liked to photograph certain elements in nature. McDonough indicated that he educated himself about nature-related issues by learning about internal Interface information on sustainability. Kellert indicated that she learned about nature-related issues through her personal self-interest, but also through working at Interface:

A lot of it comes through just my personal interest, like when I garden, read, talk with other gardeners, or watch shows that educate on how to take care of the planet. A lot of it comes by default working at this company. There’s a lot of information you get here, like for instance, at our national sales meeting that’s coming up we do a legacy day where we all break up into different teams and go out and do a project. One year we cleaned up an estuary. (Kellert, personal communication, February 22, 2010)

McDonough is in charge of operations at Interface’s Showroom. So, as a leader he is likely motivated to be on the forefront of knowledge about Interface’s sustainability ethic. However, Benyus and Kellert indicated that their motivation to educate themselves also stemmed from their personal interest in nature (photography for Benyus and gardening for Kellert). It is likely these activities provided positive experiences for Benyus and Kellert. Moreover, these two also have a high emotional affinity for nature. This finding is likely in line with Kals et al.’s (1999) research which suggests that positive experiences with nature likely translate into an emotional affinity for nature.
Participant’s definitions of feeling connected to and removed from nature. The author asked participants to define what the feeling identified as 'connected to nature' within a building meant to each of them. The consensus among all five participants was that feeling 'connected to nature' meant having some form of visual connection with the outdoors. Braungart also noted that “being in an open environment which embodied the characteristic of entropy (feeling like the environment is a part of a cohesive whole)” makes her feel connected to nature. Wilson indicated that being surrounded by natural materials in an interior environment made her feel connected to nature.

Kellert was the only participant that noted she could not feel connected to nature within the built environment because she connects to nature while being outside. However, she noted an appreciation for Interface’s Showroom because it allowed her to experience the natural elements she values. Kellert articulated this distinction:

I think for me it’s hard to put it into context just in a building because a connection to nature for me has nothing to do with a building at all. I’m a gardener. I love to get out and work in the dirt. I love to watch things change, watch the light, check the soil (things like that). So, I connect to nature just kind of at a more raw level. So, obviously you’re not going to come in here and start digging in dirt or things like that. But, to me, that connection really has nothing to do with work. But, to work in an environment that still allows me to have that personal connection that I already have to nature is real important. Because for me, things like light are very important. (Kellert, personal communication, February 22, 2010)

Participants were also asked to define what feeling ‘removed from nature’ within a building meant to them. Four out of five participants indicated that having no windows, or lacking the visual connection to the outdoors, would make them feel removed from nature. Other notable answers included stale air, chemical smells, fluorescent lighting, drab paint colors, cramped space, looking at too much concrete outside, and an overall feeling of placelessness.
Participants’ value of a nature-connection and the degree to which they feel connected to or removed from nature inside Interface’s Showroom. Participants were asked via a likert scale “How important is it to you to feel ‘connected to nature’ each day?” Steven Kellert defines contact with nature as something that is “integral to one’s life” (2005, p. 11). However, something can be an integral part of one’s life even if one places minimal importance upon that thing. Therefore, this question sought to investigate whether participants’ think feeling a connection to nature is valuable (rather than integral) to them. Overall, participants’ placed a high importance on feeling connected to nature each day, ranking it either as 'Important' or ‘Very Important’ as illustrated in Table 4.3.

Participants were also asked via a likert scale “How ‘connected to nature’ do you feel while working at Interface’s Showroom?” Participants’ answers to this question are illustrated in Table 4.4. Overall, participants felt either ‘Connection to Nature,’ ‘Somewhat Connected to Nature,’ or slightly more than ‘Somewhat Connected to Nature.’ However, none of the participants felt removed from nature or a strong connection to nature inside Interface’s Showroom.
Participant self-classification of nature-connectedness gauged by classified photographed experiences within the showroom. For each experience photographed, participants were asked to assess whether their experience created a pleasing or enjoyable moment for them, made them feel connected to nature, or made them feel removed from nature. Participants could choose more than one category. They were provided the option of classifying their experience as a pleasing or enjoyable moment because pleasing moments may actually be indirect or symbolic connections to nature. These are more subtle connections and often not recognized as related to nature. Therefore, this option was provided to not overly direct participants when they made observations. The author also avoided overt identification or discussion of ‘direct, indirect and symbolic’ categories with the participant.

Participants’ documented a total of 47 experiences with photographs. Table 4.5 illustrates how each participant classified his or her respective experiences. It is
important to note that experiences at times fit into more than one classification category which is why some participants have a total number of classifications exceeding ten.

Table 4.5. Participants’ self-classification of their experiences within Interface’s Showroom.

<table>
<thead>
<tr>
<th></th>
<th>Pleasing/ Enjoyable Moment</th>
<th>Connected to Nature Experience</th>
<th>Removed From Nature Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Checked by itself)</td>
<td>(Checked with Other Categories)</td>
<td>(Total Times Checked)</td>
</tr>
<tr>
<td>Benyus</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Braungart</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>McDonough</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Kellert</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Wilson</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>19</td>
<td>44</td>
</tr>
</tbody>
</table>

Overall, participants reported they experienced more than twice as many pleasing moments (44) than nature-connected experiences (21). However, it is notable that out of the 25 experiences participants classified as being exclusively a pleasing or enjoyable moment, 20 of these experiences (as assessed by the author) actually contained either direct, indirect, or symbolic connections to nature or vernacular connections the participant did not overtly recognize as being nature-connections. This is a notable finding because it illustrates that biophilic design principles facilitated enjoyable experiences without participants realizing their experiences had any connection to nature. This provides support for broadening the use of nature representations in interior environments in order to provide positive experiences for users.

A discussion of participant Braungart’s single ‘removed from nature’ experience will be discussed shortly when analyzing different aspects of the building that created participants’ experiences.
Author’s classification of participants’ photographed experiences according to Kellert’s classification system of biophilic design. After the author conducted content analysis of the EDFs and interviews and classified each participant’s experience according Kellert’s classification system, it was determined that as a whole (out of the participants’ 47 total experiences) participants experienced 23 direct connections to nature, four indirect connections to nature, 27 symbolic connections to nature and eight vernacular connections (a total of 62 connections). Each experience could have contained more than one connection which is why there were more connections (62) than experiences (47). Additionally, the author identified biophilic design attributes which facilitated each connection and, similarly, each connection could have contained more than one biophilic design attribute. Refer to Table A.6 in Appendix L (Content Analysis) for a detailed illustration of the author’s method for classifying participants’ experiences according to Kellert’s classification system of biophilic design. A discussion of participants’ connections made inside Interface’s Showroom is detailed below.

Direct Connections to Nature. The author’s classification of participants’ 23 total direct connections to nature inside Interface’s Showroom is illustrated in Table 4.6. Overall, participants experienced the majority of direct connections to nature as a result of outside views and natural light. One example of such a connection is provided in Figure 4.1. This result was not surprising considering the entire eastern side of the Interface Showroom has floor to ceiling windows and the eastern side of the office area has windows ranging from three to five feet above finished floor (AFF). It follows that participants would be affected by the natural light and views facilitated by these windows. Furthermore, the literature consulted for this study noted the importance of natural lighting and views to human well-being (Beauchemin & Hays, 1996; California Energy Commission, 2003 & Ulrich, 1984).
Table 4.6. Biophilic design attributes and aspects of the built environment which facilitated 23 direct connections to nature inside Interface’s Showroom.

<table>
<thead>
<tr>
<th>Biophilic design attribute which facilitated direct connection:</th>
<th>Aspect of the built environment that enabled biophilic design attribute:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Views and Vistas (17)*</td>
<td>open space plan in showroom</td>
</tr>
<tr>
<td></td>
<td>windows</td>
</tr>
<tr>
<td></td>
<td>glass walls</td>
</tr>
<tr>
<td>Natural Light (11)</td>
<td>windows</td>
</tr>
<tr>
<td>Light &amp; Shadow (5)</td>
<td>windows</td>
</tr>
<tr>
<td></td>
<td>graphic that relates to Interface’s mission on window</td>
</tr>
<tr>
<td>Warm Light (2)</td>
<td>windows</td>
</tr>
<tr>
<td>Animals (1)</td>
<td>floor to ceiling windows</td>
</tr>
</tbody>
</table>

*numbers indicate the total amount of times the biophilic design attribute contributed to a direct connection to nature

Figure 4.1. Kellert’s photograph of natural light, a biophilic design attribute which facilitated 11 direct connections to nature within Interface’s Showroom.
Overall, an important consensus among the participants was that they valued the views afforded as a result of being on the ground level, such as seeing people and animals, as well as the element of surprise a pedestrian-friendly area brings to the showroom. The surrounding area has a streetscape which was defined by one participant as being a “walking community.” Another participant commented on why he valued the pedestrian-friendly area: “You can see outside, but you can also see the people coming and going and still feel the heartbeat of what’s going on on the outside.” The type of development immediately adjacent to the showroom was found to directly impact the quality of the experience in the interior environment.

It is notable that the floor to ceiling windows on the eastern wall of the showroom facilitated a direct connection to nature of seeing a dog for one participant. If these floor to ceiling windows would have been a window with a sill beginning at three feet AFF, or if the showroom was not on the first floor, this connection would not have been possible.

Figure 4.2. Wilson’s photograph of a direct connection to nature, a dog on the urban streetscape adjacent to Interface’s Showroom.
Indirect Connections to Nature. The author’s classification of all participants’ indirect connections to nature inside Interface’s Showroom is illustrated in Table 4.7.

<table>
<thead>
<tr>
<th>4 Indirect Connections to Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biophilic design attribute which facilitated indirect connection:</td>
</tr>
<tr>
<td>Potted Plants (1)*</td>
</tr>
<tr>
<td>Inside-Outside Spaces (1)</td>
</tr>
<tr>
<td>Natural Materials (3)</td>
</tr>
</tbody>
</table>

*numbers indicate the total amount of times the biophilic design attribute contributed to an indirect connection to nature

Overall, participants experienced a minimal amount of indirect connections to nature when compared to direct and symbolic connections made within Interface’s Showroom. The natural material which facilitated the indirect connection was bamboo flooring used to separate the product display areas as illustrated in Figure 4.3. The inside-outside atrium area was not located specifically inside Interface’s Showroom, but in the foyer of the Centurgy Building where some participants pass through on their way to and from work each day as illustrated in Figure 4.4.
Symbolic Connections to Nature. The author’s classification of all participants’ symbolic connections to nature inside Interface’s Showroom is illustrated in Table 4.8.

Figure 4.3. Benyus’ photograph of natural materials, a biophilic design attribute which facilitated three indirect connections to nature.

Figure 4.4. Benyus’ photograph of an inside-outside space, a biophilic design attribute which facilitated an indirect connection to nature.
Table 4.8. Biophilic design attributes and aspects of the built environment which facilitated 27 symbolic connections to nature inside Interface’s Showroom.

<table>
<thead>
<tr>
<th>Biophilic design attribute which facilitated symbolic connection:</th>
<th>Aspect of the built environment that enabled biophilic design attribute:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spaciousness (12)*</td>
<td>windows (office)</td>
</tr>
<tr>
<td></td>
<td>open space plan in office</td>
</tr>
<tr>
<td></td>
<td>open space plan in showroom</td>
</tr>
<tr>
<td></td>
<td>open space plan in kitchen</td>
</tr>
<tr>
<td></td>
<td>glass walls in office area</td>
</tr>
<tr>
<td></td>
<td>large-scale super graphic as architectural element</td>
</tr>
<tr>
<td></td>
<td>translucent, gold shimmering curtain fabric with downlighting</td>
</tr>
<tr>
<td></td>
<td>comfortable furniture arranged with a view out a window</td>
</tr>
<tr>
<td>Mastery &amp; Control (5)</td>
<td>authentic lighting in copy room</td>
</tr>
<tr>
<td></td>
<td>filtered water in kitchen</td>
</tr>
<tr>
<td></td>
<td>water-saving dishwasher in kitchen</td>
</tr>
<tr>
<td></td>
<td>designated recycling area in kitchen</td>
</tr>
<tr>
<td>Shapes resisting straight lines and right angles (4)</td>
<td>large-scale curved light fixture</td>
</tr>
<tr>
<td></td>
<td>curved wall (entry)</td>
</tr>
<tr>
<td></td>
<td>curved wall (presentation area)</td>
</tr>
<tr>
<td>Growth &amp; Efflorescence (3)</td>
<td>windows (office)</td>
</tr>
<tr>
<td></td>
<td>graphic that relates to Interface’s mission on window</td>
</tr>
<tr>
<td></td>
<td>floor to ceiling windows (giving sense of time)</td>
</tr>
<tr>
<td>Color (3)</td>
<td>large-scale super graphic as architectural element</td>
</tr>
<tr>
<td></td>
<td>wood case pieces and bamboo flooring</td>
</tr>
<tr>
<td></td>
<td>translucent, gold shimmering curtain fabric with downlighting</td>
</tr>
</tbody>
</table>

*numbers indicate the total amount of times the biophilic design attribute contributed to a symbolic connection to nature
Overall, participants experienced the most symbolic connections to nature than any other type of connections in Interface’s Showroom. Furthermore, these connections were created by 20 different aspects of the built environment. This is a notable result in

Table 4.8 cont. Biophilic design attributes and aspects of the built environment which facilitated 27 symbolic connections to nature inside Interface’s Showroom.

<table>
<thead>
<tr>
<th>Biophilic design attribute which facilitated symbolic connection:</th>
<th>Aspect of the built environment that enabled biophilic design attribute:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Focal Point (3)</td>
<td>large-scale curved light fixture</td>
</tr>
<tr>
<td></td>
<td>curved wall (entry)</td>
</tr>
<tr>
<td></td>
<td>curved wall (presentation area)</td>
</tr>
<tr>
<td>Prospect &amp; Refuge (2)</td>
<td>translucent, gold shimmering curtain fabric with downlighting</td>
</tr>
<tr>
<td></td>
<td>comfortable furniture arranged with a view out a window</td>
</tr>
<tr>
<td>Affection &amp; Attachment (1)</td>
<td>kitchen</td>
</tr>
<tr>
<td></td>
<td>comfortable furniture arranged with a view out a window</td>
</tr>
<tr>
<td>Security &amp; Protection (1)</td>
<td>kitchen</td>
</tr>
<tr>
<td>Information Richness (1)</td>
<td>large-scale super graphic as architectural element</td>
</tr>
<tr>
<td>Dynamic Balance &amp; Tension (1)</td>
<td>large-scale super graphic as architectural element</td>
</tr>
<tr>
<td>Spatial Harmony (1)</td>
<td>large-scale super graphic as architectural element</td>
</tr>
<tr>
<td>Curiosity &amp; Enicement (1)</td>
<td>super graphic of tropical porch scene</td>
</tr>
<tr>
<td>Pictoral Expression of Nature (1)</td>
<td>translucent, gold shimmering curtain fabric with downlighting</td>
</tr>
<tr>
<td>-reflected Light (1)</td>
<td>overall showroom: a variety of shapes, colors, textures &amp; materials integrate to</td>
</tr>
<tr>
<td></td>
<td>create a complete whole</td>
</tr>
<tr>
<td>Exploration &amp; Discovery (1)</td>
<td>floor to ceiling windows (facilitating discovery)</td>
</tr>
</tbody>
</table>

*numbers indicate the total amount of times the biophilic design attribute contributed to a symbolic connection to nature*
this author’s opinion because it demonstrates that symbolic connections to nature in the interior environment can be created in a variety of ways.

Twelve symbolic connections occurred as a result of the biophilic design attribute spaciousness present throughout the showroom as a result of open space planning as illustrated in Figure 4.5. Although two participants expressed negative comments about the lack of visual and acoustical privacy in the office as a result of the open space planning, overall participants appreciated this aspect of the built environment.

Five symbolic connections were made by participants as a result of the biophilic design attribute mastery and control. This feeling of mastery and control was created by features and technologies that allowed the user to feel in control of their environment. These are technologies that foster environmental stewardship to save water, energy, or resources, such as the sensors on lighting in the copy room, the filtered water machine, the water-saving dishwasher, and the recycling bins in the kitchen (See figure 4.6). Participants appreciated that they could practice environmental stewardship at work. These results also demonstrate the importance of providing people with an environment that fits their needs, or what Kaplan termed ‘compatibility’, and which is also found to a high degree in natural environments (Hartig et al., 2003).
One feature in the showroom which facilitated three symbolic connections to nature were the large-scale super graphics with backlighting as accent lighting, a mirror between the graphic and floor, a colorful array of carpet tiles beneath the mirror, and Interface-specific graphics as illustrated in Figures 4.7 and 4.8. Participants noticed and appreciated seven different biophilic design elements that corresponded to these super graphic displays: spaciousness ("feeling of volume and height"), color ("colorful array of carpet tiles"), information richness ("visually interesting"), dynamic balance & tension ("I love that the design firm took a really big heavy element and make it feel light."), spatial harmony ("I love that it’s not just the content but it’s the size that’s in relationship to the space that we would have artwork like this."), curiosity and enticement and pictoral expression of nature ("[What makes me feel connected to nature] are the plants, surfboard, and Adirondack chairs, also a sense of what would lie beyond the image: the beach."). This finding illustrates that drawing upon numerous and varied symbolic biophilic design elements can create valued experiences within an interior.
Vernacular Connections. To review, the vernacular dimension of biophilic design are buildings and landscapes that connect to the culture and ecology of a locality or geographic area (Kellert et. al, 2009). For the purpose of this study, the author interpreted the term vernacular to include buildings and landscapes that can also connect to an organization’s ‘culture,’ such as the ‘culture’ of Interface. The author also considered the four types of vernacular design which include designs that relate to the ecology of a place, relate to the culture and history of a place, fuse culture and ecology, and/or avoid placelessness (Kellert, 2005). Just as the organic dimension of biophilic design does, the vernacular dimension of biophilic design also embodies the six biophilic design elements and 72 biophilic design attributes. Therefore, the author classified participants’ vernacular connections using the same methodology used to classify connections to nature under the organic dimension of biophilic design. The
Six of the vernacular biophilic connections were created by aspects of the environment (photographs of carpet-recycling process, graphic on window, super graphics, furniture, and kitchen) which visually tied the participant to the meaning of Interface as a company or to a particular mission that the company represents, all of which are likened to the biophilic design attribute spirit of place. For example, a portion

<table>
<thead>
<tr>
<th>Biophilic design attribute which facilitated vernacular connection:</th>
<th>Aspect of the built environment that enabled biophilic design attribute:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirit of Place (6)*</td>
<td>photographs of Interface's carpet-recycling process</td>
</tr>
<tr>
<td></td>
<td>‘Mission Zero’ graphic on window</td>
</tr>
<tr>
<td></td>
<td>super graphics with Alice &amp; Wonderland theme (related to Interface)</td>
</tr>
<tr>
<td></td>
<td>use of furniture user perceives as reflecting Interface’s mission</td>
</tr>
<tr>
<td></td>
<td>recycling area (reinforces Interface’s environmental ethic)</td>
</tr>
<tr>
<td></td>
<td>kitchen (social aspect of the workplace related to Interface’s company culture)</td>
</tr>
<tr>
<td>Integration of Culture &amp; Ecology (1)</td>
<td>photographs of Interface’s carpet-recycling process</td>
</tr>
<tr>
<td>Historic Connection to Place (1)</td>
<td>view out a window at an American flag</td>
</tr>
</tbody>
</table>

*Numbers indicate the total amount of times the biophilic design attribute contributed to a vernacular connection.
of the furniture in the showroom was repurposed from another location in Atlanta and helped contribute to earning a LEED credit. These connections were visual reminders to employees of the cause they are working to support. Therefore, not only were these connections created by visually interesting things, these things also embodied a part of Interface’s culture or mission which connected to the participants on a personal level. An illustration of the repurposed furniture which facilitated a vernacular connection for McDonough is illustrated in Figure 4.9.

Another aspect of the environment that created a vernacular connection was a collection of images of Interface’s carpet-recycling process which is integral to the company’s operation and mission. These images are displayed on the back side of the curved presentation area wall and are illustrated in Figure 4.10. Biophilic design attributes employed in this visual display include integration of culture and ecology.
(connecting to how the mission of Interface places a premium on sustainability in order to benefit both humanity and nature) and spirit of place (connecting to the meaning participants associate with working at Interface). This same concept of spirit of place could be applied to a variety of settings (philosophy of a school classroom used creatively in the room, community spaces, etc.) in order to get people to identify with the places they live and work.

The vernacular connection created by the kitchen was made possible due to the culture at Interface’s Showroom which allows people to talk in the kitchen and work in an alternative setting than just in the office area. Regarding this connection, Wilson noted: “I love that I can be in a kitchen setting, for some reason that’s comforting.” The connection created by the recycling bins was something Kellert enjoyed and made her think of what Interface represents: “I like the fact our company takes the time to provide programs such as recycling. It is one outward example of a bigger concept about what is happening within this company.” Lastly, the connection created by viewing the

![Figure 4.10. McDonough’s photograph of images of Interface’s carpet-recycling process which embodied the biophilic design attributes integration of culture and ecology and spirit of place and facilitated two vernacular connections.](image-url)
American flag flying across the street was afforded by the outside views and surrounding development. Wilson described her thoughts upon seeing the flag: “It made me think of how blessed I am/we are to live in such a great country, be free and have a great job.” Therefore, most of the vernacular connections made in the showroom and offices were related to the culture or mission of Interface.

**Subquestion 2. What aspects of the built environment do participants perceive create the feeling of being either connected to or removed from nature?**

An analysis of the number of times specific aspects of the built environment facilitated connections for all participants is illustrated in Table 4.10. This table also contrasts how each participant experienced that aspect of the built environment against how the author classified that experience according to Kellert’s classification system of biophilic design. Overall, the majority of participants’ pleasing and enjoyable moments as well as experiences which made them feel connected to nature were created by the windows (both 3’ AFF and floor to ceiling) in the showroom. This also coincided with the author’s classification as most direct connections to nature were created by windows.

There were few indirect connections to nature compared to direct and symbolic connections. Symbolic connections to nature were made by a variety of different aspects of the built environment which was different than the aspects which created the direct connections to nature. To illustrate, symbolic connections were created by 20 different aspects of the built environment while direct connections were created by three aspects of the built environment (three different types of windows).

A single participant, Braungart, reported having a ‘removed from nature’ experience (reported by the participant as being facilitated by the ‘open space plan’). However, in the interview Braungart elaborated on this experience and revealed that it really was not the open space plan which made her feel removed from nature. She indicated the root cause of the removed-from-nature experience was the nature of office work and being surrounded by computers and documents. Braungart’s response uncovered a different issue regarding products people intimately interact with in the interior environment. How might these products and technologies people use daily in an
office environment facilitate a connection to nature? While out of the scope of this study, it is an interesting question that may warrant further scrutiny.

Table 4.10. Aspects of the built environment which facilitated connections to nature as identified by (a) participants' self-assessment contrasted with (b) the author's classification of participants' photographed experiences.

| Aspect of built environment that created the following experiences for participants: | a) participants' assessment of their experiences | b) author's classification of participants' photographed experiences according to Kellert's classification system of biophilic design |
|---|---|---|---|---|---|---|---|
| windows (3 ft. above finished floor (A.F.F.) or higher) | 11 | 4 | 0 | 11 | 0 | 1 | 0 | 0 |
| window (floor to ceiling) | 10 | 6 | 0 | 10 | 0 | 1 | 0 | 0 |
| open space plan | 4 | 2 | 1 | 0 | 0 | 3 | 0 | 1 |
| large-scale super graphic | 3 | 1 | 0 | 0 | 0 | 3 | 1 | 0 |
| kitchen | 3 | 0 | 0 | 0 | 0 | 2 | 1 | 1 |
| large-scale, round light fixtures | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| natural materials as finish materials | 2 | 2 | 0 | 0 | 2 | 1 | 1 | 0 |
| presentation space | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| photographs of carpet-recycling process (which illustrate Interface's mission) | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| furniture arranged for outside views | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| glass walls | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Interface's "Mission-zero" graphic on window | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| colorful array of carpet tiles | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| mirror between graphic and floor | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| indoor plants planted in atrium at floor level | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| floor to ceiling windows in atrium | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| curved walls | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| repurposed furniture (which user sees as reflecting Interface's environmental ethic) | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| automatic lighting technology | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| filtered water machine | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| recycle bins | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| separated bays | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| designated recycling area | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| curved wall | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
Subquestion 3. Which perceived connections to nature are created by aspects of the built environment which are the result of meeting a LEED-CI prerequisite or credit?

The purpose of asking this subquestion was to analyze whether or not the LEED green building certification program addresses the issue of a human connection to nature. The author acknowledged that the purpose of the LEED certification program is not to emphasize this connection; however, it was interesting to explore whether or not this program is facilitating a nature-connection inadvertently. Therefore, the author analyzed the LEED-CI Version 2.0 (v. 2.0) Rating System and the summary of the Interface Showroom’s LEED points achieved to determine if any of the prerequisites or credits in the v. 2.0 rating system had the potential to facilitate biophilic design connections (either organic or vernacular). Out of the possible prerequisites or credits which had the potential to facilitate biophilic connections, the author identified the number of these biophilic connections that were realized within Interface’s Showroom. This analysis was conducted solely by the author without any participant input.

**LEED-CI prerequisites and credits that had potential to facilitate biophilic connections.** Within the LEED-CI v. 2.0 Rating System the author identified a total of one prerequisite (out of a total of six prerequisites) and 14 credits (out of a total of 48 credits) which had the potential to facilitate biophilic connections. These prerequisites and credits are highlighted in yellow in Figure 4.11. In Figure 4.11, yellow illustrates which prerequisites and credits had the potential to facilitate biophilic design connections and the red outline illustrates which of these biophilic design connections were both created by the design team and recognized by participants within Interface’s Showroom (according to the author).

Two examples (one prerequisite and one credit) the author identified are further discussed here for clarification. One LEED prerequisite which affords the opportunity for a biophilic connection is Prerequisite 1 (Storage & Collection of Recyclables) under the category ‘Materials and Resources.’ This prerequisite intends to reduce landfill waste by providing recycling areas within interiors (USGBC, 2006). These type of dedicated areas within the built environment are features which embody the biophilic design characteristic ‘mastery and control.’ A credit which creates the possibility for a biophilic
connection is Credit 2 (Urban Redevelopment) under the category ‘Sustainable Sites.’ This credit promotes site selection in established urban areas with infrastructure in order to preserve undeveloped land and natural resources (USGBC, 2006). If the design team selects a site in an urban community with a specific culture, they would be able to create vernacular connections for people within the built environment.

In total, the author identified 28% of the total prerequisites and credits (highlighted in yellow) which allow design and construction professionals opportunities to create biophilic connections.

While a total of 28% of the total prerequisites and credits in the LEED-CI v. 2.0 Rating System having the ability to create biophilic connections is a significant amount, the majority of the initiative to create these biophilic connections rests in the hands of the design team. Therefore, even though the LEED-CI v 2.0 Rating System contains opportunities for biophilic connections, the ultimate responsibility currently lies with the visionary person(s) behind the design and not one merely seeking to meet minimum LEED requirements.

Furthermore, it is of the opinion of this author that the majority of the prerequisites and credits in the LEED-CI v. 2.0 Rating System encourage what McDonough and Braungart (2005) termed a “being less bad” approach to environmental strategies identified in Chapter 2. For example, Credit 3.1 (under the category ‘Water Efficiency’) requires a 20% reduction in water use and states the intent for the credit is to “maximize water efficiency within the tenant spaces to reduce the burden on municipal water supply and wastewater systems” (USGBC, 2006). A design team can meet this requirement without utilizing biophilic design strategies. However, if biophilic design strategies which creatively facilitated a connection to nature with water were employed in an interior, users may come to connect with nature at an emotional level. This may result in a valued experience for the user and also may foster a greater appreciation for water which could lead to a desire to conserve water. Therefore, biophilic design can represent a paradigm shift in how we motivate people to exhibit pro-environmental behavior.

LEED-CI prerequisites and credits which facilitated biophilic connections in Interface’s Showroom. Out of the opportunities for biophilic connections mentioned above (one prerequisite and 14 credits), the author identified a total of one prerequisite and six credits which were created by the design team, recognized by participants within Interface’s Showroom, and classified by the author as biophilic connections. This prerequisite and the six credits are outlighted in red in Figure 4.11 and further explained below:

- Credit 2: Urban Redevelopment (in the category ‘Sustainable Sites’) encourages tenants to develop their site in urban areas with existing
infrastructure (USGBC, 2006). This credit facilitated the choice to place the showroom within an established and walkable community which created a direct biophilic connection when a participant noticed a dog on the sidewalk.

- Prerequisite 1: Storage and Collection of Recyclables (in the category ‘Materials & Resources’) required a dedicated area for the storage and collection of recyclables (USGBC, 2006). Participants valued this feature which embodied the biophilic design attribute of mastery and control, a symbolic connection to nature.

- Credit 3.3 Resource Reuse, 30% Furniture and Furnishings, (in the category ‘Materials & Resources’), required reusing furnishings for 30% of the total furniture and furnishings budget. This created a biophilic connection in the retail area when a participant valued repurposed furniture as a reflection of Interface’s mission.

- Credit 6: Rapidly Renewable Materials (in the category ‘Materials & Resources’) required using materials and products made from plants that are typically harvested within a 10-year or shorter cycle for 5% of the total value of all building materials and products used in the project (USGBC, 2006). The biophilic connection this facilitated was an indirect connection to nature by using a natural material (bamboo) in the showroom.

- Credit 6: Controllability of Systems (in the category ‘Indoor Air Quality’), facilitated placing lighting control sensors in the showroom which embodied the biophilic design attribute of mastery and control.

- Credit 8.1: Daylight and Views, Daylight 75% of Spaces and Credit 8.2: Daylight and Views, Views for 90% of Spaces (in the category ‘Indoor Air Quality’) facilitated many direct biophilic connections in the showroom in the form of natural lighting and outside views.
This prerequisite and six credits represent a small percentage of the total prerequisites and credits in the LEED v.2.0 Rating System which had the potential to create biophilic connections. Unrealized connections were either present at the showroom and participants did not make a connection to them, or the design team did not create a biophilic connection for that particular prerequisite or credit (which had the opportunity to facilitate a biophilic connection).

Two examples of credits which had the opportunity to facilitate biophilic connections in the showroom but were not recognized by participants as biophilic connections are Credit 4.2: Alternative Transportation, Bicycle Storage & Changing Rooms (in the category ‘Sustainable Sites’) and Credit 1.3: Innovation in Design: Sustainability Education (in the category ‘Innovation & Design Process’). With credit 4.2 participants had the opportunity to store bicycles in an adjacent parking garage and shower in the nearby LA Fitness facilities, yet they did not take advantage of this resource. The potential for a direct connection to nature when commuting to and from work would have a significant impact on the daily lives of office users. Additionally, participants did not recognize Credit 1.3 as offering a biophilic connection. This credit was achieved in Interface’s Showroom by providing educational information about achieved LEED credits on the walls and windows of the showroom. These educational graphics could have been recognized as a biophilic design attribute ‘spirit of place’ being that the educational graphics reflects Interface’s mission.

In order to determine if the overall LEED-CI v. 2.0 Rating System is addressing the issue of a human connection to nature, it is important to reflect on how the overall rating system afforded opportunities for biophilic design. The LEED certification program is designed to promote low environmental impact design principles, not biophilic design principles. That being said, currently 28% of the total prerequisites and credits in the LEED-CI v. 2.0 Rating System allow design and construction professionals to create biophilic connections. However, the initiative and responsibility lies primarily on the design team to create quality biophilic connections within the interior.

Therefore, it is this author’s opinion that the LEED certification program is addressing the issue of a human connection to nature at a very low-level with much room for improvement. An enormous opportunity exists to incorporate biophilic design
into the LEED process in order to create more valued experiences for users of these low environmental impact buildings. Hopefully the LEED process will also continue to evolve so that the “being less bad” approach will give way to an approach which adds to the health and productivity of natural systems.

**Subquestion 4. What are participants’ perceived effects of experiencing a connection to nature at Interface’s Showroom?**

Overall, participants thought that experiencing an overall connection to nature inside Interface’s Showroom had a positive effect on their physical health, attitude, job satisfaction, and job performance as illustrated in Table 4.11. These results were obtained from the interview questions the author asked the participants.

It is notable to discuss participants’ responses to the perceived effects of a connection to nature on their job satisfaction and performance. Three participants noted that although they thought feeling connected to nature within Interface’s Showroom had an overall positive affect on their job satisfaction and performance, there were also a number of other variables which affect job-related satisfaction and performance. Braungart noted: “The connection and job satisfaction are a little more separate. When you’re having a bad day/hard time with your job, it still creates stress even if you’re in a great space.” Furthermore, Wilson commented on how coworkers have a marked impact on job satisfaction and performance: “I couldn’t work anywhere were I didn’t like the people.” Although participants’ perceived effects of experiencing a connection to nature within Interface’s Showroom was very positive, participants also recognized the multiple and varied factors that affect the office environment.
Table 4.11. Participants’ perceived effects of, overall, feeling connected to nature at Interface’s Showroom.

<table>
<thead>
<tr>
<th>What type of effect (if any) does experiencing a connection to nature have on your <strong>physical health</strong>?</th>
<th>What type of effect (if any) does experiencing a connection to nature have on your <strong>attitude</strong>?</th>
<th>What type of effect (if any) does experiencing a connection to nature have on your <strong>job satisfaction</strong>?</th>
<th>What type of effect (if any) does experiencing a connection to nature have on your <strong>job performance</strong>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Effect</td>
<td>Slightly Negative Effect</td>
<td>No Effect</td>
<td>Slightly Positive Effect</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

| Benyus | X |  | X | X |
| Braungart | X | X |  | X |
| McDonough | X |  | X | X |
| Kellert | X | X |  | X |
| Wilson | X |  |  | X |
Emergent Themes

From the results garnered as a result of answering the research question and subquestions, the author identified emerging themes from analyzing and classifying participants’ photographs, EDFs, and responses to interviews and questionnaires. The following emergent themes represent main ideas arising from the qualitative data and serve to describe how office users perceived experiences contributed to an overall feeling of being connected to nature within Interface’s Showroom. These findings serve to add practical insights into the growing field of biophilic design which may be further explored. The following emerging themes resulting from the data suggest:

1. Participants experienced 20 pleasant or enjoyable moments which actually contained either direct, indirect, or symbolic connections to nature or vernacular connections that they did not recognize. An implication of this finding is that biophilic design attributes can be drawn upon symbolically in a variety of ways to create valued experiences in the interior environment. Further, because they are not recognized, the presence of these attributes may need to be identified and valued before they will be further pursued through standards or policy.

2. The most enjoyed experience and that which connected people the most to nature was afforded by outside views and natural light within the showroom. All five participants noted the importance of outside views and three participants noted the importance of natural light as being integral to feeling more connected to nature within the interior environment. These findings confirm established research findings that views to the outside and natural lighting are likely crucial to human well-being within the built environment (Beauchemin & Hays, 1996; California Energy Commission, 2003 & Ulrich, 1984).

3. The surrounding community directly impacts the quality of the experience in the interior environment. Moreover, participants valued the surrounding pedestrian-friendly, vibrant community. Four out of the five participants commented on the value of this aspect of the showroom’s location. The implication of this finding is that, ideally, local opportunities to connect with nature should be available to all people within an interior environment (even in a high-rise location, which may present particular challenges to this idea).
4. Given that participants recognized a total of eight vernacular connections without being asked by the author to specifically identify these connections suggests that vernacular connections are valued in an interior environment. Connecting people to the culture and mission of a cause they are working with is a valuable tool to help them engage with the space they spend a large amount of time in each day.

5. While the finding was isolated, one respondent reported feeling disconnected from nature due to interaction with computers, documents, and other items that people in an office environment interact with each day. This raises the issue that it may be important that the products and technologies one interfaces with daily also embody biophilic design characteristics. It is worthwhile exploring how more innovative product design might be able to create more enjoyable experiences and nature-connected experiences for users in an office environment at the level of personal interaction.

6. All five participants experienced a connection to nature inside Interface's Showroom and felt that experiencing this overall connection to nature had a positive effect on their physical health, attitude, job satisfaction, and job performance. The implication of this finding confirms the benefits, from the point of view of user perceptions, of incorporating biophilic design into interior environments as a strategy that supports human well-being.

7. Only a total of 28% of the total prerequisites and credits of the LEED-CI v.2.0 Rating System afford opportunities to create biophilic connections, and the initiative to create these connections lies solely with the design team at this point in time. Therefore, it is worth considering that the LEED-CI v.2.0 Rating System used to guide the construction of Interface’s Showroom is not yet adequately addressing the issue of a human connection to nature in an office and retail environment. More biophilic design attributes that matter to human users might be captured that have not yet been explored. In turn, this may prompt enhanced valuation of nature and its concomitant preservation.

These emergent themes will be further discussed in Chapter 5 and used to arrive at informed conclusions which describe the essence of a human connection to nature
within an office environment. The author will also suggest potential for further research which has been identified over the course of this study.
CHAPTER 5

SUMMARY AND CONCLUSIONS

This chapter will discuss conclusions and main emergent themes gathered from the results discussed in Chapter 4 which relate to biophilic design. It will also discuss potential avenues for research into the topic of reconnecting people with nature in the built environment by employing biophilic design elements and attributes. Due to the small sample size employed in this study, the author can only generalize these conclusions to the five participants at Interface’s Showroom. However, even though the conclusions are not able to be generalized to a larger population, they can act as insights to larger trends which may be present within the larger office user population.

Major Emergent Themes and Conclusions

The following section will offer conclusions drawn from the main emergent themes identified in Chapter 4. The significance and implications of these conclusions will be examined.

Value of a Connection to Nature

People value experiencing a connection to nature and feel it positively affects their health, attitude, and job performance and satisfaction. Moreover, this study suggests that nature can be translated into the design of the built environment in a number of ways which people find pleasing, even if they do not recognize that the design is referencing nature directly, indirectly, symbolically or through a vernacular connection utilizing biophilic design attributes. Moreover, people value a variety of biophilic attributes utilized throughout an interior space.

Being that people value an overall connection to nature as well as experiences which are facilitated by varying biophilic design attributes, this suggests that utilizing Kellert’s framework of biophilic design as a means to reconnect people with nature within the built environment would be a worthwhile system to employ. This also implies that it would be optimal to employ a variety of biophilic design attributes that represent
all biophilic design elements (environmental features, natural patterns and processes, place-based relationships, natural shapes and forms, light and space, and evolved human-nature relationships) within the built environment. This may require a collaborative effort from experts in different disciplines that understand different aspects of the problem and solution of reconnecting people to nature within the built environment (ie – urban planners, systems specialists, landscape designers, interior designers, architects, lighting designers, graphic designers, artists, craftsmen, technology specialists, etc).

**Opportunities Exist for Nature Contact from Surrounding Community**

The surrounding community directly impacts the quality of experiences as well as opportunities for nature connect within an interior. It affects outside views afforded in an interior space which are opportunities to connect with nature. Adjacent development also affects office users’ experiences as they commute to and from work, travel to and from meetings, and take breaks from office work. These times are opportunities to provide nature-connections, such as user-friendly bike commuting lanes, vegetative walking paths, places for restoration which draw upon nature, or vernacular connections in the form of architecture which reflects the spirit of place. Being that four out of the five participants in this study felt that a connection to the surrounding community contributed towards positive and nature-connected experiences within an interior, it follows that nature connections should be afforded within the surrounding community in addition to within the interior environment. Additionally, innovative designers should be able to create nature connections within an interior and to the surrounding community regardless of location. For example, even in a high-rise building one could create local opportunities on each floor to connect with nature utilizing a variety of biophilic design attributes.

**Value of Vernacular Connections**

Vernacular connections created through visually connecting people to the culture and mission of a cause they are working with are valued in an interior environment. This concept of reinforcing a company’s mission visually within a space reminds employees of the personal contribution they are making to a larger cause. The importance of applying this same principle to environments such as hospitals, clinics, support group
settings, community centers, schools, health facilities and faith-based environments to visually remind people of why they are spending time in such spaces should not be ignored or undervalued.

In addition to the intrinsic value of creating vernacular connections, it is important to note that the quality of how the vernacular connection is translated into the built environment also matters. This principle is likened to the assertion of Kellert et al. (2009) discussed in Chapter 2 which states the quality of the design of a direct experience with nature within the built environment affects the impact of the direct experience on users. For example, vernacular connections created in Interface’s Showroom were creatively and artistically employed. The mission was not blatantly written on a wall; instead, the spirit of Interface’s culture and mission was captured in images and creative graphics throughout the space. These vernacular connections can create enjoyable experiences for users which foster an appreciation for buildings which is a key component of practicing true restorative environmental design. These vernacular connections to a company could also unify employees and aid in employee retention, both of which can contribute to a company’s success.

**Importance of Product Interaction on Experiences in an Interior Environment**

Even though this conclusion stems from the sole experience of one participant, it bears mention and exploration. Based on Braungart’s experience of feeling removed from nature based on her interface with office products, it follows that the types of products and technologies utilized within an interior influence the experience of the user within that space. If products and technologies have the ability to make people feel disconnected from nature, these feelings could counteract other positive biophilic design attributes existing in that space. It is of this author’s opinion that all components of the interior environment, including products and technologies, should embody the restorative environmental design paradigm (employing both low environmental impact design and biophilic design principles) in order to achieve a lasting sustainability. Products and technologies that embody the RED paradigm should be utilized in interiors. A few examples of such products and technologies are those which are able to be up-cycled, are ergonomic, are beautiful and create an enjoyable user experience,
and/or have a personal use for the user after the product’s lifecycle in the office environment expires.

**Opportunities Exist for Integrating Biophilic Design into the LEED Rating System**

The LEED-CI v.2.0 Rating System used to guide the construction of Interface’s Showroom is not yet adequately addressing the issue of a human connection to nature in an office and retail environment. Only a total of 28% of the total prerequisites and credits of the LEED-CI v.2.0 Rating System afford opportunities to create biophilic connections in an interior environment. Additionally, the responsibility to create these connections currently lies with the initiative and creativity of the design team. Moreover, the latest LEED-CI v.3.0 Rating System lacks protocol on how to connect people with nature and primarily focuses on low environmental impact design principles.

A different avenue LEED is becoming increasingly interested in is measuring the return on investment for constructing LEED buildings. In this author’s opinion this is a valuable pursuit. However, assessing only the financial benefits of low environmental impact strategies in isolation is not a comprehensive approach. The intrinsic human-cost of enhanced health, well-being, and performance is not being measured by LEED and opportunity exists for measuring such costs.

Kellert’s framework for biophilic design could be integrated into the LEED green building certification program by creating such categories as direct nature contact, indirect nature contact, symbolic nature contact, and vernacular connections. Furthermore, drawing upon the six different elements of biophilic design within spaces could be encouraged while giving the design team the freedom to interpret biophilic design attributes as they relate to the context of the space and surrounding community. Integrating a human contact with nature into the LEED certification program could engage office users with the building on a deeper level and would ideally connect them to the principles of low environmental impact design more quickly.

**Suggestions for Further Research**

The next section will discuss potential avenues for further research which are informed by the study’s conclusions.
Empirically Measuring Benefits of a Connection to Nature

Opportunities exist for quantitatively studying the health and productivity benefits of working within an environment employing biophilic design attributes. It would be worthy to contrast the benefits garnered from working in an office building with these attributes versus working in an office building representing a standard office environment. This type of study would be a valuable step towards creating an evidence-based defense for biophilic design. Furthermore, empirically measuring any cost savings derived from enhanced health, well-being, and performance of workers in biophilic buildings may be a means of incorporating biophilic design into the LEED certification program. These savings could potentially be realized from reduced sick days or enhanced retention of employees, for example.

Creating Biophilic Connections between Exterior and Interior Environments

A topic bearing further investigation is how the surrounding community can create authentic biophilic connections. These connections, by nature, would influence office users in an interior environment. Innovative ways in which authentic biophilic connections could be created within streetscapes in a variety of urban and suburban communities could warrant further exploration. One example of a rich biophilic connection such as this is the High Line, a public park on New York City’s West Side. The High Line was originally constructed in the 1930’s as a way to lift freight trains above the street and has since been abandoned. Design firms repurposed the elevated structure into a walking path complete with native vegetation and rest areas above the urban streetscape. The first section of the High Line opened in 2009 and provides people with nature contact, sites for public art display, and draws upon the history of the original use of the High Line to create meaningful vernacular connections (High Line, n.d.). It would be worthwhile to explore other ways in which biophilic connections within the community, such as the High Line, could be created in other urban and suburban communities.
Identify or Create Office Products Embodying the RED Paradigm

An exhaustive study could be done which would survey existing products and technologies utilized within an office environment that embody the RED paradigm. If such products are lacking, one could explore better ways to create products that embody the RED paradigm and manufacture such products. If these products exist one could examine why they are not being utilized in the market on a large-scale. Once these office products are located or new models embodying the RED paradigm are created, one could analyze office users’ experiences with them to determine if the products are facilitating better experiences for users and not isolating them from nature.

Conclusion

From the information gathered from the preceding chapters, the author suggests that an opportunity exists for designers to facilitate a reconnection between people and nature within the built environment. After studying the perceptions of office users’ connections to nature within the built environment, it is apparent that what facilitates nature connections varies within an interior. Therefore, Kellert’s classification system for biophilic design is an opportunity to employ a framework for facilitating biophilic connections. Established green building certification programs such as LEED could benefit from employing Kellert’s framework in order to create more valued experiences for office users which connect them to the low environment impact design principles the certification program espouses. Finally, notable opportunities exist for further research into the empirical benefits people garner from working in office buildings employing biophilic design elements and attributes.

It is of the author’s opinion that reconnecting people to nature within the interior environment should employ a holistic framework which considers design decisions on all scales (from product design to community design). Achieving this reconnection between people and nature will also likely need to draw upon the varied talents of individuals. Doing so will be a challenge, but will also be an opportunity to bring humanity back to the natural rhythms from which we evolved, but within the context of the modern environment. And finally, even though reconnecting people and nature within the built environment is important, the preservation of nature should not be
ignored or undervalued. People should be able to experience biophilic connections within the built environment in addition to being immersed within nature.
APPENDIX A

HUMAN SUBJECTS APPROVAL
Subject: Use of Human Subjects in Research - Approval Memorandum

From: Human Subjects <humansubjects@magnet.fsu.edu>

Date: Thursday, November 19, 2009 11:27 am

To: olg07m@fsu.edu

Cc: jpmble@fsu.edu

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 • FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 11/19/2009

To: Christy Gullikson

Address: 253 Hayden Road Apt. 215 Tallahassee, FL 32304
Dept.: INTERIOR DESIGN

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Human Connection to Nature Within the Built Environment

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 11/16/2010 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Jill Pable, Advisor
HSC No. 2009.2882
APPENDIX B

EXAMPLE OF A PARTICIPANT’S
EXPERIENCE DOCUMENTATION FORM
Experience Documentation Form

Instructions:
1. Take a photograph of:
   A) An aspect of the building that creates a pleasing or enjoyable moment for you.
   B) An aspect of the building that makes you feel connected to nature, OR
   C) An aspect of the building that makes you feel removed from nature.

2. Note picture number on camera 27

3. Provide a maximum 20 word description describing the photograph you captured:
   Example: A view out the window from the staircase that leads to my office.
   Sunlight streaming in through windows & shadow effect created by Interface's 'Mission Zero' sign

4. Check all that apply:
   This photo represents:
   (A) An aspect of the building that creates a pleasing or enjoyable moment for me.
   (B) An aspect of the building that makes me feel connected to nature.
   (C) An aspect of the building that makes me feel removed from nature.
5. Describe why you found this to be a pleasing/enjoyable moment, a nature-connected experience, or an experience of being removed from nature here:

connection to nature - brightness & warmth that comes from the sun. further thought & connection to nature while pondering the meaning of mission zero.

6. Were you with other people when you had this experience? If you were with others, describe who you were with (ie - coworker, customer, etc) and what you were doing (ie - chatting informally by the kitchen, introducing a new product line to a client in the showroom, etc).

no
BIOGRAPHICAL QUESTIONNAIRE

Instructions:
Circle the letter that applies. Fill in the blank when appropriate.

-----------------------------------------------

GENERAL INFORMATION

1. I am:
   a. Female
   b. Male

2. I am ____ years of age.

-----------------------------------------------

EDUCATION

3. The highest level of education I have completed is:
   a. high school
   b. technical degree
   c. bachelors degree
   d. masters degree
   e. doctoral degree

If you circled b, c, d, or e above, answer the following question:

3b. The title of the degree(s) I have earned is/are:


-----------------------------------------------

WORK EXPERIENCE

4. I have worked for Interface for ____ years.

5. I have been working in Interface’s Atlanta Showroom at 75 5th St. NW for ____ years.

6. On average I spend ____ hours each week in the Atlanta showroom at 75 5th St.

7. The average length of continuous time I spend in the Atlanta showroom building is _______ hours/day.
WORK EXPERIENCE (CONT.)

8. Prior to working at Interface, I have worked in the following field:


My prior job responsibilities have included:


TIME SPENT IN INTERFACE’S ATLANTA SHOWROOM

9. Indicate how much of a total percentage of your work week is spent in the following locations (on average):

   Retail Area Inside the Atlanta Showroom
   Office Area Inside the Atlanta Showroom
   Kitchen Area Inside the Atlanta Showroom
   Conference Area Inside the Atlanta Showroom
   Outside of Atlanta Showroom (ie – traveling, etc.)

100% Total
APPENDIX D

NATURE AFFINITY AND EXPERIENCE QUESTIONNAIRE
Instructions:
Circle the choice after each statement that indicates your answer.

Note:
"Nature" is defined as:
elements of the natural world, such as mountains, trees, plants, animals, and bodies of water

Examples of “interacting with nature” include:
hiking in the wilderness, road biking through forested roads, being in a park, playing outdoor sports, being outside in a garden, etc.

1. I consider myself to have a deep appreciation of nature.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
</tbody>
</table>

2. Currently I make an effort to educate myself about nature-related issues (i.e. - water resources, plant or animal species, community parks, composting, etc.)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
</tbody>
</table>

If you answered ‘Strongly Agree’ or ‘Agree’ to #2, list:
a) the nature-related issue(s) you are educating yourself about and how you are obtaining this knowledge:


3. Currently I spend the following amount of time “interacting with nature” each week (on average):

(1) 0 hrs
(2) 1-2 hrs
(3) 2-4 hrs
(4) 4-6 hrs
(5) above 6 hrs
If you spend 1 or more hours “interacting with nature” on average/week, indicate how you “interacting with nature” during this time:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4. I would **like** to spend the following amount of time “interacting with nature” each week (on average):

(1) 0 hrs  
(2) 1-2 hrs  
(3) 2-4 hrs  
(4) 4-6 hrs  
(5) above 6 hrs

Indicate how you would like to spend this time “interacting with nature”:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

5. I spent the following amount of time “interacting with nature” each week (on average) during my childhood (age 7 to 18 years).

(1) 0 hrs  
(2) 1-2 hrs  
(3) 2-4 hrs  
(4) 4-6 hrs  
(5) above 6 hrs

If you spent 1 or more hours “interacting with nature” on average/week during your childhood, indicate what this time typically entailed:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Subject: Asking for your participation in graduate student study

From: Christy Guillikson <elg07m@fsu.edu>

Date: Wednesday, December 16, 2009 11:31 am

To:

Dear Interface Employee,

Hello! I am a masters student in the Interior Design Department at Florida State University and am interested in you being part of my thesis study.

I am working in collaboration with my advisor, Dr. Jill Pable, on my master’s research project. For my project I am conducting a research study on employee enjoyment and well-being within office spaces. I have chosen full-time employees that work in the Interface Atlanta Showroom as the location for my study, with the approval of Interface through Joyce LaValle, due to the likelihood that it offers employees’ exposure to elements of the built-environment that promote well-being as a results of the building’s LEED Platinum-Commercial Interiors certification status.

If you participate in this study you will be asked to carry a disposable digital camera with you for five typical eight hour work days spent in Interface’s Atlanta Showroom and take photographs of moments when an aspect of the building creates a pleasing or enjoyable moment for you, makes you feel connected to nature, or make you feel disconnected from nature. After taking a photograph of an aspect of the building, you would need to briefly document your experience on a form I would provide. After you have documented a minimum of ten experiences, you would need to send the camera to me in a self-addressed envelope I would provide. A few weeks later I would conduct a follow-up interview with you about the photographs you took which would take between 30 to 60 minutes.

All the information I will collect in this study will be confidential, and there will be no way of identifying your responses in the data archive. I am not interested in any one individual’s responses; I want to look at the general patterns that emerge when the data are aggregated together.

I foresee your participation in this study consisting of no more than a total of four hours over the course of four weeks. The four hours are estimated from a total of 10 minutes for each of the 10 experience documentations, 30 minutes for the initial study briefing in two weeks, and one hour for the follow-up interview a few weeks after you have sent me your camera. At the completion of the study I will provide you with a personal framed sketch as a token of appreciation for your participation and a breakfast.

If you are able to participate in this study, would you please send me a return e-mail indicating your willingness to participate? In addition, could you please indicate which dates out of the following; January 4, 5, 6, 11, and 18th, you would be able to meet with me to further discuss the study with you, answer any questions you may have, officially sign you up as a participant, and begin the study.

I have attached a required consent form for your review which includes further study details. If you choose to be in this study I will have you sign this form when I come to the Interface showroom in January. Please don’t hesitate to ask me questions via email or in the meantime. I hope you will consider being a part of this study!

Sincerely,

Christy Guillikson
APPENDIX F

FSU BEHAVIORAL CONSENT FORM
FSU Behavioral Consent Form

Research Study: Employee Well-Being within the Office Environment

You are being invited to participate in a research study about employee enjoyment and well-being within office spaces. You are eligible to participate in this study because you are a full-time employee that works in Interface’s Atlanta Showroom. As the principle researcher I have chosen the Atlanta Showroom as the location for my study, with the approval Joyce Lavalle of Interface, due to the likelihood that it offers employees’ exposure to elements of the built-environment that promote well-being as a result of the building’s LEED Platinum-Commercial Interiors certification status. I am conducting my master’s research in collaboration with my faculty advisor, Dr. Jill Pable, at the Florida State University Department of Interior Design.

Background Information
The purpose of this study is to identify elements of the built-environment that create enjoyable experiences for office workers and promote well-being.

Procedures
If you agree to be in this study, we would ask you to do the following things:

● Sign and return this consent form to Christy Gullikson if you agree to participate
● Carry a disposable digital camera with you for five typical eight-hour work days spent in Interface’s Atlanta Showroom
  ◦ Take photographs of moments when an aspect of the building creates a pleasing or enjoyable moment for you or makes you feel connected to nature
● After taking a photograph, document your experience by completing an “Experience Documentation Form” the Principle Investigator (PI) will provide
  ◦ After documenting a minimum of ten experiences, send the camera to the PI in the self-addressed envelope the PI will provide
● Participate in a follow-up interview with the PI a few weeks after mailing camera to the PI. The follow-up interview will take between 30 to 60 minutes and will be recorded via audio-tape.
  ◦ Answer the PI’s questions regarding your pictures and responses
  ◦ A few examples of questions that will be asked include:
    1. What is it about this aspect of the built environment that created a pleasing or enjoyable moment for you?
    2. Is this experience something that you conscientiously create for yourself or is it a natural part of your day? (Ex. Do you out of your way to walk through the courtyard or do you have to walk through it in order to get to work?)
    3. Did this experience affect your attitude throughout the rest of your day? If yes, how?
    4. How does experiencing this aspect of the built environment affect your actions (more productive during the day, etc.)?
  ◦ Complete two short questionnaires: a biographical questionnaire and a nature-affinity questionnaire. The biographical questionnaire will ask questions regarding age, education, and work experience. The nature-affinity questionnaire will ask questions about attitude towards and experiences with nature.

Risks and benefits of being in the study
There is no anticipated risk to you if you participate in this study. There are no direct benefits to you for participating in this study. However, your answers will help interior designers create office
environments that promote well-being among employees.

Compensation
You will receive no monetary compensation for your participation. However, you will receive small gifts of appreciation, such as a personal framed sketch and breakfast from the PI at the completion of the study.

Confidentiality
The records of this study will be kept private and confidential to the extent permitted by law. The confidentiality of your responses to questionnaires and other study materials is assured to the extent allowed by law. In any sort of report we might publish, we will not include any information that will make it possible to identify you. You will be given, along with each participant, a "code participant name" which will be used to identify you in written documents throughout the course of the study. The PI will be the only person with access to the document which identifies each participant to their code participant name. Research records will be stored securely and only Christy Gullikson and Jill Pable, FSU faculty adviser, will have access to the records. The follow-up interview will be audio-recorded to fully capture the information that results. The audio recordings will only be accessible to Christy Gullikson and Jill Pable and will only be used for educational purposes. These recordings and all paper and digital files with study information will be destroyed within 3 years after the anticipated 2010 completion of the study.

Voluntary Nature of the Study
Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the Interface Community. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships. If you do not wish for your follow-up interview to be recorded via audio-tape you may still participate in the study. Your participation is voluntary, and you can stop the survey or interview at any time without any penalty to you.

Contacts and Questions
The researcher conducting this study is Christy Gullikson. You may ask any question you have now. If you have a question later, you are encouraged to contact Christy at cgl07@fsu.edu. You may also contact Dr. Jill Pable at or at jnpable@fsu.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher[s], you are encouraged to contact the FSU IRB at 2010 Levy Street, Research Building B, Suite 276, Tallahassee, FL 32306-2742, or 850-644-8633, or by email at humansubjects@magnet.fsu.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent
I have read the above information. I have had the opportunity to ask questions and receive answers. I consent to participate in the study.

Participant Signature __________________ Date ____________

APPENDIX G

DIRECTIONS FOR PARTICIPANTS
Directions for Taking Photographs

• Carry this disposable digital camera with you throughout the course of a week (40 total hours) spent working inside Interface’s Atlanta Showroom.

• Take at least 10 photographs of:

  A) An aspect of the building that creates a pleasing or enjoyable moment for you,

   Examples of what these moments may be:

   • Viewing a beautiful piece of artwork
   • Pausing to appreciate the lighting in the lobby
   • Enjoying the ease at which you are able to navigate the hallways and accomplish your work efficiently

  B) An aspect of the building that makes you feel connected to nature, OR

   Examples of what these nature-connected experiences may be:

   • Walking through a courtyard or a landscaped street outside your office
   • Looking out a window at vegetation
   • Viewing a piece of artwork of a natural scene

  C) An aspect of the building that makes you feel removed from nature.

   Examples of what these experiences may be:

   • Working in a windowless room
   • Not being able to see vegetation
   • Poor artificial lighting

NOTE: In general, examples of what an “aspect of the building” could include:

• Lighting
• Artwork or color
• Ceiling height
• Furniture arrangement
• Windows or window treatments
• The way your work area is organized
• Specific materials used throughout the building
• Outside views of the surrounding landscape through windows

• As soon as you take the photograph, fill out the Experience Documentation Form

• The 10 experiences you photograph can be an enjoyable moment, a nature connection, or an experience of being removed from nature—this is your choice. After you have documented the 10 experiences, mail the camera and the 10 Experience Documentation Forms to Christy Gullikson using the pre-addressed FedEx package
APPENDIX H

SUMMARY OF PARTICIPANT EDFs
<table>
<thead>
<tr>
<th>Benyus' numbering for photographs</th>
<th>Benyus' Description of Photograph</th>
<th>Photograph represented the following for Benyus: (A) An aspect of the building that created a pleasing or enjoyable moment</th>
<th>(B) An aspect of the building that made Benyus feel connected to nature</th>
<th>(C) An aspect of the building that made Benyus feel removed from nature</th>
<th>Description of why Benyus found this to be: (a) a pleasing/enjoyable moment (b) a nature connection, or (c) a removed from nature experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Sunlight streaming in through windows and shadow effect created by Interface's &quot;Mission Zero&quot;</td>
<td>X</td>
<td>X</td>
<td></td>
<td>The warmth and brightness that comes from the sun. Further thought and connection to nature while pondering the meaning of &quot;Mission Zero&quot;.</td>
</tr>
<tr>
<td>26</td>
<td>Sun shining into showroom through window wall - lighting up space</td>
<td>X</td>
<td>X</td>
<td></td>
<td>The feeling of being drawn to the sun &amp; outside. Interesting rainbow effect created as sun streams through glass doors.</td>
</tr>
<tr>
<td>25</td>
<td>Super graphic wall with carpet display &amp; furniture arrangement</td>
<td>X</td>
<td></td>
<td></td>
<td>Super sized graphic is visually interesting. Like the neutral colors of the graphic with the colorful array of carpet tiles. Feeling of volume and height. Accent lighting is pleasing and accents architectural elements - thus creating visual interest as mentioned above.</td>
</tr>
<tr>
<td>24</td>
<td>Building lobby with plants &amp; wall of windows letting the sun in</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Almost no realization of the boundary of inside and outside. Green plants create a lush feeling of being outside in nature.</td>
</tr>
<tr>
<td>23</td>
<td>FLOR Graphic - front porch with surfboard, plants, wood sided house</td>
<td>X</td>
<td>X</td>
<td></td>
<td>This graphic makes me feel like I could just walk up &amp; have a seat on this porch. Life size image is very effective. Almost like stepping outside.</td>
</tr>
<tr>
<td>22</td>
<td>Light fixtures - large lamp shades housing fluorescent lighting.</td>
<td>X</td>
<td></td>
<td></td>
<td>Size and scale of the lamp shade creates interest. Clever way of hiding tubular fluorescent lighting making it a soft glowing form of indirect light. Draws the eye upward.</td>
</tr>
<tr>
<td>21</td>
<td>Bamboo flooring &amp; wood case pieces</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Use of natural elements in the design of space (certified wood and grass). Bamboo is a rapidly renewable resource. Both are true representations of nature inside. Golden colors also bring a sense of warmth. Natural shading and grain of wood is nature at it's best.</td>
</tr>
<tr>
<td>19-18</td>
<td>Architectural elements (round lampshades)</td>
<td>X</td>
<td></td>
<td></td>
<td>Curved lines more common in nature. Circular patterns repeated throughout create interest in a very rectilinear space.</td>
</tr>
<tr>
<td>17</td>
<td>Architectural elements (curved walls)</td>
<td>X</td>
<td></td>
<td></td>
<td>Curved lines more common in nature. Circular patterns repeated throughout create interest in a very rectilinear space.</td>
</tr>
<tr>
<td>16</td>
<td>View from kitchen to outside</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Large windows that bring in light and allow exterior view of street, trees, etc.</td>
</tr>
<tr>
<td>15</td>
<td>Gold shimmering curtain in presentation area</td>
<td>X</td>
<td>X</td>
<td></td>
<td>When closed, the curtains are highlighted by lights - creating a warm sparkle. Brings warmth and visual interest to area - suggestion of sunlight 'shimmering'.</td>
</tr>
</tbody>
</table>

11 total experiences

| 11 | 7 | 0 |
### Table A.2. A Summary of Braungart’s Experience Documentation Forms

<table>
<thead>
<tr>
<th>Braungart’s numbering for photographs</th>
<th>Braungart’s Description of Photograph</th>
<th>Photograph represented the following for Braungart:</th>
<th>Description of why Braungart found this to be:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>View from our conference room</td>
<td>(A) An aspect of the building that created a pleasing or enjoyable moment</td>
<td>(a) a pleasing/enjoyable moment</td>
</tr>
<tr>
<td>2</td>
<td>Open floor plan (in open office area)</td>
<td>(B) An aspect of the building that made Braungart feel connected to nature</td>
<td>(b) a nature connection, or</td>
</tr>
<tr>
<td>3</td>
<td>Light shining in</td>
<td>(C) An aspect of the building that made Braungart feel removed from nature</td>
<td>(c) a removed from nature experience</td>
</tr>
<tr>
<td>4</td>
<td>Auto light in supply room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Open work space (related to personal interactions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kitchen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Filtered water machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Recycle bins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bays separated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Presentation Space</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>9</th>
<th>6</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

10 total experiences
<table>
<thead>
<tr>
<th>Kellert’s numbering for photographs</th>
<th>Photograph represented the following for Kellert:</th>
<th>Description of why Kellert found this to be:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) An aspect of the building that created a pleasing or enjoyable moment</td>
<td>(a) a pleasing/joyful moment</td>
</tr>
<tr>
<td></td>
<td>(B) An aspect of the building that made Kellert feel connected to nature</td>
<td>(b) a nature connection, or</td>
</tr>
<tr>
<td></td>
<td>(C) An aspect of the building that made Kellert feel removed from nature</td>
<td>(c) a removed from nature experience</td>
</tr>
<tr>
<td>1 Personal Work space</td>
<td>X</td>
<td>I enjoy having a “home away from home.” It gives a sense of belonging.</td>
</tr>
<tr>
<td>2 Working showroom</td>
<td>X</td>
<td>I enjoy the fact customers can come to our showroom to work on real projects. This makes the overall experience good for everyone.</td>
</tr>
<tr>
<td>3 &amp; 10 Open &amp; airy</td>
<td>X</td>
<td>Makes me feel connected to others. I enjoy working in a space that is open because it provides a nice area to take a break and walk around after sitting at the computer for long hours.</td>
</tr>
<tr>
<td>4 Recycling</td>
<td>X</td>
<td>I like the fact our company takes the time to provide programs such as recycling. Ultimately this allows us all to play a role in sustainability (even if it is on a smaller scale).</td>
</tr>
<tr>
<td>5 Beautiful Architecture</td>
<td>X</td>
<td>Working in a space that is beautiful, especially when your customers are interested in that, helps promote a pleasant feeling about the space you work in.</td>
</tr>
<tr>
<td>6 Natural Light</td>
<td>X</td>
<td>I can’t live without natural light. It connects one to nature in many ways by letting you know what time of day and even what time of year it is. I think humans are designed to have relationships with these qualities because it helps us process the world.</td>
</tr>
<tr>
<td>7 Store Front</td>
<td>X</td>
<td>This definitely ties to my comments regarding natural light in #6. I also like being on the first floor where our store front ties us to nature and all the pedestrians on the street. Atlanta doesn’t have very many areas that are pedestrian friendly, so having this window wall in one of the very few pedestrian type areas makes for a unique experience.</td>
</tr>
<tr>
<td>8 Natural Materials</td>
<td>X</td>
<td>I enjoy being around natural elements, so the use of bamboo in our space is something I’ve always enjoyed. It brings in a warmth to the overall space.</td>
</tr>
<tr>
<td>9 Beautiful art and furniture</td>
<td>X</td>
<td>Similar to #5 in that having things around us we enjoy, appreciate or find interesting brings energy and well being.</td>
</tr>
</tbody>
</table>

8 total experiences
### Table A.4. A Summary of McDonough’s Experience Documentation Forms

<table>
<thead>
<tr>
<th>McDonough’s numbering for photographs</th>
<th>McDonough’s Description of Photograph</th>
<th>Photograph represented the following for McDonough:</th>
<th>Description of why McDonough found this to be:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Retail component for walk-in</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>2</td>
<td>Kitchen to entertain</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>3</td>
<td>Working closely with great people</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>4</td>
<td>Great Furnishings</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>5 &amp; 8</td>
<td>Great area to tell the story</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>6</td>
<td>Outside view from the office</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>7</td>
<td>Outside view from the sofa</td>
<td>X</td>
<td>not filled out</td>
</tr>
<tr>
<td>9</td>
<td>Conference room with a great view</td>
<td>X</td>
<td>not filled out</td>
</tr>
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</table>

8 total experiences

<table>
<thead>
<tr>
<th>8</th>
<th>1</th>
<th>0</th>
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</table>

114
<table>
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<tr>
<th>Wilson's numbering for photographs</th>
<th>Wilson's Description of Photograph</th>
<th>Photograph represented the following for Wilson:</th>
<th>Description of why Wilson found this to be:</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Sun shining across building out our windows</td>
<td>(A) An aspect of the building that created a pleasing or enjoyable moment</td>
<td>(a) a pleasing/enjoyable moment</td>
</tr>
<tr>
<td>2</td>
<td>Flag flying in sun</td>
<td>(B) An aspect of the building that made Wilson feel connected to nature</td>
<td>(b) a nature connection, or</td>
</tr>
<tr>
<td>3</td>
<td>In conference room on phone - looking outside at the beautiful day</td>
<td>(C) An aspect of the building that made Wilson feel removed from nature</td>
<td>(c) a removed from nature experience</td>
</tr>
<tr>
<td>4/10</td>
<td>View from Van der Ryn's desk (where I often sit) / Glass feels open (photo of looking in on my workspace)</td>
<td>X</td>
<td>It's a cold day in Atlanta. I'm tired and ready to go home. I looked out and saw the sun streaming across the building out our window. It made me feel warm.</td>
</tr>
<tr>
<td>5</td>
<td>View when I'm on couch where I make calls</td>
<td>X</td>
<td>It was a very windy day - cold but sunny. As I looked out the window, I noticed the American Flag flying straight out. It made me think of how blessed I am to live in such a great country. Be free and have a great job.</td>
</tr>
<tr>
<td>6</td>
<td>View from conference table in main showroom Seeing a dog out the window</td>
<td>X</td>
<td>Often I go into the conference room to make a call when I need a quiet spot. Because of the all glass walls and windows everywhere, we can see the sunny day as we work...such a great environment.</td>
</tr>
<tr>
<td>7</td>
<td>Hanging out in kitchen - sitting on counter (as if at home) on phone and looking outside</td>
<td>X</td>
<td>As I do my day to day work, I can see outside from my desk. Because the walls to my office are glass and there are so many windows, I constantly feel connected to nature. As I look at my office, I realize how great it is to have all the interior walls be made of glass. It makes our work experience so much richer - feels open and airy instead of small, closed in offices where I feel boxed in</td>
</tr>
<tr>
<td>8</td>
<td>Working at drop in stations - enjoying scenery</td>
<td>X</td>
<td>I sometimes sit on the casual furniture in the showroom to make calls. Feels so comfortable, like being in someone's home. I used to study in a &quot;den-like&quot; environment in college - reminds me of those days.</td>
</tr>
<tr>
<td>9</td>
<td>Choosing tiles to send to a customer - able to do this with a view - stop, think and look out window</td>
<td>X</td>
<td>Have meeting at this conference room table. At a meeting, noticed a dog sitting outside on the side walk in front of our building. Love that you can see and be a part of this very urban community - people living and working in same area.</td>
</tr>
</tbody>
</table>

9 total experiences

8 2 0

As I am searching for tiles to send to a customer. I have lots of natural light which helps me really see the textures and colors of the tiles. As I am doing this, I glance out the window periodically. Makes me feel free - not so constrained.
PARTICIPANT BENYUS

GENERAL QUESTIONS:

1. CG: What does feeling “connected to nature” within a building mean to you?
BENYUS: A visual connection with the outside

2. CG: What does feeling “removed from nature” within a building mean to you?
BENYUS: No windows; air feels stale and un-fresh; chemical smell

3. CG: How important is it to you to feel “connected to nature” each day according to the following scale (1 = Not Important, 2 = Somewhat Important, 3 = Undecided, 4 = Important, or 5 = Very Important) and why?
BENYUS: 4 because I believe it helps with one’s productivity at work

4. CG: How “connected to nature” do you feel while working at Interface’s showroom and offices according to the following scale? (1 = Strongly Removed from Nature, 2 = Somewhat Removed, 3 = Connected to Nature, 4 = Somewhat Connected to Nature, or 5 = Strongly Connected to Nature)
BENYUS: 3. I do feel a connection to nature in the showroom, but know it could be stronger. For instance, my view is of an urban streetscape and it would be nice to look at a view of more vegetation or a park.

QUESTIONS ABOUT PHOTOGRAPHS & BENYUS’ COMMENTS IN EXPERIENCE DOCUMENTATION FORMS:

QUESTIONS ABOUT PHOTOGRAPH:

27. Sunlight streaming through window & shadow effect created by Interface’s ‘Mission Zero’
CG: What caused you to stop at this window and have this nature-connected moment? (ie – the moving shadow, the ‘Mission Zero’ text, etc)
BENYUS: The moving shadow of ‘Mission Zero’ caused me to stop.

26. Sun shining into showroom through window wall - lighting up space

CG: What time of day did you take this photograph?
BENYUS: Around 9:00 am
CG: Do you think this experience would be different for you if there were not floor-to-ceiling windows on each side of the front door?
BENYUS: Yes. The floor-to-ceiling windows are key and what make the experience. Would not be the same if they weren’t there.

25. Super Graphic Wall with carpet display, furniture arrangement
CG: Specifically, what do you find “visually interesting” about the super-sized graphic?
BENYUS: The graphic as an architectural element (the backlighting, overall size and the mirror on the bottom). The entire composition (the contrast between the neutral image and the colorful carpet). I may not have taken a picture if the carpet color was more neutral.
CG: What is creating the “feeling of volume and height” for you, the super graphic or the space itself?
BENYUS: Both – the interaction of the large space and the large graphic.

24. Building lobby with plants; wall of windows letting the sun in

CG: When did you take this photo?
BENYUS: mid-morning
CG: How much time do you spend in this space?
BENYUS: Not a lot. I come in through this space in the morning.
CG: How do you feel when you’re in this space?
BENYUS: Good
CG: Is this space as enjoyable to be in when there is no sunlight streaming into the space?
BENYUS: Not quite as nice – nice with sunlight – the sunlight makes the space

23. FLOR graphic – front porch with surf board, plants & wood-sided house

CG: Specifically, what aspect of this super graphic makes you feel connected to nature?
**BENYUS:** The plants, surfboard, and Adirondack chairs. Also, a sense of what would lie beyond the image—the beach.

22. **Light fixtures – large lamp shades housing fluorescent lighting**

No interview questions pertaining to photograph #22.

21. **Bamboo flooring & wood case pieces**

No interview questions pertaining to photograph #21.

*Note: BENYUS did not take a photograph #20

19 & 18. **Architectural elements: round lampshades**
17. Architectural element: curved wall

No interview questions pertaining to photograph #s 19, 18 & 17.

16. View from kitchen to outside

CG: Specifically, what do you find most enjoyable about a view to the outside? (ie – knowing the time of day, seeing people, seeing the sky, viewing trees, etc).
**BENYUS:** A connection to the outside world. In the winter the view isn’t quite as effective because there is a lack of leaves on the trees.

**15. Gold shimmering curtain in presentation area**

**CG:** Specifically, what about the curtain makes you feel connected to nature? Is it the “suggestion of sunlight “shimmering?”

**BENYUS:** Reminds me of sunlight (especially when the curtains are closed and the lights are hitting the curtain).

**QUESTIONS ABOUT BENYUS’ PERCEIVED EFFECTS OF, OVERALL, FEELING CONNECTED TO NATURE WITHIN THE SHOWROOM:**

**1.**

**CG:** What type of effect (if any) does experiencing a connection to nature have on your physical health based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

**BENYUS:** 5 (Positive Effect)

**CG:** What are these perceived positive effect(s)?

**BENYUS:** Seeing outside (don’t feel closed-in); the indoor air feels fresh (nice to know this building monitors CO2); fresh outdoor air is available quickly by stepping outside; if I was working in a high-rise building fresh outdoor air wouldn’t be as accessible.

**2.**

**CG:** What type of effect (if any) does experiencing a connection to nature have on your attitude based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

**BENYUS:** 5 (Positive Effect)

**CG:** What are these perceived positive effect(s)?

**BENYUS:** Overall, just makes it easier to have a positive attitude
3. **CG:** What type of effect (if any) does experiencing a connection to nature have on your job satisfaction based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

**BENYUS:** 5 (Positive Effect)

**CG:** What type of effect (if any) does experiencing a connection to nature have on your job performance based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

**BENYUS:** 5 (Positive Effect)

4. **CG:** What are these perceived positive effect(s) that a connection to nature has on your job satisfaction and job performance?

**BENYUS:** I feel good about the space and I think to a degree this affects how I feel and function at work.
**PARTICIPANT BRAUNGART**

**GENERAL QUESTIONS:**

1. **CG:** What does feeling “connected to nature” within a building mean to you?  
**BRAUNGART:** Being able to see outside; natural light; open space; having a variety of items and colors within a space, but having the entire space look like a cohesive whole (entropy).

2. **CG:** What does feeling “removed from nature” within a building mean to you?  
**BRAUNGART:** Fluorescent lighting; taupe paint color on walls; feeling like the space you’re in could be anywhere (placelessness).

3. **CG:** How important is it to you to feel “connected to nature” each day according to the following scale (1 = Not Important, 2 = Somewhat Important, 3 = Undecided, 4 = Important, or 5 = Very Important) and why?  
**BRAUNGART:** 5 – Very important because I have become more aware of a connection to nature since working in the Atlanta showroom.

4. **CG:** How “connected to nature” do you feel while working at Interface’s showroom and offices according to the following scale (1 = Strongly Removed from Nature, 2 = Somewhat Removed, 3 = Connected to Nature, 4 = Somewhat Connected to Nature, or 5 = Strongly Connected to Nature)?  
**BRAUNGART:** Between 4 and 5

**QUESTIONS ABOUT PHOTOGRAPHS & BRAUNGART’S COMMENTS IN EXPERIENCE DOCUMENTATION FORMS:**

1. **View from our conference room**

**CG:** What is it about being able to “see outside when meeting” that makes you feel connected to nature? (i.e. - Do you enjoy being able to gauge what time of day it is?)
BRAUNGART: The window makes the space feel more open and makes me feel more in touch with the world.

CG: Would your experience of having a view outside be enhanced if there was more vegetation outside the window?

BRAUNGART: Of course. That would be ideal.

2. Open floor plan (in the office area)

CG: Why do you find it “enjoyable to be in a space so open?”

BRAUNGART: The open space makes me feel more connected to the people I’m working with.

3. Light shining in

CG: You noted it was “great to have natural light.” What specific qualities about the natural light in the showroom do you find most appealing?

BRAUNGART: The shadow and movement created by the natural light
4. Auto light in supply room

CG: Have you felt “connected to nature” by using this technology before this study?
BRAUNGART: I've always been aware of this feature and enjoyed it. It is not so much a “connection to nature” as much as it is a technology that facilitates environmental stewardship.

5. Open work area (related to personal interactions)

CG: What exactly about this space makes you feel “removed from nature”?
BRAUNGART: Just the nature of doing office work – being surrounded by computers, documents, etc.
CG: What would improve this space for you? (i.e. - being behind floor-to-ceiling glass walls (to keep space visually open and make less noisy?)
BRAUNGART: Don't think anything could improve the problems in the space (low visual and acoustical privacy). The glass walls generally are not liked by the people in them (it feels like a fish bowl). Currently, McDonough and Van der Ryn are in the glass offices. Currently, we all deal with the privacy issues just by leaving when we get a phone call and talking on our cells in a private area in the showroom.
6. Kitchen

CG: Does the window in the kitchen to the street view add to the open feeling of the space?
BRAUNGART: Yes. Also the fact that the kitchen is open on 3 out of the 4 sides makes it feel open.
CG: Does business get done in the kitchen, or is it mainly social?
BRAUNGART: Both social interaction and business happen here. It is utilized for both purposes often. The social component of the kitchen adds a lot to the environment.

7. Filtered Water Machine

CG: How often do you use the filtered water machine?
BRAUNGART: Everyday
CG: Do others use it and value it as much as you do?
BRAUNGART: Everyone uses it on a daily basis. This is another item in the space that fosters environmental stewardship.
8. Recycle bins

**CG:** How does recycling make you feel “connected to nature?”

**BRAUNGART:** Again, not so much a “connection to nature,” but another item in the space that fosters environmental stewardship.

9. Bays separated

**CG:** Specifically, what is it about the separated bays that make you feel “connected to nature?”

**BRAUNGART:** The material that is used in the separated bays (bamboo). The way the space is free-flowing yet separate (the same concept as the parts are different, but the whole is cohesive). There is a product (Entropy) that was designed based on this principle.

**CG:** What is usually happening in the showroom when you lower the panels?

**BRAUNGART:** The showroom sells retail and commercial products, so sometimes when there is a luncheon going on in the space (happens usually twice per week), they will lower a panel so that retail customers can still come in and not bother the luncheon crowd. The bays aren’t lowered very often.

**CG:** When you say the “lighting is great,” are you referring to the natural light or the artificial lighting?

**BRAUNGART:** Natural lighting is the most prominent, nicest form of lighting in the space.
10. Presentation Space

CG: Specifically, what is it about this space that makes you feel “connected to nature?”
BRAUNGART: It’s just a nice, pleasant space.
CG: Why do you describe this space as an “open area?”
BRAUNGART: When the curtain is closed, the space still feels open since it’s a translucent material. You feel protected behind the curtain, but you can still see what is going on in the entire showroom.
CG: How often do you meet with customers in this space? Are you usually talking or utilizing the television?
BRAUNGART: Often meet with customers. The TV is actually a presentation screen (power point, etc) and is used a lot. Other times it is just talking on the chairs.
CG: Is this space utilized with both the curtains drawn and open? Which is more popular with the clients and people that work here?
BRAUNGART: Utilized both ways equally. Open is used a little more, but both are liked.

QUESTIONS ABOUT BRAUNGART’S PERCEIVED EFFECTS OF, OVERALL, FEELING CONNECTED TO NATURE WITHIN THE SHOWROOM:

1. CG: What type of effect (if any) does experiencing a connection to nature have on your physical health based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
BRAUNGART: 5 – Positive Effect
CG: What are these perceived positive effect(s)?
BRAUNGART: Being exposed to sunlight; seeing outside views

2. CG: What type of effect (if any) does experiencing a connection to nature have on your attitude based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
BRAUNGART: 4 – Slightly Positive Effect
CG: What are these perceived positive effect(s)?
BRAUNGART: Generally in a better mood
3. **CG:** What type of effect (if any) does experiencing a connection to nature have on your job satisfaction based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

**BRAUNGART:** between 3 (No Effect) and 4 (Slightly Positive Effect)

**CG:** What are these perceived effect(s)?

**BRAUNGART:** The connection and job satisfaction are a little more separate. When you’re having a bad day/hard time with your job, it still creates stress even if you’re in a great space.

4. **CG:** What type of effect (if any) does experiencing a connection to nature have on your job performance based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

**BRAUNGART:** between 4 (Slightly Positive Effect) and 5 (Positive Effect)

**CG:** What are these perceived positive effect(s)?

**BRAUNGART:** Overall my job performance is enhanced.
1. **CG:** So I have a couple of overall questions. Since we’re talking about a connection to nature, I wanted to ask you what that means to you personally in the context of the interior environment. What does feeling a connection to nature within a building mean to you?

**KELLERT:** I think for me it’s hard to put it into context just in a building because a connection to nature for me has nothing to do with a building at all. I’m a gardener. I love to get out and work in the dirt. I love to watch things change, watch the light, check the soil – things like that – so I connect to nature at a more raw level. So, obviously you’re not going to come in here and start digging in dirt or things like that. But, to me, that connection really has nothing to do with work.

But, to work in an environment that still allows me to have that personal connection that I already have to nature is real important. Because for me, things like light are very important. Even down to when I was looking to buy my house and looking at interior space and just the way the light felt in the rooms really connects to me. It helps the mood for me. It helps my eye sight. I think it just helps overall well-being. Again, all of this then translates into the work environment as well. That’s why I love this space, because we do get so much natural light. And being on the ground floor (not that Atlanta’s the most pedestrian-friendly city), but in the little bit of spaces that we do have that are pedestrian-friendly we’re in one of them. So to not only see just light and trees and things like that, but also to see other humans and animals and things like that interacting is a real connection to where I think we’re supposed to be. Because I don’t think when you look at how we were designed early as humans I don’t think the building was part of the plan.

**CG:** Yes, exactly.

**KELLERT:** I know David Oakey who is our product developer; he always does a lot of talks on something called biophilia.

**CG:** Yes, that’s actually what I’m reading about a lot lately.

**KELLERT:** And one of the things that he says is if you ask anyone to close their eyes and envision a place of comfort and relaxation rarely is it going to be an office building. It’s usually going to be a beach, or the woods, or maybe even your own home or your own backyard. But a lot of times it does have a connection to nature. But what I think is very interesting that you’re doing is that because of the world we live in we have to go to work. We have to make a living. And if we can make those spaces pleasant, comfortable, more productive, then that is good for everybody.

**CG:** Exactly. It’s interesting you bring that up because that is kind of what the theory of this is based on.

**KELLERT:** Biophilia?

**CG:** Yes. It’s interesting that your product developer is talking about it, although it makes sense with your mission.

**KELLERT:** It does. I think it goes back to who we are as early humans and there’s probably a lot of physiological and psychological connection to it; having things above
us that give us shelter in the wild probably was a very comforting thing that you knew a big tiger wasn’t behind you (if you were inside a cave or something). So I think that all of the things we create around here in the spaces that we live in (not that we have a big tiger getting ready to jump out on us, although we might feel like it sometimes), but having these places that we feel like are our home or where we feel like we can interact and go and get a breadth of fresh air and step outside, not being way up high, being where we can get outside I think just ties us to those types of things.

2. CG: Great. Very insightful. Then, conversely, what does being removed from nature mean to you within the building?
KELLERT: Horrible. To be one of those people that unfortunately has to sit in a room where there are no windows and you’re at a desk 24/7; that, to me, would be a nightmare. Not only do I need that connection, but I also need that freedom to get up and move about. And that’s probably more of a personality thing than it is a real human need, but my personality interacts in this space well because we can get up. And a lot of what I do in my job (sometimes it will be stuff at my desk, sometimes it’ll be stuff out here in the showroom), so having that flexibility of movement is really nice. So, to be in a space where you couldn’t tell what season it was or what time of day would be a weird twilight zone kind of feeling.

3. CG: And then, you basically already answered this, but based on the following scale (1 = Not Important, 2 = Somewhat Important, 3 = Undecided, 4 = Important, or 5 = Very Important), how important is it to you to feel connected to nature each day?
KELLERT: 5

4. CG: And then, how “connected to nature” do you feel while working in this building according to the following scale? (1 = Strongly Removed from Nature, 2 = Somewhat Removed, 3 = Connected to Nature, 4 = Somewhat Connected to Nature, or 5 = Strongly Connected to Nature)
KELLERT: I’d say in between a 3 and a 4. I would go 4.
QUESTIONS ABOUT PHOTOGRAPHS & KELLERT’S COMMENTS IN EXPERIENCE DOCUMENTATION FORMS:

1. Personal workspace

CG: For your personal workspace, you said that it’s a home away from home and it gives you a sense of belonging.
KELLERT: Yes, well it’s interesting because, I guess I’m a perfect person to answer this question because I’ve worked in this showroom in a variety of ways. I’ve worked in here when I’ve had one of those touch-down spaces where you didn’t have your own personal space; it was just kind of revolving. And on one level it’s kind of nice that you can even have any space here because a lot of people would love to work in this showroom and not everybody gets to. But, to then actually have a space that is mine that I go to everyday, that I can put up my pictures, that I can have my files right there; I think it creates not only a home, but it also creates a sense of community that you belong here.
CG: And do you feel like you have all your needs met in this space for what you need to do to get your job done?
KELLERT: This has nothing to do with the showroom, but from a technology standpoint, no. But we’re working through that.
CG: OK, sounds good. But, it sounds like it’s a better situation than the touch down space?
KELLERT: Absolutely. Yes.

2. Working Showroom
**KELLERT:** This isn’t really tied to nature so to speak, but it is something I like about the showroom. What I mean by being a “working showroom” is that customers can come here and actually work on real projects. Because when we first opened the showroom it was designed to be more of a showpiece. It wasn’t a place where someone would come and say “Go pull this sample and let’s look at this for this project.” It was really to come and see the different product layouts, but we quickly changed that to be what we call a “working showroom” where somebody can come in here and normally what would have taken the rep and maybe the designer a week or two long process of going back and forth with samples, they can come and bang out here in an hour or two. And again, that really doesn’t tie to nature, but it does tie to interaction with customers. Which if you stretch what nature is and you don’t think trees and leaves and plants but you think human interaction, it makes that whole experience of working with the customer much quicker, more efficient, much more pleasant. They “get it” quicker. So, I took a picture of these bins because that’s just an example that we keep the tiles here in the different color ways that we can actually go and pull and work with the customers. So, that was kind of the thought process on that.

**CG:** So, it seems like it makes everyone’s job easier if you can just get everyone here.

**KELLERT:** It’s more of a one-stop shop. You can get a lot of things done in a shorter amount of time.

**CG:** Okay, and that’s where all the samples are stored?

**KELLERT:** Yes, well they kind of wrap around, but I just took a shot at the biggest area.

**CG:** How often do customers come here?

**KELLERT:** Daily. Multiple people during one day, because this showroom services not only the local community but it also is a stopping point globally for customers that come from all over the world that are heading down to our mill. They want to stop by here and see the first commercial interior LEED Platinum Rated facility ever in the world which is this one. And so, this is usually a stopping point on the way down to our mill. So we’ll get customers from all walks of life.

**CG:** That’s nice. And what do they usually comment about when they come into the space?

**KELLERT:** They love the architecture. They love the openness. They talk a lot about how beautiful and how light it is in here. They love the LEED aspect of it. They come here actually to learn. I think Wilson does CEU [continuing education] courses for credit here. And then some people will come just to see it and other people will come to actually work on a real project.
KELLERT: This kind of related to both 3 and 10
CG: Is this a view of the office area or the showroom? I wasn’t sure.
KELLERT: It is both. I took this picture [in office area], then I took that picture out here [in showroom area] and thought those both were the same idea. I liked that it’s an open versus enclosed offices and enclosed space. When I say open and airy it’s not just the physical architecture but it’s also the use of materials like the glass. Because this is a pretty long and narrow space, and if this [the eastern wall] was not a window wall this space would feel completely different. It would feel like a bowling alley. So what I liked about this back environment, I also liked out front. So I thought I was really saying the same thing, so I just put them into one.
CG: Okay, that makes sense.

KELLERT: So, it probably comes back to the light again. Well, not even just the light, it’s the vistas. It’s being able to see beyond the perimeter of the building. It’s seeing what’s going on (not that we love looking at cars) but, still you can see movement and life outside of this space.

CG: Do you think that would be a different experience if the window sill was at 3 feet?
KELLERT: I think it’d be a hugely different experience if we were at the tenth floor too. It would have a different feel. It might be nice to look out and see Stone Mountain or whatever direction you’re pointed to, but what I think is nice about this is that there’s
kind of a heartbeat to it. There’s a pulse, and you see what’s going on out and around us. So it feels like there’s activity and life. That kind of feels connected and makes you kind of feel like you’re one foot in/one foot out in this space (psychologically that is).

CG: Another thing you mentioned about this is that you feel like you can take a break and walk around. Do you take these breaks after you’ve been working hard so you can step away from it and then go back?

KELLERT: If you work at a computer for a certain amount of time you’re supposed to take breaks because of ergonomics and eye strain and things like that. So to be able to get up and get a cup of coffee or walk up here and see what’s happening on the FLOR residential side. Or if you have impromptu meetings, because a lot of times information is exchanged in this office with informal, impromptu, face to face meetings and you may never have planned those meetings. But because of the environment we work in and the people touching in here, it gives you the ability to interact with them just because you have that face time.

CG: So do you return to your desk feeling refreshed after a break like this?

KELLERT: It gives you a little bit of a mental break. And I have to because I’ve been having some carpel tunnel issues. Before I used to ignore it and now I’m trying to make a point to do some of the exercises or get up and go move around and not be in the same position or the same eye strain for too long of a period of time. So yes, there’s actually something physiological about it that helps too.

4. Recycling

CG: You said the recycling makes you feel connected to nature and I was curious as to how.

KELLERT: It does in a different sense. Not so much because I look at it and I see nature. But it’s that our company is committed to a bigger cause. If they’re taking the time to place the bins and offer the service, obviously they’ve got a mindset that cares about the environment. So, this is kind of just one outward example of a bigger concept about what is happening within this company. So that’s kind of how it makes me feel. Not me as in I feel connected to nature because I heard a bird sing or saw a leaf, but it’s more through this community of consciousness that this company has of caring for the planet.
CG: So it’s a sign of that, or helps facilitate environmental stewardship?
KELLERT: Exactly. It’s more connected to a concept that we care about nature and we’re connected to nature is what I mean.

5. Beautiful Architecture

KELLERT: I just love this. This is one of my favorite. I love that right there. I love that curved wall. I love the way the light hits in there. I love that there’s this beautiful elegant curve in the middle of this very rectangular space. And it’s simple. Some people may not see it as beautiful, but to me it’s kind of this elegant, subtle arc in the space. I’ve just always loved that. I also like that it’s got our convert, which is our recycled story happening along this wall too. So it’s almost like you’re going around this process. Working in a place that I find attractive (not in a sense of superficial, but beautiful, comfortable, and with things that work), that’s pleasing to me.

6. Natural Light

KELLERT: I think the thing to add to this one is that there’s a difference with the window wall (being able to see through it and look beyond) and there’s also this exchange of looking out and light coming in. It’s kind of like a two way interaction. I think
one thing that’s nice about the light that comes into this space (besides illuminating this space) is it definitely gives you a sense of time. You know, is it morning; is it afternoon; is it winter; is it Fall; is it Spring? Because the way the sun positions and the way light will shine through here, is it cloudy out; is it sunny out? All of that can definitely affect your mood. And I like to see the light travel throughout the space.

**CG:** Yes, this photograph definitely denotes that movement because of the morning light and strong shadows.

**KELLERT:** Which I think also plays well visually in a space like this. Even though this is a well thought-out space, it’s still open enough so that there’s room for a shadow to make a statement. You know what I mean?

**CG:** Yes.

**KELLERT:** So, I like that.

### 7. Store Front

**KELLERT:** This was more connected to the life outside, the people. You know there’s even humor in it too. It’s not just seeing kids out at Georgia Tech or people drinking coffee. But it’s funny too because people walk by and they’ll start looking in and you know, it’s just funny. And one time someone in the showroom acted like a mannequin in the window. There’s such a humor in all this too. So, it’s being on a street-level storefront has a lot of cool energy that you couldn’t have if you were up on the tenth floor.

**CG:** That’s an interesting observation, just not know what you’re going to get.

**KELLERT:** Right, because the storefront street level is all about an interaction between the people inside and the people outside. And nobody knows what will happen. It might be that they just want to see what’s in here. It might be somebody inside the showroom noticing their customer walking down the street about to come in. It creates an opening between inside and outside that can be helpful; it can be funny; it can be engaging; it can just be surprising. There are a lot of different opportunities for it to play out.

**CG:** That’s an interesting observation. I guess it’s kind of like an element of surprise too that you might not get...

**KELLERT:** on the tenth floor. Unless it’s a bird maybe I guess. So yes, just the entire street-level storefront experience I would definitely say connects me to nature. And
again, I’m thinking about nature beyond the scope of leaves and trees and plants. I’m including humans. I’m including life of all sorts.

8. Natural Materials

CG: You indicated you enjoy the warmth these materials bring to the space. Would the space be more enjoyable for you if there were more natural materials?

KELLERT: I think for what we’re doing it’s perfect. Originally I think the design had the bamboo going up the wall and around the ceiling which would have been really cool. I don’t know for sure, but I think it was value-engineered down to just the floor. But no, I think for what we’re trying to do here which is create a space that’s attractive and comfortable, but also is a real display show space. So integrating the concrete floors to be a backdrop to our carpet is perfect. So yes, I’m very happy with the balance in the room.

9. Beautiful Art and Furniture
CG: What in particular do you think is the most beautiful thing about the art and furniture?

KELLERT: I love our graphics (the big billboards). Not only just the content. (You know these are part of our image campaigns that change out annually with our shows.)

CG: Oh, I didn’t realize that.

KELLERT: Right, so it’s art specific to us. So I like that aspect of it. And in this case it had a theme of Alice in Wonderland, but we called it Alice in Underland so it was about the carpet underfoot. So it’s Alice in the looking glass and Alice falling down the tunnel and there’s all these different play on themes on the whole Alice in Wonderland theme. I just think it’s really fun and big and in your face.

I love that the design firm took a really big heavy element and made it feel light. Because a lot of times when you see something this big there’s a visual weight to it (and obviously they are very heavy), but by floating them and backlighting them and having the mirrors all of a sudden you have this really cool juxtaposition of a heavy element that appears to be lightweight and floating. And then it also really helps to bring the inside out and the outside in because at night when these are lit and you’re outside driving by these just pull through the window. So I love that it’s not just the content but it’s the size in relationship to the space that we would have artwork like this. And I’m calling this artwork.

CG: Yes.

KELLERT: And then for the furniture, I love that we’re surrounded by modern classic pieces that are very well known to us as well as to our customers. Not every office gets to have it. To be able to sit in a chair that feels good and looks pretty (and it’s not a vanity thing, it’s more of a good design thing). So that’s what I mean by beautiful art and furniture. And I think when you have that I think it also is a sign that the company cares about its employees. It cares about the space. It cares about the image we’re trying to portray. And when I say the image (that word’s kind of a weird word sometimes), you’ve got to have real content behind the image to really make it strong, and I think our company does.

CG: Yes, it’s not a superficial image.

KELLERT: It’s not an “Oh, let’s make this pretty, but there’s nothing behind it. You’ve got the beauty but no brains.”

CG: Right.

KELLERT: I think we’ve got both.

CG: That’s a good analogy.

QUESTIONS ABOUT KELLERT’S PERCEIVED EFFECTS OF, OVERALL, FEELING CONNECTED TO NATURE WITHIN THE SHOWROOM:

1.

CG: Earlier you said you feel “somewhat connected to nature” in this space. What type of effect (if any) does experiencing this connection to a degree have on your physical health based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

KELLERT: I’d say it’s a positive effect. 5 definitely.

CG: How so?

KELLERT: I think there’s a lot going on physiologically within us that we’re not even aware of such as heart rate, breathing, eye strain or eye comfort. Acoustics and all
those things that happen around us and how we perceive them with whatever sense affects our mental and physical health I think. And if you’re in spaces that are conducive to things that help you relax, inspire, or make you feel comfortable it’s only going to help you. Because I know when they were doing work at LA Fitness a couple of weeks back you could hear jackhammers running all of the time, and it almost drove me over the edge. So, just sounds, what you see, what you smell (because the adhesives they were using were so strong that a couple of us had to leave early), the air quality, the essence of how you feel when you’re here, I think all of that affects your health.

2. CG: What type of effect (if any) does experiencing this connection to a degree have on your attitude based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

KELLERT: Positively, I would say 5 as well.

CG: What are these perceived positive effect(s)?

KELLERT: I like working here.

3. CG: What type of effect (if any) does experiencing this connection to a degree have on your job satisfaction based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

KELLERT: In relationship to the showroom I would give it a 5. Again, you’re going to have other things that affect job satisfaction that may not have anything to do with the space that you work in. But related to the showroom, definitely a 5.

4. CG: What type of effect (if any) does experiencing this connection to a degree have on your job performance based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)

KELLERT: I would say a 5 again in relationship to the showroom. But again, there are things that affect your job that may be technology issues or whatever that may be unrelated to the showroom. But in relationship to the showroom I would say 5 for sure.
PARTICIPANT MCDONOUGH
GENERAL QUESTIONS:

1. CG: Since this is about a connection to nature, I was curious about what a connection to nature within a building means to you.
MCDONOUGH: To me, connected to nature means more of being able to see out into nature versus walking through a lobby that has a lot of plants. You know, a lot of companies spend a lot of money on services that come in and have giant trees or fuchs plants or whatever. That’s not connected to nature for me; it’s being able to see nature from my desk. Whether its water or little ponds with ducks or something, it’s being able to see out.

2. CG: Okay and then conversely, what is being removed from nature within a building mean to you?
MCDONOUGH: No windows. All these hotel/conference center-type things where they’ve pulled some sliding walls to make a half of a ball room and you can’t see the daylight.

3. CG: And then on a scale from 1 to 5 with 5 meaning very important and 1 meaning not important (1 = Not Important, 2 = Somewhat Important, 3 = Undecided, 4 = Important, or 5 = Very Important), how important is it to you to feel connected to nature every day?
CG: Okay, and then on a scale from one to five (five being important and one
MCDONOUGH: It’s at least four if not five. I mean, I need to see it. I need to see the sun.

4. CG: And then, how “connected to nature” do you feel while working in this building according to the following scale? (1 = Strongly Removed from Nature, 2 = Somewhat Removed, 3 = Connected to Nature, 4 = Somewhat Connected to Nature, or 5 = Strongly Connected to Nature)
MCDONOUGH: In that same spot, because there is nowhere in our showroom that you can’t see outside, that you can’t see the sun shining, that you can’t see something happening outside. Even though it’s an urban environment, we still are connected. We see people walking by, especially with the college kids, you know, with book bags and their shorts – they’re having fun at least – we’re in here slaving away, they’re still having fun. So, I think we’re connected.
QUESTIONS ABOUT PHOTOGRAPHS & MCDONOUGH’S COMMENTS IN EXPERIENCE DOCUMENTATION FORMS:

1. Retail component for walk-in

MCDONOUGH: I think this is great. You know, what I do day-to-day is really the commercial aspect of it. When I say commercial aspect of it, this is really more of a contract showroom. We’re going out to find people. We’re going out to call in customers. The retail component is people stumbling in off the street. And we don’t get to talk to those people, but it’s just neat to see that people don’t have eight to five jobs, people are shopping at two o’clock in the afternoon, and they’ve gone to Starbucks, they’ve grabbed a coffee and they’re over here trying to fit their little need of which could be ten tiles in their small office or ten tiles in their home. So, it kind of brings the rest of the world in to us. As long as their kids behave I like it.

CG: And don’t spill anything.

MCDONOUGH: It’s OK if they spill because it’s modular flooring

CG: …and then it’s an opportunity to showcase your product

MCDONOUGH: Absolutely, I hope they all spill.

2. Kitchen to entertain

CG: You said this was an enjoyable aspect.

MCDONOUGH: Yes, our kitchen is like the kitchen when you go to a dinner party in someone’s house. It could be a three million dollar house with all the media rooms and
all these beautiful things and everybody’s still in the kitchen. The morning when someone’s making coffee and we’re just trying to get the day started we end up in the kitchen talking and being coworkers and friends. So, it’s kind of a fun thing that we have our little kitchen area.

**CG:** So, it kind of lightens the mood?

**MCDONOUGH:** Absolutely. Absolutely.

### 3. Working closely with great people

**CG:** What about this space do you feel like makes working closely with coworkers a feasible thing to do; you know, working closely with them and being able to work well?

**MCDONOUGH:** In the office element we’re all jammed pretty tight. So there are not a lot of secrets back there. But, the space is so large and long, that if somebody needs to go do something (You see this as Michele has walked away from his desk), we’re all able to flow freely. We get to see the outside. We’re still here and we’re all still right together, but we’re all very supportive and using the space to go hide and make a phone call. Or, if somebody is calling a customer they haven’t called before, being respectful and being a little more quiet as they’re trying to do their work. It’s different than talking to a person you’ve talked with 400 times; they can handle the background noise and all the hoopla that goes on in the space. Because on a good day it is grand central here. We want it to be busy. We want people here. We want you and me to have a meeting while somebody sitting over there is having a meeting. So, I don’t know if that truly answers your question.

**CG:** Yes, it does. And I know that other people have said that the space is tight, and just the nature of the good working relationship makes it easier to deal with the lack of privacy by changing behavior.

**MCDONOUGH:** Right, everyone is very supportive of the fact that we are jammed in there together. You don’t find this within a working space very often, but we’re all within five or six years of each other in age, our kids are similar ages. And there’s a lot of coincidences and camaraderie here.
4. Great furnishings

CG: Is this picture about how you like the modern classic furniture in general? MCDONOUGH: This goes back to all of the DNA of Interface because the furnishings are refurbished which is part of the LEED criteria. It’s something that was in someone else’s showroom floor or in somebody’s warehouse. So not only is it a modern classic in terms of everybody knowing what it is, it may have had a broken arm. It may have had a gash in its fabric that we refurbished. So, it goes back to the DNA of who we are, and it’s just cool kickin’ furniture. You know, it’s just cool stuff.

5/8. Great area to tell the story

CG: You said this was a great area to tell the story. Would you say this aspect of the environment caused you a pleasing moment, made you feel connected to nature, or removed from nature?
MCDONOUGH: It’s kind of between A and B. It creates a pleasing and enjoyable moment because I get to tell the story. To me that wall/that whole presentation area tells our environmental story so well. Historically, we’ve had a difficult time telling our environmental story. People say, “What do you do for the environment?” and we go into this dissertation that’s deep, scientific and over their heads. It’s kind of like when somebody asks you what time it is and you tell them how a watch works. That’s what we did. This boils it down to one component and that’s to get off of oil, to use Mother Nature’s molecules and keep them in the loop versus just using virgin oil. So, it’s very pleasing to me to be able to tell that story because it’s who we are, and also a
connection to nature because the option if we don’t do that is that just gets thrown in the landfill. And nylon will not break down for hundreds and hundreds of years and it just creates more problems. And you see people that drive and throw their carpet on the side of the road and it’s just going to stay there forever. So, a little bit of both.

6. Outside view from the office

CG: You said this was a pleasing experience. Does this tie to what you said earlier about seeing what’s going on outside?
MCDONOUGH: It’s everything because we can see Spring Street, watch skyscrapers being built out of this window. When our parking garage collapsed we watched the whole search and rescue, everything. And then now cleaned up that area and made it more of a grassy knoll and cleaned it up. So that’s a great view.

7. Outside view from the sofa

MCDONOUGH: This is me sitting on the black sofa looking out which is my favorite thing to do. So that’s what that is.
CG: Why is that your favorite spot?
MCDONOUGH: Usually I’m here either first or second. And I can grab a cup of coffee, sit there with my blackberry and clean off anything. Spring [Street] is a major thoroughfare going into the city. So in the morning it’s bumper to bumper, car to car. You see people going by and I’m already sitting in this cool space and they’re stuck at a
red light at Spring and 5th trying to get to Coca Cola, trying to get to Georgia Pacific, trying to get to one of the major skyscrapers downtown. So, it’s kind of like, I win. I’ve got a blackberry and a Starbucks and you are still there.

CG: In traffic

MCDONOUGH: So almost every morning, I’m sitting on the sofa looking out, kind of like a dog sitting on the porch watching the cars go by.

CG: Right. Okay.

MCDONOUGH: And everybody in here knows that’s my favorite spot. I’m just there.

CG: It’s your thing every morning.

MCDONOUGH: Yes and those people going into the skyscrapers downtown are the ones that we’re trying to sell to. So those are our customers.

9. Conference room with a great view

CG: What do you find most enjoyable about this space?

MCDONOUGH: I don’t enjoy it at all.

CG: No?

MCDONOUGH: The irony is where it is today versus where it was. LEED does not take acoustics into play. This particular room without the soundproofing you see there was a total echo. You couldn’t hear yourself to talk. And accidentally the thermostat to this room was put next door above the copier. So you had a thermostat next to the copier which is the hottest thing in the building. So you couldn’t hear and you had to wear a jacket in this room when we first started. Now it’s pleasing to sit there and you can see outside, you can see outside, not only outside the conference room but you can see outside. It’s a space that’s come a long way in it’s time.

CG: Do you find the specific view enjoyable, or do you just like being able to gauge the passage of time?

MCDONOUGH: You can see outside, but you can also see the people coming and going and still feel the heartbeat of what’s going on.
QUESTIONS ABOUT MCDONOUGH’S PERCEIVED EFFECTS OF, OVERALL, FEELING CONNECTED TO NATURE WITHIN THE SHOWROOM:
(answered by McDonough in a follow-up e-mail)

1. CG: What type of effect (if any) does experiencing a connection to nature have on your physical health based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
MCDONOUGH: 5

2. CG: What type of effect (if any) does experiencing a connection to nature have on your attitude based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
MCDONOUGH: 5

3. CG: What type of effect (if any) does experiencing a connection to nature have on your job satisfaction based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
MCDONOUGH: 5

4. CG: What type of effect (if any) does experiencing a connection to nature have on your job performance based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
MCDONOUGH: 5
PARTICIPANT WILSON

GENERAL QUESTIONS:

1.
CG: What exactly does a connection to nature mean for you? If you had to define what a connection to nature within a building means to you, what would that be? It doesn’t have to be this building, but any building in general.
WILSON: Well, I just think it’s important when you’re in a building, to be able to see nature. I think with our cities we’ve done a great injustice by leveling trees and building concrete cities. I can’t imagine living in New York because that would drive me crazy to see only concrete. And Atlanta’s done a little better job than that just because when you look out the windows you do see trees. And I think that connection to nature somehow makes us feel OK and grounded. And I think if there’s too much concrete it just makes you feel wrong. It’s institutional and it just doesn’t feel good. So I really like the natural woods and I think this place could use stone. Stone would be so cool in here. I’m surprised they didn’t use that actually. Just anything you can do to make it feel like there is some nature around you I think makes you feel like a better person, more comfortable and, then, productive.

CG: So, seeing the trees and the grass definitely helps?
WILSON: Yes, and the fact that we get to see the sky. And we’re in Atlanta and if one day if the buildings just keep being built higher it would be so dark in the streets. I just think it would be so awful. I hope they’ll leave spaces and that won’t happen, but look at New York. I imagine it will be. You go to New York and its dark until you’re way up high in one of the buildings. But right now because we can see out and see the sky and then also being able to see that gorgeous Biltmore building. I just love that. Because it somehow feels so much less institutional to me. It just feels like the 1920’s and I don’t know what it is about that but it’s comforting to me too, as opposed to that yellow building to the right. [square, modern yellow building] How heinous is that? It’s just so institutional, so I don’t even look at that. I just block that out and I look up at the other building and it just makes me feel good.

CG: That’s interesting that the traditional architecture brings more comfort to you than the stark modern building.
WILSON: Yes. And this building over here is certainly more modern [bookstore on corner], but it doesn’t bother me nearly as much. Because it has the buttresses you know that come out and it has the different textures. I don’t like it as much as I like the Biltmore, but somehow it’s not as bothersome to me as that. That is just the biggest eyesore. There are no architectural features at all; it’s just a box with box windows. There’s nothing warm or enchanting. It’s awful. Even this one over here though [pointing to residential building to the left of the Biltmore]. Even though its modern, I really like that one too.
CG: You do?
WILSON: Yes. I love the different windows and the different colors of the windows. Somehow you can look at that and think, “Wow, I would love to live there.” I can picture Saturday morning drinking coffee on that porch. So maybe it’s not so much historical,
but about having something architecturally interesting. I never would have thought about these things until I started working for Interface. I've become more aware of how you can take a space and really change it and it affects how you feel.

CG: How long have you worked for Interface?
WILSON: 4 years. I've worked in this building for 3 years. I was in LaGrange for the first year (the first 9 months).

CG: So the way of thinking about space that you mentioned has become more ingrained in you since working at Interface, did you also start to think more like that when working in LaGrange or did that happen more so when you came to this showroom?
WILSON: This showroom. Kellert walked me through and asked me to picture the space without the ceilings dropped down and the walls brought in. And that really helped me a lot because you can just picture this open, vacuous, not so special space. But then the things Holly did to bring the ceiling down and bring the walls in. All the little architectural things that make it feel almost like three separate rooms, yet it feels open and not locked up. Once Kellert made me aware of this then I started to become aware of all kinds of things. Since I don't have an architectural or design background, nobody every pointed that stuff out to me before.

CG: What was your degree in?
WILSON: English
CG: And what other fields have you worked in?
WILSON: I was always in sales and I was in real estate sales. And then I worked for the Ritz Carlton. And interestingly enough, even though the Ritz Carlton was gorgeous, our offices were absolutely horrible. We were in one office that was probably the size of this table and there were three of us and no windows. It was painted a horrible brown with awful brown carpet. It was blah. Luckily we got out a lot because we would go on calls and take people to lunch. But yes, the space for us was yucky. Then I worked at a children's hospital and that was really fun. I did have a window, but the office was still kind of gross. But I got to walk through the hospital and see the little kids.
CG: So you've had a pretty diverse working background in terms of environments that you were in.
WILSON: Yes, and I think people have a large part to do with it too. Like at the hospital it was like a Christian sorority. It was a bunch of girls that were really on the same wavelength, were all about the same age. It was really fun.
CG: So the people aspect played a big role in it?
WILSON: Yes.

2.
CG: So on the flipside, what makes you feel “removed from nature” in a building? You touched on it just now with the horrible colors and the cramped space...
WILSON: Yes, and just no windows. Also, when you do have windows if you look out and don’t see something that is pleasing to the eye like trees or something that has
some resemblance to nature or a lot of concrete. So I think too much concrete, no views, and looking at ugly buildings when you do have views.

3.  
**CG:** And then on a scale from 1 to 5 with 5 meaning very important and 1 meaning not important (1 = Not Important, 2 = Somewhat Important, 3 = Undecided, 4 = Important, or 5 = Very Important), how important is it to you to feel connected to nature every day?  
**WILSON:** I would say a 5. Yes, I think I get depressed in the winter just because I don’t want to be outside because I’m cold and I hate the cold. And then in the Spring that’s all I want to do is sit on porches and be outside and go run or ride bikes.

4.  
**CG:** And then, how “connected to nature” do you feel while working in this building according to the following scale? (1 = Strongly Removed from Nature, 2 = Somewhat Removed, 3 = Connected to Nature, 4 = Somewhat Connected to Nature, or 5 = Strongly Connected to Nature)  
**WILSON:** I would say a 3. To me, working in a park would be a 5. So this is not a park, but there’s certainly things that make you feel connected to nature although probably not as much as you could.

**QUESTIONS ABOUT PHOTOGRAPHS & WILSON’S COMMENTS IN EXPERIENCE DOCUMENTATION FORMS:**

1. **Sun shining across buildings out our windows**

   **CG:** You said the sun made you feel warm.  
   **WILSON:** Yes, it was a cold day. So, when you’re cold and sometimes the space can be cold. It’s just so big and it’s hard to keep warm. So, somehow, looking out and seeing the sun makes you feel good.
2. Flag flying in sun

WILSON: That was the flag that was flying straight out, which flags don’t do very often. It didn’t look so big in the window, but when I looked out and thought “How cool is that?” And all that that represents, too, is pretty neat.

CG: Yes, that’s interesting that it wasn’t a building or nature, per se, but a symbol.

WILSON: Well, but the wind, because it was such a windy day and you could see the wind blowing everything. And for it to be blowing that gigantic flag straight out had to be really strong. So that’s nature, you know?

CG: So, the movement of the flag played a part in it?

WILSON: Yes, totally.

3. In conference room on phone – looking at outside – beautiful day

CG: You said that you like seeing the sunny day while you work and it’s a great environment. What about seeing the sunny day makes it an enjoyable experience? Is it just seeing the sky or being able to gauge the time of day?

WILSON: No, not so much that. Today is not a sunny day, so it just feels kind of blah. I think the weather affects us, or affects me, more. When the sky is blue and the sun is out everything just seems better. And I’m just so glad that I have access to that.

CG: Right, and even when you’re in the conference room.

WILSON: Yes. Everywhere I am I have access to it. And that’s what I love.
4/10. View from Van der Ryn’s desk (where I often sit) / Glass feels open [photo looking in on Van der Ryn’s workspace in the background (along with McDonough’s workspace in the foreground)]

CG: What specifically makes this an enjoyable experience? Is it being able to see outside the window, or…
WILSON: I think it’s the glass; that it’s an office of glass. Glass is so great because it doesn’t make you feel closed in. And then, yes, the view because with the glass you have a little privacy which is very nice. But in my office back there [the open office space] we have no privacy and it drives me crazy. It’s awful. That’s absolutely the worst thing about this space.
CG: Is it the lack of visual privacy or acoustical?
WILSON: I would say it’s audible; it’s a hearing issue. Because there are so few of us, you can’t not hear everyone’s conversations. So, if you don’t want to hear their conversation or if you’re trying to have your own conversation you just can’t. When everyone is on the phone there’s a slight buzz and that’s OK. But when there are only 3 or 4 people talking you just can’t help but listen to their conversation and it drives me crazy. And it makes me nervous because I don’t want people to listen to my conversation. I do great on the phone, but if I feel like somebody is listening to me I can’t focus on the conversation. So, I just get a little distracted. Not that their listening per se, but it just bugs me.

WILSON: But yes, those glass offices are awesome because they do give you a sense of privacy but don’t make you feel closed in.
CG: Do you work from Van der Ryn’s desk then?
WILSON: Yes.
CG: And where is your desk?
WILSON: I don’t have one. Like today I’m here because Kaplan’s out. Sometimes Benyus is out and I’ll be there and sometimes Braungart’s out. Mostly Van der Ryn is out because of a heavy travel schedule. So I sit there most often. But then sometimes if everybody is full I sit at one of the drop-in stations. Kellert usually comes in at some point during the day so I don’t sit at that desk much. I don’t sit at Fuller, Carson, or McDonough’s desks because you can tell they don’t like it.
WILSON: This is my favorite desk actually [Kaplan’s desk].
CG: Why?
WILSON: Because this area of the office is open and people are in and out and talking and everybody that comes in that door sees you. But if you’re over here, there’s a wall and these people don’t necessarily even know you’re there. So I feel like I have more privacy there.
CG: Interesting…at Kaplan’s desk.
WILSON: Yes
CG: You can see, but not be seen.
WILSON: Exactly. [At other desks in the space] you feel like you have to talk to everyone that comes in the space. I can do that, but I don’t want to do it 24/7.

5. View when I’m on couch where I make calls

CG: What was it about this view that created a pleasing/enjoyable moment for you?
WILSON: I was just sitting on the phone talking, and I thought, “You know, I just love this.” I used to study at Vanderbilt in a dark room with comfy chairs with lights that would hover above you. I would sit in those chairs to study. And I would also sit on the floor and use a low table to study on. I’ve always been an unconventional studier. I always studied in my den like that home. I’d put everything on the floor with my knees tucked up under me. Sitting at a desk never felt right. So I guess that’s why I like that, because it reminds me of that and it’s not sitting at a desk. For me its better; I can just think better.

CG: Specifically, what is it about this experience that makes it enjoyable?
WILSON: I would say the couch first. But if it were just the couch with no window it would be ruined. So they play into each other. But I really like the fact that it’s a couch and it’s removed from people. I feel like I have a little privacy. But it’s such a big space too. It’s not like I have to go sit in a phone booth. I just think this space is the greatest space. I really do. I would love to have my house somehow look like this.
6. View from conference table in main showroom – dog out window

CG: This photo is kind of from where you’re sitting now.
WILSON: Yes, I saw a dog and thought, “That’s kind of neat. You don’t see that everyday.” It’s not normal to see a dog in a business environment. It’s kind of unusual and especially since he was sitting there looking in the window. I thought, “That’s nature.”

CG: So was it a different experience than seeing people walking by you’d say?
WILSON: Yes. Definitely. It just really struck me. It was different. But you also see all different walks of life walking by and its fun. It is a different energy. And then when I go downtown I think “I would die if I had to be down here.” It feels so different. There are homeless people everywhere and it just feels so different.
CG: Interesting.
WILSON: Oh yes, downtown is gross. Drive down there and you’ll see. Just the vibe there is so different. And then the vibe in Buckhead is different too. This area was renovated for the Olympics, so it has a different feel. It has wide sidewalks and everything was done fairly recently with different things in mind. Whereas downtown, it hasn’t been touched in years and all the sidewalks are tiny and people aren’t as into walking and being outside. I don’t think they’ve thought about things you’re thinking about back then when they built all that.

And then Buckhead feels so retail. The sidewalks aren’t very big and people don’t walk. They drive to the mall. I hate it.

Whereas Atlantic Station [in the vicinity of Interface’s showroom and offices] is an outdoor mall and it has an entirely different feel. It has big sidewalks. Everybody is walking around. There’s an Ann Taylor Loft and a Target and little restaurants. It’s really cool. I like the feeling of that area. It feels like they thought about those things, whereas in Buckhead and downtown they didn’t.
CG: And Atlantic Station is close to here?
WILSON: Oh yes, about two blocks away. Go straight down West Peachtree and take a left on 17th. It’s a multiuse facility too, so that’s kind of cool. It was also something before and they redeveloped it and used land that…
CG: A Brownsfield EPA site perhaps?
WILSON: Something like that were it was going to be something that nobody could ever touch and they figured out a way to use it so that it wasn't going to be dangerous for people. I know that it was something very sustainable they did with that space. And then they have hotels, apartments, condos and shops. They meant for it to be a walking community. If I were younger and didn’t have kids I think I might like that area.

7. Hanging out in kitchen – sitting on counter (as if at home) on phone and looking outside

CG: And then this one was your view from the kitchen.

WILSON: Oh yes, because I sit on the kitchen counter a lot and that reminds me of when I was a kid too. I noticed when I was sitting on the kitchen counter that this is nice too and I just love this. I love that I can be in a kitchen setting, for some reason that's comforting. And it's a nice kitchen. And you can look out the window and sit there and chat on the phone.

CG: Would it be more or less enjoyable if you had a different view out the window?

WILSON: No I like that view. I like that building.

8. Working from drop-in stations – enjoying scenery

CG: This one was interesting too, working from the drop-in stations.

WILSON: Sometimes we sit from those. One day I was on the phone and turned around and looked around. Otherwise you’re facing the wall and that's kind of blah. So just because you can turn around and look through the kitchen and through the window and
just see other stuff. It’s more stimulating than staring at a wall while you’re talking to somebody.

CG: So, was part of what made this nice the ability to know that you can work from different locations within the building?

WILSON: Yes.

CG: And do you like working facing an un-stimulating view and then being able to turn around and have the view, and then go back to working? Or would you rather have a work area where you can see outside a window. Which do you prefer?

WILSON: I think it just depends. I do like being able to tuck back in and focus a little bit and then turn back around. Yes, I think that is good. I think you do that anyway, even if I’m sitting at Van der Ryn’s desk where I don’t really have the option to turn that off. You do focus and turn it off. And then all of a sudden you’re more aware and you look up and find yourself staring out in space thinking about what to do next.

CG: So you think it’s a natural process no matter where you are?

WILSON: Yes, exactly.

CG: So you have moments of thought while looking at what’s around you, and then turn it off to work?

WILSON: Yes, then focus back.

9. Choosing tiles to send to a customer – able to do this with a view – stop, think and look out window

WILSON: I took this one is because I was looking for samples and thinking about what a customer wants. I was pulling samples I thought he would like. And as I looked out I got little glimpses of trees and the sun. Even when you’re doing your daily stuff it just, seeing outside somehow makes you feel good. It affects you and your mood.

CG: Do you think its easier to make decisions sometimes when you have, like you said, a moment to look out and look at something different than the samples?

WILSON: I do and I think that, especially because of what we do, our samples can look different in different light. And so if we were looking at them with just fluorescent lights I think it would be very difficult.

I think your eyes would literally go cross-eyed. But when you can take them over to the window and feel like you can really get a good feel for what they look like, that’s helpful.
CG: Also, in this view the windows are continuous. Do you think that the ability to look out and pause and see outside would be diminished if the windows weren’t continuous?
WILSON: Yes, I do. What I was trying to show here was what I was doing with the samples and how they related to the experience, but I couldn’t get all of them in. But yes, if the windows were small it wouldn’t feel the same.
CG: This is a good picture. I think it does illustrate what you’re going for.

MISCELLANEOUS QUESTIONS ABOUT SHOWROOM IN GENERAL

CG: Also, where are the showers?
WILSON: At the LA Fitness Center. We contracted with them to be able to use those showers and we never use them. But they’re supposed to let us. I’ve never tried.
CG: And that’s relatively close right?
WILSON: It’s right under us. To get there you’d go out the lobby and down stairs. But we truly don’t use them. I don’t know anybody who has ever used them.
CG: And then there is bike storage somewhere supposedly?
WILSON: The bike racks are in the garage. [Adjacent to the showroom]
CG: I was just curious about that because I saw it in the LEED points and didn’t see it in the showroom.

QUESTIONS ABOUT WILSON’S PERCEIVED EFFECTS OF, OVERALL, FEELING CONNECTED TO NATURE WITHIN THE SHOWROOM:

1.
CG: Overall you said you feel connected to nature in this space. What type of effects on your physical health do you feel that connection creates based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
WILSON: I would say 5 (Positive Effect).
CG: Specifically, what do you feel are these positive effects?
WILSON: I think that in a bad environment you just feel bad. And when you feel bad you’re run down and it feeds on itself. Whereas when you’re given a positive environment it’s bound to make you feel better in every aspect – emotionally and physically.

2.
CG: And then, on the same scale, what type of effects do you think experiencing a connection to nature has on your attitude based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
WILSON: It depends. I would say it’s positive when it is nice, but negative when it’s not. I mean, not negative, but when it’s raining it just makes you feel like you want to go home.
CG: So, what I’m hearing you say is that your attitude can change depending on the weather?
WILSON: Yes.
3.
CG: What type of effect does experiencing a connection to nature have on your job satisfaction based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
WILSON: 5 (Positive Effect). It helps. Because when I was in LaGrange it was very different.
CG: Are the people a factor in your job satisfaction as well?
WILSON: Yes, I couldn’t work anywhere where I didn’t like the people. And we’re all pretty good friends.

4.
CG: What type of effect (if any) does experiencing a connection to nature have on your job performance based on the following scale? (1 = Negative effect, 2 = Slightly Negative Effect, 3 = No Effect, 4 = Slightly Positive Effect, 5 = Positive Effect)
WILSON: Oh yes, definitely. I would say 5 (Positive Effect)
CG: How do you feel you perform better as a result of this connection?
WILSON: I don’t know. Somehow the atmosphere, and being able to come out here and sit on the couch and talk to customers and I don’t feel tied to my desk. It’s just easier for me to talk to people like that. So I can take my notebook and just chat. I really do think it makes my job much much better.
PARTICIPANT BENYUS

GENERAL INFORMATION

CG: How old are you?
BENYUS: 39

Benyus’ title is ‘Interface Showroom Manager-Atlanta’

EDUCATION

CG: What is the highest level of education you have completed?
BENYUS: Bachelors degree

CG: What is your degree in?
BENYUS: Interior design from Mississippi State

WORK EXPERIENCE

CG: How long have you worked for Interface?
BENYUS: 6 years

CG: How long have you been working in this showroom?
BENYUS: 6 years

CG: How many hours, on average, do you spend each week in this showroom?
BENYUS: 40 hours

CG: Are you here continuously or are you in and out of the showroom on a daily basis?
BENYUS: I’m continuously here 8 hours a day

CG: Prior to working at Interface, what other type of work did you do?
BENYUS: I worked in sales. My prior job responsibilities included coordinating sales for high-end antique dealer for 10 years in New Orleans – then managed their new shop in Atlanta for awhile before coming to Interface
TIME SPENT IN INTERFACE’S ATLANTA SHOWROOM

CG: Indicate how much of a total percentage of your work week is spent in the following locations (on average).

BENYUS: The percentage breakdown is:

- Showroom Area: 85%
- Office Area: 5%
- Kitchen: 10%
- Conference Room: 0%
- Outside of Atlanta Showroom (ie – traveling, etc.): 0%

(100% Total)
PARTICIPANT BRAUNGART

GENERAL INFORMATION

CG: How old are you?
BRAUNGART: 39

BRAUNGART’s title is ‘Sales Analyst’

EDUCATION

CG: What is the highest level of education you have completed?
BRAUNGART: Bachelors degree

CG: What is your degree in?
BRAUNGART: Speech Communications

WORK EXPERIENCE

CG: How long have you worked for Interface?
BRAUNGART: 9 years

CG: How long have you been working in this showroom?
BRAUNGART: Since it opened [in 2004]

CG: How many hours, on average, do you spend each week in this showroom?
BRAUNGART: 28-30 (I spend 3.5 days in the office and 1.5 days working from home)

CG: When you are in the showroom for 28-30 hours, are you here continuously or are you in and out?
BRAUNGART: Here in the showroom

CG: Prior to working at Interface, what other type of work did you do?
BRAUNGART: Sales (have always worked in corporate office environments)
TIME SPENT IN INTERFACE’S ATLANTA SHOWROOM

CG: Indicate where you spend the 28-30 hours per week that you’re working out the showroom (on average).

BRAUNGART: The percentage breakdown is:

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showroom Area</td>
<td>minimal</td>
</tr>
<tr>
<td>Office Area</td>
<td>80%</td>
</tr>
<tr>
<td>Kitchen</td>
<td>10%</td>
</tr>
<tr>
<td>Conference Area</td>
<td>10%</td>
</tr>
<tr>
<td>Outside of Atlanta Showroom (i.e. – traveling, etc.)</td>
<td>rare</td>
</tr>
</tbody>
</table>

(100% Total)
PARTICIPANT KELLERT

GENERAL INFORMATION

**CG:** What is your official job title here?
**KELLERT:** Director of Product Styling

**CG:** What do your general job responsibilities include?
**KELLERT:** I work on a lot of different things. It’s part of marketing. I do a lot on our photography, for example scouting locations to shoot for photo shoots for brochures and styling the products. I work on different showroom layouts. I work on stuff for trade shows. Anything that has to do with product layout (not design as in designing the product, but designing how we use the produce for showrooms, tradeshows, and brochures in any message that we’re trying to send). And I’m part of a team, there’s a ton of people that have their hand in the pot. This work [Alice in Wonderland super graphics] we typically contract out an outside firm. We’re getting ready to start it up again and I’m part of the team that’s on it, but they’re actually the outside creative group and they present to a team of us internally.

The other thing I do is deal a lot with the sales force on training them on product. We have new product calls whenever a new product launches. I facilitate those and train people about what’s new and different about the product. An example of what we just did for photography is that we just did an educational catalog and it’ll go out the door probably in about a month. But, along with the photographer we scouted out places where we wanted to do the photo shoot. Then we went there and actually did the shoot. Then I’ll take those images and start to compile a storyboard of how they’re going to layout with the graphic design team.

EDUCATION

**CG:** What was your degree in?
**KELLERT:** Bachelor of Interior Design at University of Oklahoma

WORK EXPERIENCE

**CG:** How long have you worked for Interface?
**KELLERT:** 15 years as of June 2010

**CG:** How long have you been working in this showroom?
**KELLERT:** 6 years (since it opened in 2004)

**CG:** How many hours, on average, do you spend each week in this showroom?
**KELLERT:** I’m here four days a week [32 hours] and then I work out of LaGrange at the warehouse one day a week (on Wednesday’s usually).

**CG:** When you’re here for the 32 hours a week, are you here continuously or are you in and out a lot on a daily basis?
KELLERT: It can vary. Like today I didn’t come into the showroom until 11:00 because I was at our corporate office because I had selected new carpet for them, we did the installation this weekend, and I went there this morning to oversee how everybody was feeling. Or I might be out on a photo shoot. There are other things I do outside of the showroom. So even though I’m here most of the time, there are also times when I’m not here.

CG: What type of jobs did you have before working at Interface?
KELLERT: Interior design.
CG: Commercial?
KELLERT: Commercial and health care. I did corporate for most of the time (about 5 years) and then 1.5 years doing health care.
CG: And what were your responsibilities then?
KELLERT: I did everything from space planning to drafting to plans to furniture and finish selection as well as interaction with the customer. So it was more full scope project work versus specializing.

TIME SPENT IN INTERFACE’S ATLANTA SHOWROOM

CG: If you had to break down the total percentage of your work week in the following locations (on average), where do you spend your time?

KELLERT: The percentage breakdown is:

- Showroom Area: 5%
- Office Area: 70%
- Kitchen Area: 5%
- Conference Room: 0%
- Outside of the showroom (traveling, etc.): 20%

(100% Total)
PARTICIPANT MCDONOUGH

GENERAL INFORMATION

CG: What is your official job title here?
MCDONOUGH: Regional Vice-President

CG: What do your general job responsibilities include?
MCDONOUGH: I manage the sales efforts for the southern part of the U.S., including the showroom management, not only the retail component but also to manage the commercial sales teams.

CG: How old are you?
MCDONOUGH: 45

EDUCATION

CG: What is the highest level of education you’ve completed?
MCDONOUGH: Bachelor’s degree

CG: What was your degree in?
MCDONOUGH: Industrial Engineering

WORK EXPERIENCE

CG: How long have you worked for Interface?
MCDONOUGH: 4 years

CG: How long have you been working in this showroom?
MCDONOUGH: 6 years (since it opened in 2004)

CG: How many hours, on average, do you spend each week in this showroom?
MCDONOUGH: 25 hours

CG: When you’re here for the 25 hours a week, are you here continuously or are you in and out a lot on a daily basis?
MCDONOUGH: Usually when I’m in Atlanta I’m here. I’m in and out some, but I’m mostly here.

CG: Prior to working at Interface, what other jobs have you had?
MCDONOUGH: I was with a company called Milliken as a sales person and as an engineer. So I was with them in two different capacities for eight years.
TIME SPENT IN INTERFACE’S ATLANTA SHOWROOM

CG: If you had to break down the time you spend in different areas of this showroom (the 25 hours each week as you indicated), where do you spend your time?

MCDONOUGH: The percentage breakdown would be:

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showroom Area</td>
<td>0%</td>
</tr>
<tr>
<td>Office Area</td>
<td>80%</td>
</tr>
<tr>
<td>Kitchen</td>
<td>0%</td>
</tr>
<tr>
<td>Conference Room</td>
<td>20%</td>
</tr>
</tbody>
</table>

(100% Total)

CG: And then the rest of the hours are spent traveling around the region or the US?
MCDONOUGH: Yes
PARTICIPANT WILSON

GENERAL INFORMATION

CG: How old are you?
WILSON: 44

CG: What is your official job title here?
WILSON: Business Development Specialist

CG: What do your general job responsibilities include?
WILSON: Picking up new business

EDUCATION

CG: What is the highest level of education you’ve completed?
WILSON: Bachelors degree

CG: What was your degree in?
WILSON: English

WORK EXPERIENCE

CG: How long have you worked for Interface?
WILSON: 4 years

CG: How long have you been working in this showroom?
WILSON: 3 years

CG: How many hours, on average, do you spend each week in this showroom?
WILSON: 30-40 hours

CG: When you’re here, are you here continuously or are you in and out a lot on a daily basis?
WILSON: I’ve been in and out a lot, but I will probably be in more with this new role

CG: Prior to working at Interface, what other jobs have you had?
WILSON: Sales with the Ritz Carlton and working at a children’s hospital
TIME SPENT IN INTERFACE’S ATLANTA SHOWROOM

**CG:** If you had to break down the time you spend in different areas of this showroom (the 30-40 hours each week as you indicated), where do you spend your time?

**WILSON:** The percentage breakdown is:

- Showroom Area: 30%
- Office Area: 30%
- Kitchen Area: 10%
- Conference Room: 20%

(100% Total)
PARTICIPANT BENYUS

Notes:
“Nature” is defined as:
Elements of the natural world, such as mountains, trees, plants, animals, and bodies of water

Examples of “interacting with nature” include:
Hiking in the wilderness, road biking through forested roads, being in a park, playing outdoor sports, being outside in a garden, etc.

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CG: Indicate your agreement with the following statements based upon the related scales:

1. I consider myself to have a deep appreciation of nature.
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

BENYUS: 5 – Strongly Agree

2. Currently, I make an effort to educate myself about nature-related issues (i.e.-water resources, plant or animal species, community parks, composting, etc).
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

BENYUS: 5 – Strongly Agree

CG: If you answered Strongly Agree or Agree to #2, what type of nature-related issue(s) you are educating yourself about and how you are obtaining this knowledge?

BENYUS: read national geographic, like to photograph certain things in nature (i.e. – moss growing on tree)

3. Currently, I spend the following amount of time “interacting with nature” each week (on average):
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
4. I would like to spend the following amount of time “interacting with nature” each week (on average).
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

   BENYUS: 5 – above 6 hours
   CG: How you would like to spend this time “interacting with nature?”
   BENYUS: Rafting, floating down a river

5. I spent the following amount of time “interacting with nature” each week (on average) during my childhood (age 7 to 18 years).
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

   BENYUS: 5 – above 6 hours
   CG: How did you “interact with nature” during your childhood?
   BENYUS: I grew up in rural Mississippi and my grandfather and mother had a farm where I spent a lot of time outdoors and collected eggs, rode in the tractor with Grandpa, etc.
Notes:
“Nature” is defined as:
Elements of the natural world, such as mountains, trees, plants, animals, and bodies of water

Examples of “interacting with nature” include:
Hiking in the wilderness, road biking through forested roads, being in a park, playing outdoor sports, being outside in a garden, etc.

CG: Indicate your agreement with the following statements based upon the related scales:

1. I consider myself to have a deep appreciation of nature.
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

BRAUNGART: 5 – Strongly agree

2. Currently, I make an effort to educate myself about nature-related issues (i.e., water resources, plant or animal species, community parks, composting, etc).
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

BRAUNGART: 3 – Undecided

3. Currently, I spend the following amount of time “interacting with nature” each week (on average):
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

BRAUNGART: 5 – above 6 hrs
CG: How do you typically interact with nature?
BRAUNGART: Playing with kids, hiking, reading outside, walking, swimming

4.
I would like to spend the following amount of time “interacting with nature” each week (on average).
1) 0 hrs
2) 1-2 hrs
3) 2-4 hrs
4) 4-6 hrs
5) above 6 hrs

BRAUNGART: 5 – above 6 hrs
CG: How you would like to spend this time “interacting with nature”?
BRAUNGART: Same as above

5.
I spent the following amount of time “interacting with nature” each week (on average) during my childhood (age 7 to 18 years).

(1) 0 hrs
(2) 1-2 hrs
(3) 2-4 hrs
(4) 4-6 hrs
(5) above 6 hrs

BRAUNGART: 5 – above 6 hrs
CG: How did you “interact with nature” during your childhood?
BRAUNGART: Playing outside in the neighborhood
Notes:
“Nature” is defined as:
Elements of the natural world, such as mountains, trees, plants, animals, and bodies of water

Examples of “interacting with nature” include:
Hiking in the wilderness, road biking through forested roads, being in a part, playing outdoor sports, being outside in a garden, etc.

CG: Indicate your agreement with the following statements based upon the related scales:

1. I consider myself to have a deep appreciation of nature.
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

KELLERT: 5, Strongly. Yes, in the spring time I go out and I watch things come out of the ground. They’ll be little things like this and my neighbors think I’m staring at dirt. There’s stuff going on at such a minute level that we pass by everyday. I’m more excited sometimes about the little things busting through the ground than the final flower. I don’t know why; it’s just that hopefulness of things starting I guess.

2. Currently, I make an effort to educate myself about nature-related issues (ie-water resources, plant or animal species, community parks, composting, etc).
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

KELLERT: I’ve got a compost pile. I haven’t been using it lately because I had a big tree fall in the backyard and it uprooted, but I try to do my best. However there’s always room for improvement and learning. So, I would say 4, agree.

CG: How you are obtaining this knowledge?
A lot of it comes through just my personal interest, like when I garden, reading, talking with other gardeners, watching shows that educate on how to take care of the planet.
A lot of it comes by default working for this company. There’s a lot of information we get here. For instance at our National Sales meeting that’s coming up we do a legacy day where we all break up into different teams and go out and do a project. In some cases its charity-type work, like paint or re-carpet a child care facility. Another year we cleaned up an estuary. So there times when you get an education like that just through doing things with the company.

3. Currently, I spend the following amount of time “interacting with nature” each week (on average):
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

KELLERT: I’d say 1 to 2 hours a day (that’s in the wintertime) and more in the spring.
CG: How do you typically interact with nature?
KELLERT: Gardening. I like to go on walks with my dog. Just being outside with friends.

4. I would like to spend the following amount of time “interacting with nature” each week (on average)?
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

KELLERT: I feel like right now I get a good balance. So probably the same as above, 1 to 2 hours a day. But like right now I’m feeling very cooped up. I don’t like how cold this winter has been. So, I would like to be out in nature more right now, yes. This winter felt really long and cold for some reason.

5. I spent the following amount of time “interacting with nature” each week (on average) during my childhood (age 7 to 18 years).
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

KELLERT: Above 6 hrs. I was out right when school got out and probably out until my mom called me around 8:30ish.
CG: What did this time “interacting with nature” during your childhood typically entail?
KELLERT: Playing, whether it was with neighborhood kids or riding bikes, swimming, playing softball and organized sports. On the weekend our family used to camp and do things like that. I was usually outdoors compared to kids today. It’s funny to me to think of sitting in front of a TV as a child.

CG: And was childhood for you in Oklahoma?
KELLERT: Yes.
Notes:
“Nature” is defined as:
Elements of the natural world, such as mountains, trees, plants, animals, and bodies of water

Examples of “interacting with nature” include:
Hiking in the wilderness, road biking through forested roads, being in a park, playing outdoor sports, being outside in a garden, etc.

CG: Indicate your agreement with the following statements based upon the related scales:

1.
I consider myself to have a deep appreciation of nature.
1) Strongly Disagree
2) Disagree
3) Undecided
4) Agree
5) Strongly Agree

MCDONOUGH: 4) Agree

2.
Currently, I make an effort to educate myself about nature-related issues (ie-water resources, plant or animal species, community parks, composting, etc).
1) Strongly Disagree
2) Disagree
3) Undecided
4) Agree
5) Strongly Agree

MCDONOUGH: 4) Agree

CG: If you answered Strongly Agree or Agree to #2, what type of nature-related issue(s) you are educating yourself about and how you are obtaining this knowledge?
MCDONOUGH: This is mostly internal Interface information because we do a lot education and learn how our product’s impact.
CG: How does Interface educate?
MCDONOUGH: It could be a weekly e-mail. There’s always a “What can you do?” type-thing. Not only about how our products fit, but what you can do personally?
3. Currently, I spend the following amount of time “interacting with nature” each week (on average):
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

   MCDONOUGH: 5) above 6 hrs
   CG: How do you typically interact with nature?
   MCDONOUGH: coaching sports outside with kids

4. I would like to spend the following amount of time “interacting with nature” each week (on average)?
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

   MCDONOUGH: 5) above 6 hrs
   CG: How would you like to spend this time “interacting with nature?”
   MCDONOUGH: I would like to spend more time exercising outside. I like to run outside, but don’t get to do it as much.

5. I spent the following amount of time “interacting with nature” each week (on average) during my childhood (age 7 to 18 years).
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs

   MCDONOUGH: 5) above 6 hrs
   CG: What did this time “interacting with nature” during your childhood typically entail?
   MCDONOUGH: sports, walking, and hiking
Notes:
“Nature” is defined as:
Elements of the natural world, such as mountains, trees, plants, animals, and bodies of water

Examples of “interacting with nature” include:
Hiking in the wilderness, road biking through forested roads, being in a part, playing outdoor sports, being outside in a garden, etc.

CG: Indicate your agreement with the following statements based upon the related scales:

1. I consider myself to have a deep appreciation of nature.
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

   WILSON: 4) Agree

2. Currently, I make an effort to educate myself about nature-related issues (ie-water resources, plant or animal species, community parks, composting, etc).
   1) Strongly Disagree
   2) Disagree
   3) Undecided
   4) Agree
   5) Strongly Agree

   WILSON: 2) Disagree. You know, I love watching nature shows with my kids, but it’s not like I read books on that stuff. So I would say 2.

3. Currently, I spend the following amount of time “interacting with nature” each week (on average):
   1) 0 hrs
   2) 1-2 hrs
   3) 2-4 hrs
   4) 4-6 hrs
   5) above 6 hrs
WILSON: It depends. In the winter I would say it’s zero. When it’s warm it’s probably 2 to 4 hours per day. As much as I can in the Summer or Spring. It totally depends on the weather.

CG: What would this time interacting with nature entail when it’s not cold outside?

WILSON: running, biking, reading outside

4.
I would like to spend the following amount of time “interacting with nature” each week (on average).
1) 0 hrs
2) 1-2 hrs
3) 2-4 hrs
4) 4-6 hrs
5) above 6 hrs

WILSON: About the same amount of time as stated above, 2 to 4 hours each day.

5.
I spent the following amount of time “interacting with nature” each week (on average) during my childhood (age 7 to 18 years).
1) 0 hrs
2) 1-2 hrs
3) 2-4 hrs
4) 4-6 hrs
5) above 6 hrs

WILSON: 5) above 6 hrs. I used to spend as much time outside as I could. I used to sit in my hammock in my backyard and just look up in the trees. I used to spend a lot of time outside.

CG: So where did you grow up?

WILSON: Nashville.

CG: Where you involved with anything growing up that would get you outside more than the average person?

WILSON: Not really. I mean I ran, but not a lot. I danced, but that would be inside.
APPENDIX L

CONTENT ANALYSIS
Table A.6. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Observation</th>
<th>What caused experience</th>
<th>How experience made them think, feel, or act</th>
<th>Data Source</th>
<th>Biophilic Design Attribute(s) that facilitated nature connection (D, I, S) or vernacular connection (V)</th>
<th>Aspect of the built environment that facilitated experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benyus 27</td>
<td>sunlight streaming</td>
<td>1</td>
<td>Natural Light (D)</td>
<td>window (floor to ceiling)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 26</td>
<td>Sun shining</td>
<td>1</td>
<td>Light as shape &amp; form (D)</td>
<td>window (floor to ceiling)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 25</td>
<td>Super graphic wall with carpet display</td>
<td>1</td>
<td>visually interesting</td>
<td>Information Richness (S)</td>
<td>large-scale super graphic (as an architectural element)</td>
<td></td>
</tr>
<tr>
<td>Benyus 24</td>
<td>plants</td>
<td>1</td>
<td>lush feeling of being outside in nature</td>
<td>indoor plants planted in atrium at floor-level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 23</td>
<td>FLOR Graphic (front porch with surfboard, plants, wood sided house)</td>
<td>1</td>
<td>feel like I could just walk up &amp; have a seat on this porch</td>
<td>Pictorial expression of nature (S)</td>
<td>large-scale super graphic (with image of tropical porch scene)</td>
<td></td>
</tr>
<tr>
<td>Benyus 22</td>
<td>Light fixtures (large lamp shades housing fluorescent lighting)</td>
<td>1</td>
<td>Size and scale of the lamp shades creates interest</td>
<td>Central Focal Point (S)</td>
<td>large-scale, round light fixtures</td>
<td></td>
</tr>
</tbody>
</table>

"Table A.6. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews."
Table A.6 cont. The Author's Content Analysis of Participants' Experience Document Forms and Interviews.

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<tr>
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<th>How experience made them think, feel, or act</th>
<th>Experience classified based on Kellert's classification system of biophilic design</th>
<th>Author's Assessment of Participant's Experience</th>
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</thead>
<tbody>
<tr>
<td>Benyus 21</td>
<td>Bamboo flooring &amp; wood case pieces</td>
<td>1 Both are true representations of nature inside</td>
<td>1 Natural Materials (I)</td>
<td>natural materials as finish materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 19-18</td>
<td>Architectural Elements (round lampshades)</td>
<td>1 Curved lines more common in nature</td>
<td>1 Shapes resisting straight lines and light angles (I)</td>
<td>round light fixtures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 17</td>
<td>Architectural Elements (curved wall)</td>
<td>1 Curved lines more common in nature</td>
<td>1 Shapes resisting straight lines and light angles (I)</td>
<td>curved walls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 16</td>
<td>View from Kitchen to Outside</td>
<td>1 connection to the outside world</td>
<td>2 Views and vistas (D)</td>
<td>window (3 feet A.F.F. or higher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 15</td>
<td>Gold shimmering curtain highlighted by lights, creating a warm sparkle</td>
<td>1 Brings warmth and visual interest to area - suggestion of sunlight 'shimmering'</td>
<td>1 Color (S)</td>
<td>translucent, gold shimmering curtain fabric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 14</td>
<td>View from our conference room</td>
<td>1 makes me feel more in touch with the world</td>
<td>2 Views and vistas (D)</td>
<td>window (3 ft. A.F.F. or higher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 13</td>
<td>Open Floor Plan (work space)</td>
<td>1 Enjoyable to be in space</td>
<td>1 Space (S)</td>
<td>open space plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 12</td>
<td>Light shining in</td>
<td>1 Great to have natural light</td>
<td>1 Natural light (D)</td>
<td>window (3 feet A.F.F. or higher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benyus 11</td>
<td>Auto light in supply room</td>
<td>1 not so much a &quot;connection to nature&quot; as much as it is a technology that facilitates environmental stewardship</td>
<td>2 Mastery &amp; control (S)</td>
<td>automatic lighting technology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table A.6 cont. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Participant’s Assessment of Experience</th>
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<th>Biophilic Design Attribute(s) that facilitated nature connection (D, I, S) or vernacular connection (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braunart</td>
<td>Open work area</td>
<td>Experience classified based on Kellert’s classification system of biophilic design</td>
<td>Aspect of the built environment that facilitated experience</td>
</tr>
<tr>
<td>Braunart</td>
<td>Positive and negative</td>
<td>Spaciousness (S)</td>
<td>Open space plan (related to personal interactions)</td>
</tr>
<tr>
<td>Braunart</td>
<td>Enjoy free-flowing ideas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>personal enjoyment of workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>very loud</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>no privacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>low visual and acoustical privacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>deal with the privacy issues just by leaving when we get a phone call</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>being surrounded by computers, documents, etc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>Kitchen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>the fact that the kitchen is open on 3 out of the 4 sides makes it feel open</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>space and discuss with friends in an open environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>social interaction and business happen here</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>The social component of the kitchen adds a lot to the environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>filtered water machine (filtered water instead of water bottles)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>another item in the space that fosters environmental stewardship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>No plastic bottles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>Recycle Bins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>Pleased that we recycle glasses, plastic, cans, and office paper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braunart</td>
<td>Bays Separated</td>
<td>Spaciousness (S)</td>
<td>Open space plan (in showroom)</td>
</tr>
<tr>
<td>Braunart</td>
<td>it’s (the showroom) totally open, but can be somewhat closed off with panels that lower down</td>
<td></td>
<td>Separated bays</td>
</tr>
<tr>
<td>Braunart</td>
<td>The material that is used in the separated bays (bamboo = natural material)</td>
<td></td>
<td>Natural Materials (I)</td>
</tr>
<tr>
<td>Braunart</td>
<td>The space is free-flowing, yet separate (the same concept as the parts are different, but the whole is cohesive)</td>
<td></td>
<td>Integration of parts to wholes (S)</td>
</tr>
<tr>
<td>Braunart</td>
<td>Overall in showroom: a variety of shapes, colors, textures, and materials integrate to create a complete whole</td>
<td></td>
<td></td>
</tr>
</tbody>
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<tbody>
<tr>
<td>9 Braungart</td>
<td>Lighting</td>
<td>1 Natural lighting is the most prominent, nicest form of lighting in the space. 2 Great design for making customers feel important &amp; cool open area, a nice, pleasant space when the curtain is closed, the space still feels open since it’s a translucent material feel protected behind the curtain, but you can still see what is going on in the entire showroom</td>
<td></td>
<td>Natural Light (D) Spaciousness (S) Presentation Space</td>
<td>window (floor-to-ceiling)</td>
</tr>
<tr>
<td>10</td>
<td>Presentation Space</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kellert</td>
<td>Personal work space that is mine that I go to everyday</td>
<td>1 I enjoy having a “home away from home.” creates a sense of community that you belong here</td>
<td></td>
<td></td>
<td>dedicated personal work space</td>
</tr>
<tr>
<td>1</td>
<td>Working Showroom</td>
<td>1 I enjoy the fact that customers can come to our showroom to work on real projects. This makes the overall experience good for everyone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Kellert</td>
<td>one-stop kind of shop</td>
<td>1 can’t really tie to nature so to speak, but it does tie to interaction with customers experience of working with the customer much quicker, more efficient, much more pleasant</td>
<td></td>
<td></td>
<td>Not Applicable - relates to the business function of the space</td>
</tr>
<tr>
<td>3 &amp; 10</td>
<td>open space plan</td>
<td>1 enjoy working in a space that is open</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kellert</td>
<td>open versus enclosed offices and enclosed space</td>
<td>2 provides a nice area to take a break and walk around after sitting</td>
<td></td>
<td>Spaciousness (S)</td>
<td>open space plan</td>
</tr>
<tr>
<td></td>
<td>the vistas; being able to see beyond the perimeter of the building, seeing what’s going on; you can just see movement and life outside of this space.</td>
<td>2 if this was not a window wall this space would feel completely different. feels like there’s activity and life.</td>
<td></td>
<td>Views &amp; vistas (D) Windows (floor-to-ceiling)</td>
<td>windows (floor-to-ceiling)</td>
</tr>
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<tbody>
<tr>
<td>Kellert</td>
<td>4</td>
<td>Recycling bins</td>
<td>1</td>
<td>one outward example of a bigger concept about what is happening within this company</td>
<td>2</td>
<td>Experience classified based on Kellert’s classification system of biophilic design</td>
<td>1 Spirit of Place (V) designated recycling area</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I like the fact our company takes the time to provide programs such as recycling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>it’s more connected to a concept that we care about nature</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>allows us all to play a role in sustainability (even if it is on a smaller scale)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kellert</td>
<td>5</td>
<td>Beautiful architecture</td>
<td>1</td>
<td>helps promote a pleasant feeling about the space you work in</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I’ve just always loved that. working in a place that I find attractive, not in a sense of superficial, but just beautiful, comfortable, and with things that work. That’s pleasing to me.</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>elegant, subtle arc in the space</td>
<td>2</td>
<td>love that curved wall love that there’s this beautiful elegant curve in the middle of this very rectangular space</td>
<td>2</td>
<td></td>
<td>Shapes resisting straight lines and right angles (S) curved wall (presentation area)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I love the way the light hits there</td>
<td>2</td>
<td></td>
<td>2 Natural Light (D) window (3’ A.F.F. and higher)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I also like that it’s got our convert, which is our recycled story happening along this wall too</td>
<td>2</td>
<td></td>
<td>2 Spirit of place (V) photographs of carpet-recycling process (which illustrate interface’s mission)</td>
<td></td>
</tr>
<tr>
<td>Kellert</td>
<td>6</td>
<td>Natural Light</td>
<td>1</td>
<td>it (natural light) connects one to nature in many ways by letting you know what time of day and even what time of year it is</td>
<td>1</td>
<td></td>
<td>1 Natural Light (D) windows (floor-to-ceiling)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>exchange of looking out and light coming in</td>
<td>2</td>
<td></td>
<td>2 Views and vistas (D)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>there’s room for a shadow to make a statement</td>
<td>2</td>
<td></td>
<td>2 Light &amp; shadow (D) Spaciousness (S)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I like to see the light travel throughout the space</td>
<td>2</td>
<td></td>
<td>2 Light as shape &amp; form (S) open space plan in showroom area</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>gives you a sense of time</td>
<td>2</td>
<td></td>
<td>2 Growth &amp; offlorescence (S) windows (floor-to-ceiling)</td>
<td></td>
</tr>
</tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Experience classified based on Kellert’s classification system of biophilic design</td>
<td></td>
<td>Aspect of the built environment that facilitated experience</td>
</tr>
<tr>
<td>Kellert 7</td>
<td></td>
<td>Store Front</td>
<td>1. storefront ties us to nature and all the pedestrians on the street</td>
<td>1</td>
<td>Views and vistas (D)</td>
<td>Windows (floor-to-ceiling)</td>
<td>2</td>
</tr>
<tr>
<td>Kellert 8</td>
<td></td>
<td>Natural Materials</td>
<td>1. I enjoy being around natural elements</td>
<td>1</td>
<td>Natural Materials (I)</td>
<td>Natural materials as finish materials</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. It brings in a warmth to the overall space</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Kellert 9</td>
<td></td>
<td>Beautiful art (graphics)</td>
<td>1. really cool juxtaposition of a heavy element that appears to be lightweight and floating</td>
<td>2</td>
<td>I love that the design firm took a really big heavy element and make it feel light</td>
<td>Dynamic balance &amp; tension (S)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. large-scale super graphic (as architectural element with theme related to interface’s mission)</td>
<td></td>
<td>Spirit of place (V)</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Spatial harmony (S)</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

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Table A.6 cont. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews.

<table>
<thead>
<tr>
<th>Participant</th>
<th>What caused experience</th>
<th>Experience classified based on Kellert’s classification system of biophilic design</th>
<th>Aspect of the built environment that facilitated experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonough</td>
<td>Retail component for walk in</td>
<td>Not Applicable. What caused the pleasing/ enjoyable moment was more of a characteristic of the purpose behind the retail portion of the store (but location in pedestrian-friendly area is key to this enjoyable moment).</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>people stumbling in off the street</td>
<td>Not Applicable. What caused the pleasing/ enjoyable moment was more of a characteristic of the purpose behind the retail portion of the store (but location in pedestrian-friendly area is key to this enjoyable moment).</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>Kitchen to entertain</td>
<td>Very supportive of the fact that we are jemmied in there together there’s a lot of coincidences and camaraderie here</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>Working closely with great people</td>
<td>Very supportive of the fact that we are jemmied in there together there’s a lot of coincidences and camaraderie here</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>We get to see the outside</td>
<td>Not Applicable. What McDonough really finds enjoyable are coworkers in the showroom. Therefore, this wasn’t classified as a type of connection because the built environment didn’t create the aura of what he enjoyed in this moment. It was the people.</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>Great Furnishings</td>
<td>This goes back to the DNA of Interface because the furnishings are refurbished which is part of the LEED criteria</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>Great area to tell the story</td>
<td>To me, that wall that whole presentation area tells our environmental story so well</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>5 &amp; 6 Great area to tell the story</td>
<td>This boils it down to one component and that’s to get off oil is connection to nature because the option if we don’t do that, is that just gets thrown in the landfill also a connection to nature because the option if we don’t do that, is that just gets thrown in the landfill</td>
<td></td>
</tr>
<tr>
<td>McDonough</td>
<td>5 &amp; 6 Great area to tell the story</td>
<td>Integration of culture &amp; ecology (V) Photographs of carpet recycling process (which illustrate Interface’s mission)</td>
<td></td>
</tr>
</tbody>
</table>

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Table A.6 cont. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Photograph Number</th>
<th>What caused experience</th>
<th>Data Source</th>
<th>How experience made them think, feel, or act</th>
<th>Data Source</th>
<th>Author’s Assessment of Participant’s Experience</th>
<th>Biophilic Design Attribute(s) that facilitated nature connection (D, I, S) or vernacular connection (V)</th>
<th>Aspect of the built environment that facilitated experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonough</td>
<td>6</td>
<td>Outside view from the office</td>
<td>1</td>
<td>I can see both ways (down Spring Street) – I can see both ways (down Spring Street) – last everything.</td>
<td>2</td>
<td>Views and vistas (D)</td>
<td>Views and vistas (D)</td>
<td>windows (3 ft. A.F.F. and above)</td>
</tr>
<tr>
<td>McDonough</td>
<td>7</td>
<td>Outside view from the sofa</td>
<td>1</td>
<td>You see people going by</td>
<td>2</td>
<td>Views and vistas (D)</td>
<td>Views and vistas (D)</td>
<td>windows (floor to ceiling)</td>
</tr>
<tr>
<td>McDonough</td>
<td>9</td>
<td>Conference room with a great view</td>
<td>1</td>
<td>I’m already sitting in this cool space and they’re stuck at a red light at Spring and 5th</td>
<td>2</td>
<td>Prospect and Refuge (S)</td>
<td>Furniture arranged for outside views</td>
<td>furniture arranged for outside views</td>
</tr>
<tr>
<td>Wilson</td>
<td>1</td>
<td>Sun shining across building out our windows</td>
<td>1</td>
<td>Now it’s pleasing to sit there...it’s a space that’s come a long way in it’s time.</td>
<td>2</td>
<td>Views and vistas (D)</td>
<td>Views and vistas (D)</td>
<td>windows (3 ft. A.F.F. or higher)</td>
</tr>
<tr>
<td>Wilson</td>
<td>2</td>
<td>Flag flying in sun</td>
<td>1</td>
<td>It made me feel warm.</td>
<td>1</td>
<td>Warm light (D)</td>
<td>Views and Vistas (D)</td>
<td>Natural light (D)</td>
</tr>
<tr>
<td>Wilson</td>
<td>2</td>
<td>As I looked out the window, I noticed the American Flag flying straight out</td>
<td>1</td>
<td>It made me think of how blessed I am/we are to live in such a great country, be free and have a great job.</td>
<td>2</td>
<td>Historic connection to place (V)</td>
<td>Historic connection to place (V)</td>
<td>windows (floor to ceiling)</td>
</tr>
</tbody>
</table>
### Table A.6 cont. The Author's Content Analysis of Participants' Experience Documentation Forms and Interviews.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Paragraph</th>
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<th>Aspect of the built environment that facilitated experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilson</td>
<td>3</td>
<td>Conference room on phone - looking outside at the beautiful day</td>
<td>such a great environment</td>
<td>Views and vistas (D) windows (3 ft. A.F.F. or higher) glass walls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Because of the all glass walls and windows everywhere, we can see the sunny day as we work</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilson</td>
<td>4/10</td>
<td>View from Van der Ryn's desk (where I often sit)</td>
<td>I can see outside from my desk</td>
<td>Views and vistas (D) windows (3 ft. A.F.F. or higher)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Because the walls to my office are glass and there are so many windows, I constantly feel connected to nature.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>glass interior walls</td>
<td>feels open and airy instead of small, closed in offices where I feel boxed in</td>
<td>Spaciousness (E) glass walls</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>glass offices are awesome because they do give you a sense of privacy but don't make you feel closed in</td>
<td></td>
</tr>
<tr>
<td>Wilson</td>
<td>5</td>
<td>View when I'm on couch where I make calls</td>
<td></td>
<td>window (floor to ceiling) furniture arranged for outside views</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I just love this</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I've always been an unconventional studier</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>for me it's better - I can just think better</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>But it's such a big space too. It's sort like I have to go sit in a phone booth</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>but if we were just the couch with no window, it would be ruined. So they play into each other</td>
<td></td>
<td></td>
</tr>
</tbody>
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**Table A.6 cont. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews.**

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</tr>
</thead>
<tbody>
<tr>
<td>Wilson</td>
<td>6</td>
<td>View from conference table in main showroom - Seeing a dog out the window in front of our building</td>
<td>1</td>
<td>Love that you can see and be a part of this very urban community - people living and working in same area</td>
<td>1</td>
<td>Views and vistas (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>it’s not normal to see a dog in a business environment</td>
<td>2</td>
<td>Animals (D)</td>
</tr>
<tr>
<td>Wilson</td>
<td>7</td>
<td>Hanging out in kitchen - sitting on counter (as if at home) on phone and looking outside</td>
<td>1</td>
<td>you can look out the window</td>
<td>2</td>
<td>Views and vistas (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sitting on kitchen counter while talking to customers with the natural light streaming in is so fun</td>
<td>1</td>
<td>Natural light (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I love that I can be in a kitchen setting, for some reason that’s comforting</td>
<td>2</td>
<td>Spirit of place (V)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Security &amp; protection (S)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Affection &amp; attachment (S)</td>
</tr>
<tr>
<td>Wilson</td>
<td>8</td>
<td>Working at drop in stations - enjoying scenery</td>
<td>1</td>
<td>Lots of natural light</td>
<td>1</td>
<td>Natural light (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I can look through the kitchen to the outside</td>
<td>1</td>
<td>you can look through the window and just see other stuff</td>
</tr>
</tbody>
</table>
Table A.6 cont. The Author’s Content Analysis of Participants’ Experience Documentation Forms and Interviews.

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</tr>
</thead>
<tbody>
<tr>
<td>Wilson</td>
<td>Choosing tiles to send to a customer - able to do this with a view - stop, think and look out window</td>
<td>I have lots of natural light which helps me really see the textures and colors of the tiles. Our samples can look different in different light. And so if we were looking at them with just fluorescent lights I think it would be very difficult.</td>
<td>1</td>
<td>Natural light (D)</td>
<td>1</td>
</tr>
<tr>
<td>Wilson</td>
<td>As I am doing this, I glance out the window periodically.</td>
<td>Makes me feel free - not so constrained</td>
<td>1</td>
<td>Views and vistas (D)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>And as I looked out I just got little glimpses of trees and the sun and it just . . . even when you’re doing your daily stuff it just . . . somehow it makes you feel good. It affects you and your mood.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 - Experience Documentation Form
2 - Participant Interview
(D) - Direct
(I) - Indirect
(S) - Symbolic
LIST OF REFERENCES


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Christina Gullikson received a Bachelor of Science degree in Geology from Furman University in 2003. Her professional experience involves working on environmental site assessments and soil and groundwater investigations. She passed the LEED-CI exam in June 2009 to become a LEED AP in commercial interiors. This thesis concludes her work towards obtaining her Master of Fine Arts degree in Interior Design from Florida State University. After obtaining her MFA degree, Christina plans on translating theory into professional practice by working on biophilic design projects.