

**Hospital Healing Garden Design and Emotional and Behavioral
Responses of Visitors and Employees**

by

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Abstract

Despite the growing interest in healing gardens in hospitals which began in the 1990's, there has been a major lack of a generalized measure to assess perceptions of specific design elements in healing gardens. Although much speculation exists that a well-designed healing garden may have the ability to bring about positive emotional and behavioral outcomes, few studies have empirically addressed these outcomes. The current study applies recommendations for key healing garden design elements derived from numerous published sources to the development and testing of an instrument which assesses individuals' perceptions of key healing garden design elements. Further, based on Roger Ulrich's (1999) Theory of Supportive Gardens, this study establishes a conceptual model that explains the influences that garden visitors' perceptions of key healing garden design elements have on their satisfaction with the garden, which in turn leads to satisfaction with the hospital and positive behavioral intentions toward the healing garden as well as the hospital. This study empirically tests this model using data collected from a survey with a sample of hospital visitors (i.e., family and friends of patients) and employees recruited from two hospitals in Alabama. Results reveal that hospital visitors' perceptions of healing garden design consist of four factors: (a) Privacy, Social Support, and Control; (b) Natural Distractions; (c) Movement and Exercise; and (d) Accessibility. Further, visitors' data supported the conceptual model by demonstrating a significant positive influence of perceived healing garden design, particularly privacy, social support, and control, on hospital visitors' satisfaction with the healing garden, which in turn positively influenced their

satisfaction with the hospital and intentions to revisit and recommend the healing garden and the hospital. Due to the small sample size which weakened the statistical power, the same relationships were not found significant among hospital employees.

This study provides key contributions to the literature through the development and testing of a scale which assesses individuals' perceptions of key healing garden design elements. This study also offers applicable information to healing garden designers by investigating the relative importance of various design elements in healing gardens. Additionally, the study addresses the process by which consumers experience emotional and behavioral responses to the healing garden and the hospital as a whole. The findings of this study provide further support for Roger Ulrich's (1999) Theory of Supportive Gardens and highlight the importance of the inclusion of healing gardens in hospitals.

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Table of Contents

Abstract	ii
Acknowledgments	iv
List of Tables	vii
List of Illustrations	ix
Chapter 1. Introduction	1
Background and Problem Statement	1
Statement of Objectives	4
Definition of Terms	5
Chapter 2. Review of Literature	9
History of Gardens in Healthcare	9
Biophilia	11
Healing Garden Effects: Theory of Supportive Gardens	12
Healing Garden Design	15
Satisfaction with and Behavioral Intention toward the Healing Garden	18
Satisfaction with and Behavioral Intention toward the Hospital	30
Chapter 3. Methodology	33
Research Design	33
Sampling and Data Collection Procedures	45

Chapter 4. Results	52
Sample Characteristics	52
Visitor Sample Results	54
Employee Sample Results	70
Chapter 5. Discussion	75
Key Healing Garden Design Elements	75
Satisfaction with and Behavioral Intention toward the Healing Garden	80
Satisfaction with and Behavioral Intention toward the Hospital	81
Employees’ Responses Related to the Healing Garden	82
Significance of the Study	83
Limitations of the Study	85
References.....	89
Appendix A Visitor Survey	96
Appendix B Employee Survey	104
Appendix C Table for Re-Coded “Not Applicable, N/A” Garden Perception Items	114
Appendix D Approved IRB Protocols	119
Appendix E Information Letters Used for the Paper-Based and Online Surveys	132

List of Tables

Table 2.1 A Pool of Perceived Healing Garden Design Feature Items	19
Table 3.1 Measurement for Perceptions of the Five Key Healing Garden Design Elements.....	35
Table 3.2 Measurements for Satisfaction with the Hospital	38
Table 3.3 Measurements for Behavioral Intentions toward the Hospital	40
Table 3.4 Covariate Measures	42
Table 3.5 Items with the “Not Applicable” Response Recoded	51
Table 4.1 Descriptive Statistics of Sample Characteristics from UAB and Madison Hospitals	53
Table 4.2 EFA Results of the <i>A Priori</i> Dimension, Sense of Control	56
Table 4.3 EFA Results of the <i>A Priori</i> Dimension, Access to Privacy	57
Table 4.4 EFA Results of the <i>A Priori</i> Dimension, Social Support	57
Table 4.5 EFA Results of the <i>A Priori</i> Dimension, Movement and Exercise	58
Table 4.6 EFA Results of the <i>A Priori</i> Dimension, Natural Distractions.....	58
Table 4.7 Initial EFA Results with 38 Perceived Healing Garden Design Items	59
Table 4.8 Final EFA Results: The 4-Factor, 29-Item Perceived Healing Garden Design Scale	62
Table 4.9 Visitors’ Descriptive and Correlation Statistics of Variables Addressed by RQ2	64
Table 4.10 Visitors’ Descriptive Statistics of Satisfaction with the Hospital and Behavioral Intentions toward the Healing Garden and the Hospital	66
Table 4.11 Employees’ Descriptive and Correlation Statistics of Variables Addressed by RQ2 ...	70

Table 4.12 Employees' Descriptive Statistics of Satisfaction with the Hospital and Behavioral Intents toward the Healing Garden and the Hospital	71
Table 4.13 Regression Results Controlling for Covariates	72

List of Illustrations

Figure 1.1 A Proposed Research Model	5
Figure 3.1 Photographs of Healing Garden at UAB Hospital in Birmingham, Alabama	46
Figure 3.2 Photographs of Healing Garden at Madison Hospital in Madison, Alabama	49
Figure 4.1 Visitor Data Results Related to Relationships Proposed in Research Questions	69

CHAPTER 1: INTRODUCTION

Background and Problem Statement

Representing \$2.6 trillion in expenditures in 2010 and anticipated growth in excess of 3% per year, healthcare in the United States is a vast industry (United States Department of Health and Human Services, 2011). An increasingly important trend in healthcare today has been a focus on *quality of life, wellbeing, and healing* (Mitrione & Larson, 2007, p. 1). With the busy lifestyles of Americans resulting in stress and other related illnesses, a renewed interest in more alternative forms of care, including “designed natural environments” in healthcare facilities, has arisen (Mitrione & Larson, 2007, p. 1). In keeping with the revived awareness of the relationship between designed natural environments and health, hospital managers have begun to incorporate *healing gardens* within the hospital environment (McKahan, 1997; Mitrione & Larson, 2007).

Consistent with Roger Ulrich’s (1991) Theory of Supportive Design, which posits that hospital environments should provide supportive design attributes including access to nature, a *healing garden* is a designated green space within a health care facility that is designed to influence visitors in a positive way (Cooper Marcus & Barnes, 1999; Relf, 2005; Stigsdotter & Grahn, 2003). According to Ulrich’s (1999) Theory of Supportive Gardens, a healing garden will be most successful in positively influencing visitors when it provides five key design elements. The five key healing garden design elements include a sense of control, access to privacy, social support, movement and exercise, and natural distractions (Ulrich, 1999). Healing gardens are intended to be places for individuals to relax, connect with nature, and ease the negative feelings that are often associated with the hospital environment (Whitehouse et al., 2001). Healing gardens may be located in an indoor or outdoor setting on a hospital campus and may vary in

size from a 1,000 square foot interior space to several outdoor acres (Cooper Marcus & Barnes, 1999).

Although healing gardens have become such a visible trend in health care design, little academic research has examined their effectiveness, with only a few exceptions (e.g., Sherman, Varni, Ulrich, & Malcarne, 2005; Whitehouse et al., 2001). Several researchers have conducted literature reviews regarding healing gardens (e.g. Bowers, 2003; Irvine & Warber, 2002); however, they have typically compiled literature from many areas that do not specifically apply to healthcare research or meet its rigorous standards (Relf, 2005). The lack of formal research providing credible evidence for the benefits of healing gardens in healthcare facilities is a major problem preventing their implementation (Relf, 2005). According to Relf (2005):

Perhaps the greatest hindrance to wider application of healing gardens and horticultural therapy in health care is the lack of documentation of the efficacy of these techniques utilizing medically acceptable research methods . . . Practitioners in horticultural therapy and users of healing gardens tend to write and lecture on their benefits without research-based documentation on the efficacy, in the mistaken belief that the benefits and efficacy are so obvious that further documentation is not required (p. 235).

Despite the lack of empirical studies that may be directly applicable to healthcare researchers, a few researchers have begun to pave the way for providing descriptive evidence for the benefits of healing gardens (e.g., Cooper Marcus & Barnes, 1999; Sherman et al., 2005; Whitehouse et al., 2001). Cooper Marcus and Barnes (1999) published a book providing healing garden design recommendations based on descriptive post-occupancy evaluations at healing gardens throughout the nation. However, based on the relatively new concept of investigating healing gardens as an area of research, the authors did not engage in empirical research. Another

study conducted by Whitehouse et al. (2001) also reported that most visitors to an outdoor healing garden at a children's hospital experienced positive changes in mood and higher levels of satisfaction with the hospital after visiting the garden; however, this study was also limited by the descriptive nature of the data since the mood and satisfaction changes were not empirically tested. Sherman et al.'s (2005) study provided preliminary empirical support for a positive relationship between use of the hospital healing garden and health-related quality of life, but the generalization of the findings is limited due to the small sample size ($n = 22$). Additionally, previous researchers have not developed or validated an instrument that can be used to accurately measure perceptions of key healing garden design elements.

Therefore, major gaps exist in the literature regarding healing gardens, including (1) a lack of validated instruments assessing healing garden users' perceptions of key design elements, which allow for empirical investigation on the effectiveness of varying healing garden design elements, (2) a lack of empirical studies on effects of healing gardens, (3) a lack of research that links the emotional (e.g., satisfaction with the garden, satisfaction with the hospital) and behavioral (e.g., healing garden visit intention, behavioral intent toward the hospital) responses toward the healing garden and the hospital, and (4) a lack of comprehensive examination of responses to healing gardens among different types of users (e.g., visitors and employees of hospitals). To justify the space required for a healing garden, it is crucial for healthcare designers to have sufficient empirical research evidence for the benefits that these spaces provide (Relf, 2005).

Statement of Objectives

In order to address the aforementioned research need, the goal of this study was (a) to develop and validate an instrument to assess healing garden users' perceptions of the five key healing garden design elements, proposed by Ulrich (1999) and (b) to assess emotional and behavioral responses to healing gardens and to the hospitals providing the healing gardens among two user groups: visitors and employees of the hospital. This study endeavored to achieve these goals by examining the research model presented in Figure 1.1 which addressed the following specific objectives:

1. To determine different features characterizing the key design elements of healing gardens from garden users' perspectives.
2. To assess the relationships between users' perceptions of the key healing garden design elements and their (a) overall satisfaction with the healing garden (i.e., emotional response to the garden) and (b) future behavioral intentions toward the healing garden (including intention to return to the garden and intention to recommend the garden to others).
3. To determine if overall satisfaction with the healing garden mediates the relationship between satisfactions with the key design elements of the healing garden and behavioral intent toward the healing garden.
4. To determine if a significant relationship exists between overall satisfaction with the healing garden and satisfaction with and behavioral intention toward the hospital among the visitor and employee groups. Specifically, the current study sought to determine if overall satisfaction with the garden is significantly related to hospital visitors' satisfaction with the hospital, intentions to return to the hospital for their own

future care, and intention to recommend the hospital to others; and (c) hospital employees' job satisfaction, intention to leave their job, and intention to recommend the hospital to others seeking a job.

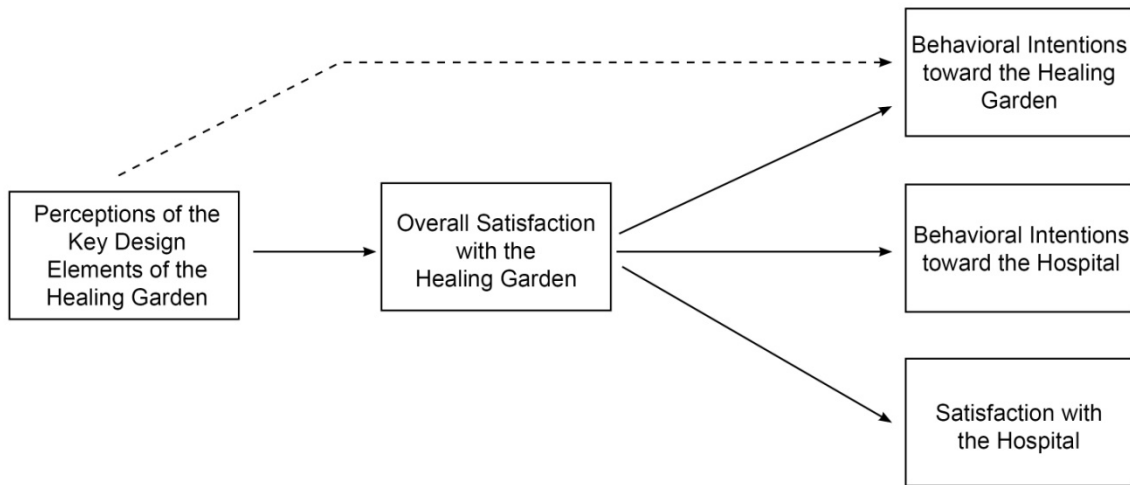


Figure 1.1 A proposed research model. Note. The dashed arrow indicates a relationship that is predicted to be mediated by Overall Satisfaction with the Healing Garden

Definition of Terms

Behavioral Intention: the likelihood an individual assigns to performing a particular task in the future (Fishbein & Ajzen, 1975)

Behavioral Intentions toward the Healing Garden: the likelihood an individual assigns to returning to the healing garden when on the hospital's campus at a future time

Behavioral Intentions toward the Hospital: an individual's subjective assessment of the likelihood that he or she would engage in a certain behavior toward the hospital. In this study, behavioral intentions toward the hospital include (1) visitors' intent to return to the hospital for future care, (2) visitors' intent to recommend the hospital to others, (3) hospital employees'

intent to remain in their job, and (4) hospital employees' intent to recommend their employer (i.e., their hospital) to others.

Biophilia: the instinctive need of human beings to be close to living things (Wilson, 1993)

Healing garden: a designated green space within a health care facility that is designed to influence visitors to the garden in a positive way (Cooper Marcus & Barnes, 1999; Relf, 2005; Stigsdotter & Grahn, 2003)

Intent to Return to the Hospital for Future Care: the likelihood that an individual will return to the same hospital when future hospital care is needed. This variable was measured among the visitor sample.

Intent to Recommend the Hospital to Others: the likelihood that an individual will recommend the hospital to others needing hospital care. This variable was addressed among visitors.

Intent to Remain in One's Job: an employee's subjective assessment of the likelihood that they will stay in their place of employment in the future (Vandenberg & Nelson, 1999). This variable was addressed among hospital employees.

Intent to Recommend One's Employer to Others: an employee's subjective assessment of the likelihood that they would recommend their employer to others seeking a job (Vandenberg & Nelson, 1999). This variable was addressed among hospital employees.

Job Satisfaction: a pleasurable feeling of fulfillment that an individual feels toward their job as a whole (Adams & Bond, 2000). This variable was addressed among hospital employees.

Key Healing Garden Design Elements: key benefits for users that should be considered in designing a healing garden. Following literature recommendations, this study originally conceptualized the following five key healing garden design elements:

- ***Sense of control:*** an individual's perception of his or her own ability to have power over what they do (Gatchel et al., 1989; Ulrich, 1999)
- ***Access to privacy:*** the likelihood that the garden provides places for individuals to be alone without others' scrutiny (Ulrich, 1999)
- ***Social support:*** the perceived emotional help individuals receive through interacting with other people in the garden (Brannon & Feist, 1997; Ulrich, 1999)
- ***Movement and exercise:*** the opportunity for individuals to engage in physical activity within the garden (Ulrich, 1999)
- ***Natural distractions:*** the opportunity to reduce stress through natural environmental features that have restorative influence (Ulrich, 1999).

Overall Satisfaction with a Healing Garden: a pleasurable feeling of fulfillment derived from experience with a healing garden (Oliver, 2010). This variable was addressed among all visitors and hospital employees.

Perceptions of the Key Healing Garden Design Elements: Individuals' perceptions of the benefits of key design elements (and their specific features) from a healing garden. Following the results of the current study, users' perceptions were classified into four key design element factors:

- ***Perceived social support, privacy, and control:*** healing garden users' perception that the healing garden design meets their privacy and social needs.
- ***Perceived movement and exercise:*** healing garden users' perception that the healing garden design provides an opportunity for them to engage in physical activity (Ulrich, 1999)

- ***Perceived natural distractions:*** healing garden users' perception that the healing garden design provides natural environmental features that have potentially restorative influence (Ulrich, 1999)
- ***Perceived accessibility:*** healing garden users' perception that the healing garden design supports users' need to navigate the garden without restriction

Visitor Satisfaction with the Hospital: a pleasurable feeling of fulfillment that a family member or friend of a patient receives from experiencing the services and service providers in a hospital

CHAPTER 2: REVIEW OF LITERATURE

This chapter reviews various sources of literature related to healing gardens in hospitals and their potential outcomes among consumers to establish a theoretical framework for the study. The chapter first discusses the history of gardens in healthcare and the construct of biophilia. Next, the chapter reviews the Theory of Supportive Gardens (Ulrich, 1999) as well as published recommendations for features of the key healing garden design elements, which are then compiled into a table generating items for the questionnaire used in this study. Lastly, this chapter reviews service literature related to satisfaction and behavioral intention.

History of Gardens in Healthcare

Historians have traced the use of gardens as restorative places back to the beginnings of recorded history in Persia, Egypt, and the Orient, and have noted that the existence of these gardens has continued until today in these cultures (Gierlack-Spriggs, Kaufman, & Warner, 1998). Gardens as an integral part of healthcare were also found in the Middle Ages among the monastic communities of Europe (Cooper Marcus & Barnes, 1999). Justification for gardens in monastic communities was based on the idea that the combination of herbs from the garden with religious prayer could aid in the healing of individuals (Cooper Marcus & Barnes, 1999). Although the exact origin of restorative gardens in Europe is nearly impossible to pinpoint, it is believed that gardens were commonly found in healthcare institutions for the poor, sick, and infirm between the 10th and 14th centuries (Gierlack-Spriggs et al., 1998).

Today, healthcare has undergone a vast transformation from the holistic focus of the past and is now largely based on technology and hard science (Cooper Marcus & Barnes, 1999; Ulrich, 1991). The healthcare service industry has also transformed in terms of its massive financial standing, representing an estimated 17.7% of the United States GDP in 2011 and

anticipated to continue growing through 2020 (United States Department of Health and Human Services, 2011). Researchers have recently been making the case for the expansive industry of healthcare to incorporate more green spaces in healthcare environments, not as an alternative to allopathic care, but as a vital augmentation to modern medicine (Gierlack-Spriggs et al., 1998). In their article promoting the greening of healthcare, Irvine and Warber (2002) stated that:

The relationship among people, nature, and well-being has all but been lost. While health is the obvious goal of allopathic medicine, many healthcare settings are monolithic, surrounded by concrete, asphalt, and other structures, and cut off from the rest of the world, particularly the natural environment (p. 76).

The incorporation of gardens in hospital settings has become a growing trend, with many hospitals today including a *healing garden* which refers to a green space in the campus of a health care facility designed with the goal of positively impacting individuals who visit the garden (Cooper Marcus & Barnes, 1999; Relf, 2005; Stigsdotter & Grahn, 2003). With the goal of facilitating a connection with nature and creating a sense of restoration among visitors, healing gardens are intended to alleviate the negative emotions often related to the hospital environment (Whitehouse et al., 2001). For hospital employees, gardens can serve as a place of relaxation and an escape from the stresses of their work (Cooper Marcus & Barnes, 1999; Whitehouse et al., 2001). Healing gardens may be located indoors or outdoors on a healthcare campus and should be composed of real nature content such as green plant life and water elements (Cooper Marcus & Barnes, 1999). Although there is no academic research reporting the number of healing gardens that are currently present in the United States, Naomi Sachs, Director of the Therapeutic Landscapes Resource Center, estimated that approximately 5-10% of hospitals in the United States had healing gardens in 2008 (Domke, 2008). Sachs also stated her

belief that most other U.S. hospitals that did not already have a healing garden were seeking to add a healing garden on their hospital campus (Domke, 2008).

Biophilia

E. O. Wilson (1993) defined biophilia as “the innately emotional affiliation of human beings to other living organisms” (p. 31), and postulated that this affiliation for being close to the natural environment is a hereditary and essential part of human nature. Wilson (1993) noted that evidence of biophilia can be seen even now in urban surroundings where humans subconsciously strive to be around nature through attending zoos and seeking highly valued water-front property. Wilson (1993) stated that humans cannot turn off their hereditary need to be around nature and living things. Even in artificial environments, nature has its pull (Wilson, 1993). Wilson (1993) argued that biophilia can be explained by the evolution of the human brain, which did not begin to occur with the development of fixed-base agriculture and cities, but rather in humans’ hunter-gatherer past. An example of this evolutionary development would be the fear of and fascination with snakes which persists in modern society and has been found to cause more nightmares than modern weaponry such as guns (Wilson, 1993). In the case of snakes, Wilson’s (1993) biophilia hypothesis explains that humans’ recurrent adverse experiences with snakes were encoded over time through natural selection, now appearing as a common fear in modern society and also as a fascination (i.e. symbolism of snakes in folklore and religion).

Ulrich (1993) wrote about humans’ positive reactions to natural scenes including mostly plant life, noting that the viewing of natural landscapes can bring about psychological, physiological, and even health-related outcomes in humans. He noted that there is a major lack of psychological research investigating individuals’ positive responses to nature (i.e., biophilia);

rather, researchers have sought to investigate negative psychological responses to nature (i.e. biophobia) (Ulrich, 1993). Thus, the field of scientific research into biophilia is young and sparse (Ulrich, 1993). Despite the lack of research into such outcomes, Ulrich (1993) hypothesized that biophilic responses to natural landscapes could include approach behaviors, stress recovery or restoration, and increased levels of cognitive functioning. However, due to its focus on the genetic explanation of humans' responses to nature, the biophilia hypothesis is difficult to test (Ulrich, 1993). A more easily testable theory for the effects of healing gardens is Ulrich's Theory of Supportive Gardens (1999).

Healing Garden Effects: Theory of Supportive Gardens

Given the growing popularity of healing gardens in hospitals, researchers have begun to develop theories to explain how and why healing gardens produce positive outcomes among individuals (e.g. Kaplan, 1995; Ulrich, 1991, 1999). One of the main theories is the Theory of Supportive Gardens posited by Roger Ulrich (1999).

Roger Ulrich has developed a stream of research regarding elements of the healthcare environment that have the ability to promote health and wellness among users, with a particular focus on the potential benefits of nature in healthcare settings (e.g. Ulrich, 1979, 1984, 1991, 1999). Ulrich noted that a focus on function rather than the comfort of individuals has led to the reputation of healthcare facilities as being "psychologically hard" (Ulrich, 1991, p. 97). Meeting the functional requirements of a healthcare facility in terms of space and equipment does not always meet the psychological needs of the individuals within that facility (Ulrich, 1991). In response to his view of the prevalence of healthcare facilities meeting merely functional needs, Ulrich (1991) posited the Theory of Supportive Design which can be applied to better understand

the critical need for psychologically positive elements such as healing gardens in healthcare facilities.

The Theory of Supportive Design centers on the idea of reducing stress through good design (Ulrich, 1991). The three main premises of this theory are that (a) healthcare facilities should not contain stressful elements or inhibit the ability to handle stress, (b) healthcare facilities should aid in the reduction of stress through features of the physical environment, and (c) design should not be focused on patients alone but also on visitors and staff (Ulrich, 1991). The theory also suggested that stress reduction and wellness promotion can be obtained through providing users with a sense of control over their environment, contact with social support, and access to positive distractions such as art, water features, and natural elements (Ulrich, 1991).

As part of the Theory of Supportive Design, Ulrich (1991) identified nature as a positive distraction with great potential to promote wellbeing, thus setting the stage for gardens in healthcare environments. Ulrich (1999) later modified the Theory of Supportive Design to apply specifically to gardens. The Theory of Supportive Gardens posits that gardens in healthcare facilities can assist in improving wellbeing among all who visit when the gardens provide a “sense of control and access to privacy, social support, physical movement and exercise, [and] access to nature and other positive distractions” (Ulrich, 1999, p. 36). Empirical support for the healing garden effect on wellbeing of individuals in healthcare environments can be found in Sherman et al.’s (2004) study which revealed that when patients were in a healing garden, they felt lower levels of pain, anxiety, fatigue, and stress than they felt when they were in the hospital interior. Whitehouse et al. (2001) also found that people felt more positive when they visited a healing garden due to the interaction with various aspects of the natural environment, such as trees, flowers, and running water, combined with bright colors and artwork.

Researchers in The Healing Garden School, a major school of thought in landscape architecture, have posited that gardens provide benefits through the restorative influence they have on individuals simply experiencing the garden itself (James, 1892; Kaplan, 1995). Kaplan (1995) focused on nature's ability to provide restoration among individuals through reducing "directed attention fatigue" (p. 170) as part of the larger Attention Restoration Theory (James, 1892; Mesulam, 1985). Directed attention refers to individuals' ability to voluntarily focus on something that is perhaps not enjoyable but is nevertheless important for them to know (Mesulam, 1985). When individuals experience directed attention fatigue, they are unable to engage in effortful focus (Mesulam, 1985). According to Kaplan (1995), individuals are subject to directed attention fatigue whenever they engage in mental effort for an extended period of time. Kaplan (1995) posited that natural settings in healthcare facilities can aid in reduction of directed attention fatigue because they allow individuals in the garden to feel a sense of being away as they rest or walk on winding paths in the garden while enjoying the gentle movements of nature such as the sun setting and leaves rustling in the breeze.

Research has provided additional support for the ability of gardens to have positive effects on the health of individuals. For example, McCaffrey (2007) found that walking through a garden either alone or on a guided tour provided positive mental health benefits for individuals with mild to moderate depression. Although this study did not involve a rigorous empirical methodology, the qualitative results of the study were clearly positive in terms of the effect of the garden on participants' mental health (McCaffrey, 2007). Participants responded to a set of open-ended questions after walking through the garden; some of the notable responses were "I think everyone should have the wonderful experience of walking in this peaceful garden. I loved the sound of the bamboo -- one day when it was a little windy, the bamboo was swishing and

cracking and I stood there for over an hour,” and “When I want to be peaceful in my heart now, I just stop and think of the garden” (McCaffrey, 2007, p. 82). In McCaffrey’s (2007) study, some participants also engaged in art therapy as an intervention for depression, but regardless of the group (i.e., walking alone through garden, guided tour through garden, or art therapy), most participants felt that their depression, mood, and outlook on life were improved based on the intervention.

Behavioral observations and interviews have revealed that one of the greatest benefits of healing gardens in hospitals is their ability to bring about positive changes in individuals’ mood and stress level (Cooper Marcus & Barnes, 1999). Hospital employees have reported that the healing garden served as a place for them to escape the stress and anxiety of the hospital setting and achieve a state of restoration (Cooper Marcus & Barnes, 1999).

Given the desirable outcomes in users’ health and wellbeing supported by healing gardens, the current study will seek to focus on *emotional and behavioral outcomes* that potentially can be attained in visitors and employees who make use of a healing garden in a hospital setting.

Healing Garden Design

Cooper Marcus and Barnes (1999) began using the term “healing garden” to describe a green outdoor space on a healthcare campus that has the ability to facilitate the alleviation of physical ailments, decrease stress levels, and give visitors a greater feeling of well-being. Cooper Marcus and Barnes visited several healing gardens throughout the United States and used their observations to provide design recommendations for healing gardens. According to Cooper Marcus and Barnes, emotional instability that occurs when individuals are stressed or ill may

impact the way in which they perceive the appearance of the physical environment. Relating this concept to healing gardens in hospitals, the importance of carefully designing a healing garden for a sensitive population is clear (Cooper Marcus & Barnes, 1999).

Cooper Marcus and Barnes (1999) noted that an environment communicates symbolically with the viewer via subconscious processing of sight, smell, and sound. The symbolism that individuals take away from design features must be carefully considered when designing a healthcare environment; for example, Cooper Marcus and Barnes (1999) referred to the experience of a hospital of which functional design actually disturbed individuals in the interior. Individuals perceived the large, leaning structural pillars at the base of the hospital as an “emotionally threatening reminder of a bleak future” (Cooper Marcus & Barnes, 1999, p. 90).

As discussed in the previous section on the Theory of Supportive Gardens (Ulrich, 1999), healing gardens should be designed to improve wellbeing among users through carefully selected design elements that promote (1) the restoration of a sense of control, (2) access to privacy (3) social support, (4) an opportunity to move and exercise, and (5) access to natural distractions (Ulrich, 1999). Ulrich’s original Theory of Supportive Gardens included access to privacy as a subset of a sense of control; however, the current study identifies access to privacy as a component of its own due to the increasing importance of privacy in hospitals (e.g., Bäck & Wikblad, 1998).

A sense of control refers to an individual’s perception of how much they decide what they do and what is done to them (Gatchel et al., 1989; Ulrich, 1999). It is important to restore a sense of control to individuals in a hospital environment (Ulrich, 1999). In a healing garden, a sense of control may be promoted through ease of access to the garden as well ease of navigation and finding one’s way in the garden (Ulrich, 1999). *Access to privacy* refers to an individual’s

ability to find spaces of solitude in the garden. It is important to provide spaces within the garden where all groups of visitors (i.e. patients, visitors, and staff) may go to have privacy (Sherman et al., 2005). *Social support* refers to the perceived emotional assistance individuals receive through communication with other individuals in the garden (Brannon & Feist, 1997; Ulrich, 1999). Social support may be facilitated by a healing garden design that encourages and reassures conversations and social network among groups of visitors (Ulrich, 1999). *Movement and exercise* refers to the ability of garden visitors to engage in physical activity when they are in the space (Ulrich, 1999). According to Ulrich (1999), engaging in physical exercise in a healing garden should help in alleviating stress among visitors to the garden. *Natural distractions* refer to environmental features that help alleviate visitors' stress through their restorative influence (Ulrich, 1999). In a healing garden, natural distractions such as greenery, flowers, water, and sunlight are thought to provide restoration to users of the garden (Ulrich, 1999).

Table 1 presents specific healing garden design features that potentially facilitate each of the above five key design elements suggested by the Theory of Supportive Gardens. These design features were compiled based on recommendations found in six influential publications in the area of healing gardens including Cooper Marcus and Barnes (1995, 1999), McDowell and Clark-McDowell (1998), Mitrione and Larson (2007), Naderi and Smith (2008), and Ulrich (1999). This study will validate the applicability of these recommended healing garden design features from users' perspectives by examining whether the design features are categorized into the five key design elements (i.e., a sense of control, access to privacy, social support, an opportunity to move and exercise, and access to natural distractions) based on potential users' perceptions, which is addressed in the following research question.

RQ1: Are individuals' perceptions about healing garden design features categorized into five dimensions addressing the five key healing garden design elements suggested by the literature?

Satisfaction with and Behavioral Intention toward the Healing Garden

Satisfaction has been a major focus in service research as a desired emotional outcome of service encounters (e.g., Parasuraman, Zeithaml, & Berry, 1988; Bitner, 1992). Customer satisfaction refers to an individual's judgment that a service experience resulted in a "pleasurable level of consumption-related fulfillment" (Oliver, 2010, p. 8). Mary Jo Bitner (1992) presented the idea of the *servicescape*, or the physical environment in which a service occurs, and developed a framework for understanding the manner in which the physical environment of service providers such as hospitals impacts consumer behavior. Service is often created and consumed at the same time in the physical environment of the service provider (Bitner, 1992). Therefore, consumers often use physical environmental cues given by the servicescape when forming perceptions about a service provider (Bitner, 1992). In a healthcare service environment, the servicescape (i.e., the physical environment of the hospital including healing gardens) has the ability to impact multiple users (consumers) of the space, including visitors and employees, through their perceptions of the servicescape.

Bitner (1992) also posited that the servicescape, when designed in a pleasing manner, may elicit approach behaviors among customers. Understanding the relationship between the environment and approach/avoidance behaviors can be best understood through the Stimulus-Organism-Response (S-O-R) paradigm (Mehrabian & Russell, 1974).

Table 2.1

A Pool of Perceived Healing Garden Design Feature Items Developed from Published Recommendations for Key Healing Garden Design Elements

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Sense of control	The garden is easily visible from the hospital entry.	Provide ease in finding one's way to the garden	Garden is easily visible from front entry			
	The garden provides an inviting entrance.				Provide an entrance that invites the visitor to the garden	
	This garden is easy to see from hallways in the hospital.		Garden is easily visible from interior corridors			
	Maps that show the way to the garden are available at different locations in the hospital.		Provide maps to the garden at elevators and front entry			
	There are proper signs leading to the garden.		Provide directional signage to the garden at elevators and front entry	Sign to identify the garden		Proper signage leading to the garden
	The doors leading into the garden are easy to use.		Provide doors that are easiest to use (automatic)			
	The paving of pathways within the garden is smooth.		Provide smooth paving without large grooves			

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Sense of control <i>(continued)</i>	Navigating around the garden is easy.	Provide ease in navigating within the garden	Layout the paths to minimize confusion of navigation	Provide ease in navigating within the garden		Provide paths to allow both conversation and passageway
	The garden provides ease in getting around for individuals in wheelchairs.	Provide ability for individuals in wheelchairs to be able to navigate the garden	Garden should be accessible to patients in wheelchairs through use of a wide paving surface	Width of paths may need to incorporate accessibility concerns (wheelchairs)		Provide accessibility to the garden for all users
	The garden provides a variety of seating arrangement choices.	Provide various choices in seating arrangements	Provide various choices in seating arrangements			Multiple seating choices
	The seating in the garden is comfortable.	Select seating that is comfortable and relaxing		Select seating that is comfortable and relaxing		Seating that is ergonomic, easy to sit in and rise from
	There are both sunny and shaded areas in the garden.	Provide both sunny and shaded areas	Provide different microclimates (sun/dappled shade/deep shade)			Provide microclimates of sun/shade
	The concrete in the garden glares in my eyes. (reverse code)		Avoid glare from light concrete			
	People can enter the garden from the hospital without having to use stairs or ramps.		Create the garden "on grade" so that people can walk into it without a ramp or stair			

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Sense of control <i>(continued)</i>	There are choices of walking routes in the garden.		Provide several walking routes to choose from			
	There is a variety of choices in spaces within the garden.	Provide a variety of types of spaces	Provide divisions in space so that there are sub-areas that vary in size		Variety of choices in spaces	
	There are different views of scenery to choose from in the garden.		Allow different views to choose from while seated			
	There is a drinking fountain in the garden.		Provide a drinking fountain in the garden			
	There is a bathroom close to the garden.		Provide a bathroom in the outside space or nearby indoors			
Access to privacy	There are private areas where people can be alone in the garden.		Provide divisions in space so that there are sub-areas that vary in privacy	Area for being alone provides an escape from the hospital environment	Space for solitary occupancy	Choice of being alone
	There are some private seating areas hidden by plants.		Provide some seating buffered by planting for privacy	Provide plants and shrubs around seating areas		
	There are places in the garden where people can talk privately.		Design should allow for areas for private conversations			

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Access to privacy <i>(continued)</i>	There is a feeling of enclosure from the outside world when I am in the garden.		Degree of enclosure/Privacy from the outside world	Enclose the garden to promote safety and intimacy		
	There is a feeling of enclosure from the hospital environment when I am in the garden.		Degree of enclosure/Privacy from the hospital environment	Enclose the garden to promote safety and intimacy		
	There are places in the garden where staff can sit together during breaks.		Semi-private space for staff to claim during breaks			
	The size of the garden is large enough to keep people from feeling crowded.	Afford sufficient space to prevent crowding	Garden space should be at least 30' wide when windows face each other			
	The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).		When an urban hospital is surrounded by high rise buildings, provide a canopy of tall trees or trellis vines / Enclosure overhead such as a canopy, gazebo, trellis			
	There is privacy in the garden from on-looking patient rooms.	Provide visual privacy in terms of windows overlooking garden	Windows should not directly overlook public spaces or should be screened			

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Social support	There are areas in the garden for conversations in small groups.	Arrange seating in subspaces that promote conversations in small groups	Offer sub-spaces that can be claimed by small groups		Provide areas for small groups such as families or support staff	
	In the garden, seating is arranged at right angles for talking with others.		Arrange seating at right-angles			
	There is some movable seating in the garden.		Provide some moveable seating			
	There is a central space for people to gather.		Offer a central gathering space			Choice of a place with larger congregating groups
	The garden has some table arrangements.		Provide some table arrangements			Small tables and chairs support casual conversation
	Chairs in the garden are made of proper materials for me to sit comfortably.		Choose seating material appropriate to the climate (i.e. avoid metal in very hot climates)			
Movement and exercise	The garden provides areas that encourage exercise through walking.		Install a walking path		Gardens should encourage exercise through walking	Provide areas for walking along paths
	There are walking paths in the garden that encourage me to walk around.	Provide spaces such as walking loops that increase patients' ability to walk around	Brisk walking path (clear circular route, smooth surfaces, width for passing, changing view, sun/shade mix			Provide walking paths with nodes of choice

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Movement and exercise <i>(continued)</i>	The garden has various types (shapes, widths, and routes) of walking paths.					
	The garden has wide walking paths with smooth surfaces that allow brisk walking.					
	The walking paths in the garden have changing views, preventing me from feeling bored while walking.					
	The garden has narrow and curving walking paths that are appropriate for slowly strolling and meandering.		Contemplative strolling path (narrower, more circuitous, allow for a sense of mystery and exploration)	Provide meandering pathways		
Natural distractions	The garden has plants with a variety of colors.	Plant materials contrast in variation in color	Provide planting with contrast in color			Contrast through natural materials
	There are spots of bright colors in the plants.		Colorful planting	Spots of color in plants	Creative colors in plants	
	Some plants in the garden are pleasant to touch.	Plant materials contrast in variation in texture	Incorporate plants that are pleasant to touch			

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Natural distractions <i>(continued)</i>	The plant life in the garden (trees, shrubs, and flowers) is planted densely.		Plant densely, not sparingly			
	Plant life (trees, shrubs, and flowers) is the major portion of the garden.			Plant materials should be the major portion of the garden	Plant materials should be the majority; Hard-scaping should be minimized to 1/3 of the space	Natural, not manmade materials
	The plants in the garden are eye-catching.		Provide planting that is eye-catching			
	The plants in the garden have a pleasant fragrance.		Select plants with a perceptible aroma			
	There is a variety of types of plant life (trees, shrubs, and flowers) in the garden.	Use a variety of plant materials	Provide a variety of trees, shrubs, and flowers.			
	The selection of flowers in the garden fits this area/town well.		Select flowers that have meaning to the typical community or age group being served			Culturally sensitive design to the community
	The garden has some plants native to this part of the country.		Create at least one area with native plants			
	Some plants in the garden attract butterflies.		Select plants to attract butterflies		Select common plants for butterflies	

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Natural distractions <i>(continued)</i>	Leaves of some plants in the garden move easily in the breeze.		Choose plants with foliage that moves easily			
	People on upper floors of the hospital can see some of the greenery in the garden.		Create a view of greenery from upper floors by providing tall trees			Give patients views of trees
	The garden is a good place for wildlife, such as birds.		Consider garden as a home for wildlife	Design to attract wildlife	Provide garden features that attract wildlife	
	There is a water feature (e.g., a fountain, water wall, or pond) in the garden.		Provide a water feature	Incorporate water elements	Incorporate a water feature	
	The water feature is easy to see in the garden.		Make sure the water feature is able to be seen			
	The size of the water feature is appropriate for this garden.			Choose a water feature that is appropriate to the scale of the area		
	The garden has an unpaved area where I can see earth/soil.					Provide restoration through water and earth
	The water feature makes soothing sounds.				Water features with soothing sounds	

Key Design Element	Design Feature Item	Published Recommendations				
		Ulrich, 1999	Cooper Marcus & Barnes, 1995, 1999	McDowell & Clark-McDowell, 1998	Mitrione & Larson, 2007	Naderi & Smith, 2008
Natural distractions <i>(continued)</i>	This garden has a relaxing view of the surrounding nature.		Provide a panoramic view to help people relax and see "the big picture"			
	There are intrusive noises in the garden. (reverse)		Minimize intrusive noises such as HVAC		Minimize urban noise	

The S-O-R paradigm posits that the environment and its related cues (S) influence individuals' internal assessments (O) of the environment, which in turn lead to their behavioral responses (R), such as an approach or avoidance behavior (Mehrabian & Russell, 1974). Approach behaviors are positive behavioral responses reflecting the individual's desire to remain and further explore an environment, whereas avoidance behaviors, such as leaving the environment, are considered to be negative behavioral responses (Turley & Milliman, 2000). The S-O-R paradigm has been shown to be well suited to the field of environmental psychology (e.g. Matilla & Wirtz, 2001; Russell & Pratt, 1980; Spangenberg, Crowley, & Henderson, 1996; Turley & Milliman, 2000), demonstrating the impact of the physical environment (either single environmental cues or a more holistic perception of the entire environment) on consumer behavior toward the environment via emotional and/or cognitive evaluations of the environment. For example, Mattilla and Wirtz (2001) found that the presence of scent and music (S) led to more favorable evaluations of a retail environment (O) which then led to a greater intent to return to the store (R). Similarly, Spangenberg et al. (1996) found that the presence of a pleasant ambient scent (S) led to a more positive evaluation of a store environment (O), which then resulted in a greater intent to revisit the store (R). Through a review of the literature on effects of the physical environment on consumer shopping behavior, Turley and Milliman (2000) showed the wide range of environmental stimulus factors considered to influence consumer approach/avoidance behavior toward a service environment. These stimulus variables ranged from external environmental cues (e.g., exterior signage, color of building, landscaping), to interior cues (e.g., flooring and carpeting, color, lighting, temperature), point of purchase factors, and human factors (Turley & Milliman, 2000).

The aforementioned service environment literature based on the S-O-R framework suggests that as a physical element constituting the healthcare service environment, healing gardens (S) can influence the approach/avoidance behaviors of users of the healthcare service environment (i.e., visitors and employees), including revisiting the healing garden and recommending the garden to others (R), through the users' internal cognitive and emotional assessments of the healing garden such as their perceptions about the five key healing garden design elements and pleasurable feeling of fulfillment derived from their experience with the garden (i.e., satisfaction with the garden) (O). Preliminary evidence for a potential relationship between satisfaction with the healing garden and behavioral intent toward the healing garden can be found from Whitehouse et al.'s (2001) study which reported that 72% of users of a healing garden at Children's Hospital and Health Care in San Diego said they would recommend that other people in the hospital should visit the garden. However, no existing literature has empirically examined the mechanism by which users' perceptions about healing garden design elements influence individuals' approach/avoidance behavior toward the healing garden by generating overall satisfaction with the garden. The current study will address this gap through seeking answers to the following research questions:

RQ2: Do individuals' perceptions about the key design elements of the healing garden significantly lead to satisfaction with the healing garden?

RQ3: Does satisfaction with the healing garden lead to behavioral intentions to (a) revisit the healing garden and (b) recommend others to visit the healing garden?

RQ4: Does satisfaction with the healing garden mediate the relationship between perceptions of the key design elements of the healing garden and behavioral

intentions to (a) revisit the healing garden and (b) recommend others to visit the healing garden?

Satisfaction with the Hospital and Behavioral Intention toward the Hospital

Visitor satisfaction refers to a visitor's (i.e. family or friend of a patient) overall pleasurable feeling of fulfillment resulting from his or her experience with the services and service providers encountered in a hospital (Oliver, 2010; Ware, Snyder, Wright, & Davis, 1983). Although patient satisfaction has long been a key goal of hospital managers for marketing purposes (Atkins et al., 1996), hospitals have recently begun to focus on the satisfaction of visitors (i.e., family and friends), particularly family, of patients as an important outcome of the hospital visit (e.g. Dodek et al., 2012; Henrich et al., 2011; Kotzer, Zacharakis, Raynolds, & Buenning, 2012; Stricker, Kimberger, Schmidlin, Zwahlen, Mohr, & Rothen, 2009). Recently, Kotzer et al. (2012) reported satisfaction ratings measured pre- and post-occupancy of a new, state-of-the-art children's hospital in Denver, finding that the new built environment, which included a focus on amenities such as natural light and spaces with access to the outdoors, resulted in statistically significant improvements in satisfaction. Kotzer et al. (2012) highlighted the importance of the physical hospital environment, noting that "perhaps most importantly, there is heightened attention to creating optimal physical environments to achieve the best possible outcomes for patients, families, and staff" (p. 61).

Whitehouse et al. (2001) investigated the relationship between hospital healing garden use and satisfaction with the hospital, finding that 50% of respondents reported "definitely yes" in agreement to the question, "Does the healing garden increase your overall satisfaction with Children's Hospital?" One highly satisfied participant in Whitehouse et al.'s (2001) study shared

an opinion that hospitals with healing gardens would focus more on providing preventative care than other hospitals. Whitehouse et al. (2001) also reported that 20% of garden users in their sample had stated that the healing garden influenced them to recommend the hospital to their peers. Whitehouse et al.'s findings demonstrate a potential effect of satisfaction with the healing garden on their overall satisfaction with the hospital and behavioral intention toward the hospital. Although Whitehouse et al.'s findings are insightful, their study was descriptive in nature, and no existing studies have empirically examined the potential relationships between satisfaction with healing gardens and satisfaction and behavioral intentions regarding the hospital as a whole. Therefore, this study will address the following research question to narrow this gap.

RQ5: Does visitors' satisfaction with the healing garden lead to their overall satisfaction with the hospital?

RQ6: Does visitors' satisfaction with the healing garden lead to their positive behavioral intentions toward the hospital including (a) intention to reuse the hospital for their own future health care needs and (b) intention to recommend the hospital to other patients?

Job satisfaction refers to the positive emotion employees feel toward their job, resulting from their experiences with specific components of the job or overall experience with the job (Adams & Bond, 2000). Research examining the effect of the physical job environment on job satisfaction has been rare. A notable exception is a recent study conducted by Parish et al. (2008) who investigated the relationship between the physical hospital environment and job satisfaction of hospital nurses. Parish et al. (2008) found that nurses working in a new hospital wing had higher levels of satisfaction and loyalty (desire to remain with the current employer) and lower levels of job stress as compared to nurses working in an old hospital wing. Parish et al. argued

that the higher satisfaction and loyalty among the nurses in the new hospital wing were generated by perceived convenience, safety, and pleasantness of the well-designed space. Parish et al.'s findings suggest a possibility that the physical environment of a hospital can have a significant impact on hospital employees' job satisfaction and intention to remain with their current employer. Based on the aforementioned literature, it is worthwhile to examine the relationship between hospital employees' satisfaction with the healing garden which is an element of the hospital physical environment and their overall job satisfaction and behavioral intentions toward the hospital such as intentions to continue to work for the hospital and to recommend the hospital to other potential employees. The following research questions capture these ideas:

RQ7: Does hospital employees' satisfaction with the healing garden lead to their overall job satisfaction?

RQ8: Does hospital employees' satisfaction with the healing garden lead to their positive behavioral intentions toward the hospital including (a) intention to remain with the current employer (hospital) and (b) intention to recommend the hospital to other potential employees?

CHAPTER 3: Methodology

This chapter discusses the research design, development of measurements, sampling and data collection procedure which were employed in this study.

Research Design

This study employed a survey to collect data from a sample consisting of visitors and employees of two hospitals in the Southeastern United States. The data collection occurred via a paper-and-pencil based self-administered questionnaire which was administered to visitors and employees on the site of the University of Alabama at Birmingham (UAB) Hospital in Birmingham, Alabama, and via an online questionnaire administered to the employees of Madison Hospital in Madison, Alabama.

Survey Instruments

A questionnaire was developed for each respondent group (i.e., visitors and employees). Each questionnaire contained two healing garden experience questions, followed by measures of the variables of interest to this study including perceptions of the five key healing garden design elements, satisfaction with the healing garden, behavioral intention toward the healing garden, satisfaction with the hospital, and behavioral intention toward the hospital. In addition, each questionnaire included measures of potential covariates to be used to control for confounding effects of the covariates, as well as demographic items to characterize the participants.

Healing garden experience questions. Two healing garden experience questions were included as screening questions to determine whether respondents' data could be included in the data set. The first question, "Have you ever viewed the healing garden in this hospital?" (Yes/No), was asked to both employee and visitor groups. The second question asked in the

visitor questionnaire was “How many times have you visited the healing garden in this hospital?” (Never have visited, 1-3 times, 4-6 times, 7-9 times, 10 or more times). In the employee questionnaire, the second question was slightly modified to “How often do you typically visit the healing garden in this hospital?” (Never, Less than once per week, Once per week, Several times per week, Once daily, More than once daily). When respondents answered “No” to the first question and “Never have visited” or “Never” to the second question, their data were eliminated from further analysis.

Perceptions of the five key healing garden design elements. Due to the lack of an existing measure to assess perceptions of the five key design elements of healing gardens, the researcher developed a new scale based on the healing garden literature. To create an initial pool of scale items, 62 design features believed to contribute to each of the five key healing garden design elements, (1) sense of control, (2) access to privacy, (3) social support, (4) movement and exercise, and (5) natural distractions, were culled from five relevant sources of literature providing healing garden design recommendations (i.e., Cooper Marcus & Barnes, 1995, 1999; McDowell & Clark-McDowell, 1998; Mitrione & Larson, 2007; Ulrich, 1999). These features were stated in declarative sentences (see Table 2) and were rated on a Likert-scale response format. Respondents were instructed to use a five-point scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*) to indicate their level of agreement with each statement. There was also an option to mark (*N/A, Not Applicable*), for the garden perception items. See Table 3.1 for the initial pool of 62 items.

Table 3.1

Measurement for Perceptions of the Five Key Healing Garden Design Elements

Key Element	Items
Sense of Control	The garden is easily visible from the hospital entry.
	The garden provides an inviting entrance.
	The garden is easy to see from hallways in the hospital.
	Maps that show the way to the garden are available at different locations in the hospital.
	There are proper signs leading to the garden.
	The doors leading into the garden are easy to use.
	The paving of pathways within the garden is smooth.
	Navigating around the garden is easy.
	The garden provides ease in getting around for individuals in wheelchairs.
	The garden provides a variety of seating arrangement choices.
	The seating in the garden is comfortable.
	There are both sunny and shaded areas in the garden.
	The concrete in the garden glares in my eyes. (reverse code)
	People can enter the garden from the hospital without having to use stairs or ramps.
	There are choices of walking routes in the garden.
There is a variety of choices in spaces within the garden.	
There are different views of scenery to choose from in the garden.	
There is a drinking fountain in the garden.	
There is a bathroom close to the garden.	
Access to privacy	There are private areas where people can be alone in the garden.
	There are some private seating areas hidden by plants.
	There are places in the garden where people can talk privately.
	There is a feeling of enclosure from the outside world when I am in the garden.
	There is a feeling of enclosure from the hospital environment when I am in the garden.
	There are places in the garden where staff can sit together during breaks.
	The size of the garden is large enough to keep people from feeling crowded.
	The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).
There is privacy in the garden from on-looking patient rooms.	

Key Element	Items
Social support	<p>There are areas in the garden for conversations in small groups.</p> <p>In the garden, seating is arranged at right angles for talking with others.</p> <p>There is movable seating in the garden.</p> <p>There is a central space for people to gather.</p> <p>The garden has some table arrangements.</p> <p>Chairs in the garden are made of proper materials for me to sit comfortably.his garden</p>
Movement and exercise	<p>The garden provides areas that encourage exercise through walking.</p> <p>There are walking paths in the garden that encourage me to walk around.</p> <p>The garden has various types (shapes, widths, and routes) of walking paths.</p> <p>The garden has wide walking paths with smooth surfaces that allow brisk walking.</p> <p>The walking paths in the garden have changing views, preventing me from feeling</p> <p>The garden has narrow and curvy walking paths that are appropriate for slowly</p>
Natural distractions	<p>The garden has plants with a variety of colors.</p> <p>There are spots of bright colors in the plants.</p> <p>Some plants in the garden are pleasant to touch.</p> <p>The plant life in the garden (trees, shrubs, and flowers) is planted densely.</p> <p>Plant life (trees, shrubs, and flowers) is the major portion of the garden.</p> <p>The plants in the garden are eye-catching.</p> <p>The plants in the garden have a pleasant fragrance.</p> <p>There is a variety of plant life (trees, shrubs, and flowers) in the garden.</p> <p>The selection of flowers in the garden fits this area/town well.</p> <p>The garden has some plants native to this part of the country.</p> <p>Some plants in the garden attract butterflies.</p> <p>Leaves of some plants in the garden move easily in the breeze.</p> <p>People on upper floors of the hospital can see some of the greenery in the garden.</p> <p>The garden is a good place for wildlife, such as birds.</p> <p>There is a water feature (e.g., a fountain, water wall, or pond) in the garden.</p> <p>The water feature is easy to see in the garden.</p> <p>The size of the water feature is appropriate for this garden.</p> <p>The water feature makes soothing sounds.</p> <p>The garden has an unpaved area where I can see earth/soil.</p> <p>This garden has a relaxing view of the surrounding nature.</p> <p>There are intrusive noises in the garden. (reverse code)</p>

Satisfaction with the healing garden. One item, “Overall, how satisfied are you with the healing garden in this hospital?”, adapted from Larsen, Attkisson, Hargreaves, and Nguyen’s (1979) patient/client satisfaction measure, was used to assess respondents’ overall satisfaction

with the healing garden. This item was rated on a five-point scale (1 = *Very Dissatisfied*, 5 = *Very Satisfied*).

Behavioral intentions toward the healing garden. A three-item scale, adapted from Cronin, Brady, and Hult's (2000) measure of behavioral intentions toward a service provider was used to assess behavioral intentions toward the healing garden. The items included "The likelihood that I would recommend this facility's healing garden to a friend visiting this hospital is," "While I am in the hospital for the current care of my family member or friend, the probability that I will visit the hospital's healing garden again is," and "If I had to return to this hospital again, the likelihood that I would visit the healing garden is," measured on a five-point scale (1 = *Very Low*, 5 = *Very High*). For employees, the wording of the third item was slightly modified to "If I had to return to this hospital again, the likelihood that I would visit the healing garden is." Cronin et al.'s (2000) original scale showed a high reliability ($\alpha = .87$).

Satisfaction with the hospital. Different measures were used for the two respondent groups' satisfaction with the hospital. For visitors, satisfaction with the hospital was assessed using nine total items. Four items were derived from the Client Satisfaction Questionnaire (CSQ) developed by Larsen et al. (1979) which measures visitors' satisfaction with the hospital. The same four items from the CSQ were adapted to measure visitors' perception of service provided to the patient whom they are visiting. The last item from the CSQ addressed overall satisfaction and was asked only once (see Table 3.2).

Larsen et al.'s (1979) original CSQ consisted of eight items, of which content validity and reliability were established through consulting with health professionals and through a high Cronbach's α (.92), respectively. However, the CSQ was adapted for the current study by removing one irrelevant item, "Have the services you received helped you to deal more

effectively with your problems?” and removing two items that had doubtful face validity because they measured behavioral intents rather than satisfaction.

Table 3.2

Measurements for Satisfaction with the Hospital

Respondent Group	Items	Source
Visitors	<p>I received a good quality of service during my time in this hospital.</p> <p>I received the kind of service I needed.</p> <p>The hospital met my needs during my time here.</p> <p>I am satisfied with the help I received at this hospital.</p> <p>The patient I am visiting received a good quality of service during their time in this hospital.</p> <p>The patient I am visiting received the kind of service s/he needed.</p> <p>The hospital met the needs of the patient I was visiting during my time here.</p> <p>I am satisfied with the help the patient I was visiting received at this hospital.</p> <p>Overall, I am satisfied with this hospital.</p>	Larsen et al. (1979)
Employees	<p>Think of your job in general. All in all, what is it like most of the time?</p> <p><i>All in all, I would describe my job as _____.</i></p> <p>Bad ---- Good</p> <p>Undesirable ---- Desirable</p> <p>Worse than most ----- Better than most</p> <p>Disagreeable ---- Agreeable</p> <p>Makes me discontent ---- Makes me content</p> <p>Poor ----- Excellent</p> <p>Not enjoyable ----- Enjoyable</p>	Russell et al. (2004)

All items from the CSQ were adapted for this study by rephrasing them to be rated on a five-point Likert scale (*1=Strongly Disagree, 5=Strongly Agree*). The original CSQ used four-point scales with varying response formats across the items. For example, some items were measured on a scale (*1 = Poor, 4 = Excellent*), whereas other items were measured on a scale (1

= *No, They seemed to make things worse*, 4 = *Yes, They helped a great deal*). Although the reliability of the original CSQ was very good, the researcher desired to keep the measurement wording consistent (i.e., 1 = *Strongly Disagree*, 5 = *Strongly Agree*) in order to avoid any confusion among respondents.

A measure modifying Russell et al.'s (2004) Abridged Job in General Scale© (AJIG) was used to assess employees' satisfaction with the hospital (i.e., job satisfaction). The AJIG scale consists of eight items reduced from the widely used Job in General Scale (JIG) and has been proven valid and reliable ($\alpha = 0.87$) (Russell et al., 2004). The AJIG scale includes eight job descriptors (good, undesirable, better than most, disagreeable, makes me content, excellent, enjoyable, and poor), which respondents are supposed to respond with an option among Y (Yes), N (No), and ? (undecided). For this study, the AJIG scale was adapted and reformatted in a semantic differential scale consisting of seven pairs of job descriptors (see Table 3.2). Each pair of descriptors accompanied five points (1-5) with a smaller number indicating a more negative feeling toward the job (i.e., a feeling closer to the negative descriptor of the pair).

Behavioral intentions toward the hospital. The visitor respondents' behavioral intentions toward the hospital were measured in two dimensions: (1) intent to return to the hospital for future care and (2) intent to recommend the hospital to others for future care. For the first dimension, four Likert-scale items (adapted from Swan, Sawyer, Van Matre, and McGee (1985) were used (see Table 4). The reliability of the original four items was established through a high Cronbach's α (.88) by Swan et al. (1985). Swan et al. (1985) also reported construct validity of the items. On the other hand, the second dimension, intent to recommend the hospital to others, was measured by two items including one adapted from Larsen et al. (1979) and the other adapted from Swan et al. (1985) (see Table 3.3).

For the hospital employee respondent group, one item adapted from Price and Mueller's (1981) questionnaire regarding professional turnover was used to measure their intent to remain in their current job (see Table 3.3). The wording was modified Price and Mueller's original wording, which prompted respondents to select the statement that best describes them with regards to leaving or remaining in their job, to ask employees to indicate the likelihood of remaining in their job for the next five years. This item was measured on a 5-point Likert scale (1 = *Definitely not likely*, 5 = *Definitely likely*). Another item, developed by the researcher, measured intended length of continued employment at the hospital. This item was measured on an ordinal scale with values ranging from 1 year to 10 or more years. Further, one item adapted from Larsen et al. (1979) was used to assess their intent to recommend the hospital job to others (see Table 4). This item was measured on a 5-point Likert scale (1 = *Definitely No*, 5 = *Definitely Yes*).

Table 3.3

Measurements for Behavioral Intentions toward the Hospital

Dimension	Items	Source	Respondent Group
Intent to Return to Hospital for Future Care	The next time I need hospital care, I would certainly return to this hospital. Unless it was an emergency, this hospital would not be my first choice (Reverse) It is possible that in the future I will use this hospital. Unless my doctor objects, when I next need a hospital, I will avoid returning to this hospital (Reverse)	Swan et al. (1985)	Visitor
Intent to Recommend the Hospital to Others	If a friend were in need of similar hospital care, I would recommend this hospital to him/her. It is likely that I will recommend this hospital to others when they are in need of hospital care.	Larsen et al. (1979) Swan et al. (1985)	Visitor

Dimension	Items	Source	Respondent Group
Intent to Remain in Job	What is the probability that you will stay employed in this hospital for the next five years? (1 = <i>Definitely Not Likely</i> , 5 = <i>Definitely Likely</i>) How long do you desire to continue to be employed at this hospital? (1 year, 2-3 years, 4-5 years, 6-7 years, 8-9 years, 10 or more years)	Price & Mueller (1981)	Employee
Intent to Recommend Job to Others	If a friend were in need of a similar job, would you recommend this hospital to him/her? (1= <i>Definitely No</i> , 5= <i>Definitely Yes</i>)	Larsen et al. (1979)	Employee

Potential covariates. For both respondent groups, (1) four demographic items including age, gender, income, and ethnicity; (2) two items asking choice and frequency of healing garden use, adapted from Davis (2002), and (3) one check-list item addressing physical reasons that individuals may not be able to visit the garden or enjoy the garden fully were asked as potential covariates. The physical reason item included the respondent's loss of hearing, vision, touch, and/or smell, sun sensitivity, color blindness, and the ability to walk (see Table 3.4).

Furthermore, additional potential covariate measures were included for each respondent group. For visitors, additional measures of covariates included (1) length of time spent visiting the hospital and (2) frequency of past visits to the hospital (see Table 5). For employees, items addressing (1) their position at work, (2) job duration, (3) the hospital's encouragement for employees to visit the garden, (4) the hospital's encouragement for employees to recommend the garden to others, (5) the amount of time taken for breaks from work in a typical work day were included as potential covariate measures, and (6) satisfaction with intrinsic and extrinsic factors of their job will be measured as potential covariates (see Table 3.4).

All covariate measures for each respondent group were developed by the researcher except for the measure used for satisfaction with intrinsic and extrinsic factors of a job, which were assessed by a scale adapted from Minnesota Job Satisfaction Questionnaire (MJSQ).

Table 3.4

Covariate Measures

Variable	Items	Source	Respondent Group
Demographics	What is your age? (___ YEARS OLD) What is your gender? (<i>Male, Female</i>) What was your total household income in 2011? <i>(Ranging from “Less than \$10,000” to “\$150,000 or more”)</i> Which of the following ethnic groups do you consider yourself to be a member of? <i>(American Indian/Alaskan Native, Asian/Pacific Islander, Hispanic, Non-Hispanic Black, Non-Hispanic White, Other)</i>		All
Choice and Frequency of Garden Use	Have you ever viewed the healing garden in this hospital ? (<i>Yes, No (If no, please move on to page #__)</i>) How many times have you visited the healing garden in this hospital? (<i>Never, 1-3 times, 4-6 times, 7-9 times, 10 or more times</i>) How often do you typically visit the healing garden in this hospital? (<i>Never have visited, Less than once per week, Once per week, Several times per week, Once daily, More than once daily</i>)	Davis, 2002	All Visitor Employee
Physical State	Do you have any of the following physical conditions that would prevent you from being able to use the garden or enjoy the garden to its fullest potential? Please check all that apply: <ul style="list-style-type: none"> • Loss of hearing • Loss of vision • Loss of touch • Loss of smell • Sun sensitivity • Color blindness • Inability to walk • Other (Please specify: _____) 		All

Variable	Items	Source	Respondent Group
Frequency of Past Visits to the Hospital	How many times have you been hospitalized at this hospital before? (<i>Never, 1 time, 2 times, 3 times, More than 3 times (please specify the number of visits: _____)</i>).		Visitor
	How many times have you visited this hospital as a visitor for a patient or as an outpatient in the last five years? (<i>Never, 1 time, 2 times, 3 times, More than 3 times (please specify the number of visits: _____)</i>)		Visitor
Length of the Current Visit to the Hospital	How long has your current visit to this hospital been? If you are a caretaker of a patient in this hospital, add all the time that you have stayed at the hospital for the patient during this hospitalization. (<i>Less than 24 hours, Between 24-48 hours, 49-72 hours, More than 72 hours (please specify the number of days_____)</i>)		Visitor
Position at Work	How would you best describe your current position at this hospital? (<i>Administrative, Nursing, Physician, Other</i>)		Employee
Job Duration	How long have you been an employee of this hospital? (<i>Less than 1 year, 1-2 years, 3-4 years, 5-6 years, 7-8 years, 9-10 years, More than 10 years (please specify the number of years: _____)</i>).		Employee
Hospital's Encouragement for Employees to Visit the Garden	Is the healing garden in this hospital a place that employees are welcome to visit? (<i>Yes, Unsure, No</i>)		Employee
Hospital's Encouragement for Employees to Recommend the Garden	Is the healing garden a place that you are encouraged to recommend to patients and their family members (<i>Yes, Unsure, No</i>)		Employee
Amount of Time Taken for Breaks from Work in a Typical Work Day	How much total time do you take for breaks from work in a typical work day? (<i>Less than 15 minutes, to 90 minutes or more</i>)		Employee
Intrinsic Job Satisfaction Characteristics	Being able to keep busy all the time The chance to work alone on the job The chance to do different things from time to time The chance to participate as a member of the community Being able to do things that don't go against my conscience The way my job provides steady employment	MJSQ: Weiss, Dawis, England, and Lofquist (1967)	Employee

Variable	Items	Source	Respondent Group
Intrinsic Job Satisfaction Characteristics (continued)	The chance to help others The chance to tell people what to do The chance to do something that makes use of my abilities The freedom to use my own judgment The chance to try my own methods of performing my job		
Extrinsic Job Satisfaction Characteristics	The way my boss handles people Competence of my supervisor in making decisions The way company policies are put into practice My pay and the amount of work I do The chances for advancement in this job The working conditions The way coworkers get along with each other The praise I get for doing a good job The feeling of accomplishment I get from my job	MJSQ: Weiss et al. (1967)	Employee

MJSQ is a widely used instrument measuring both extrinsic and intrinsic factors of job satisfaction, initially developed by Weiss, Dawis, England, and Lofquist (1967) and validated in several studies (Arvey, Bouchard, & Abraham, 1989). MJSQ consists of 20 items rated on a five-point Likert scale (1 = *Very Dissatisfied*, 5 = *Very Satisfied*) (see Table 3.4).

Expert Review

After developing the survey instruments for each group, the questionnaires were submitted to experts for review. Two graduate students reviewed the visitor surveys, and minor changes were made accordingly to the item wording on the survey instrument. Additionally, a field expert (a medical doctor working at Duke University Medical Center) reviewed the employee version of the survey. Minor item wording changes were made based on the expert's review.

Sampling and Data Collection Procedures

UAB Hospital healing garden. The healing garden at UAB Hospital in Birmingham, Alabama is located on the fifth floor of the surgery building. It is a rooftop garden that is located in an atrium, surrounded by windows of on-looking viewers from the surgery building on all four sides. The garden can be viewed from the adjacent waiting rooms which wrap around the garden. The garden is approximately 1500 square feet, with flooring composed mostly of brick. Many bricks are “donor bricks” and display the names of individuals who have donated to the healing garden construction or maintenance. The center of the garden is occupied by a glass pyramid which serves as a roof for the main lobby of the surgery building below. Individuals may look through the glass pyramid to see the hospital below. Seating options consist mostly of wooden benches and chairs. Plants are mostly enclosed in planters, with some plants hanging from wooden trellises above seating areas (see Figure 3.1).

Sampling and data collection procedures at UAB Hospital. A purposeful sample consisting of 137 visitors and 3 employees was recruited from UAB Hospital in Birmingham, Alabama, for a total sample of ($n = 140$). All respondents were 19 years of age or older. Respondents may or may not have visited the healing garden in the hospital; however, the researcher ensured that the majority of the sample of the visitor group consisted of individuals who had viewed the healing garden. If respondents had not viewed the garden, the questionnaire instructed them to skip the healing garden questions and go to the questions regarding satisfaction and behavioral intent toward the hospital. The rationale for including respondents who had not viewed the garden as well as those who had viewed the garden was to provide the participating hospital with as much feedback as possible on general satisfaction and behavioral intent toward their hospital.

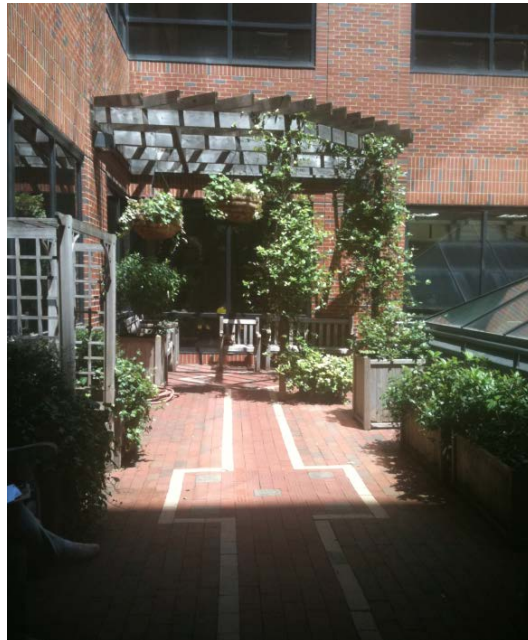
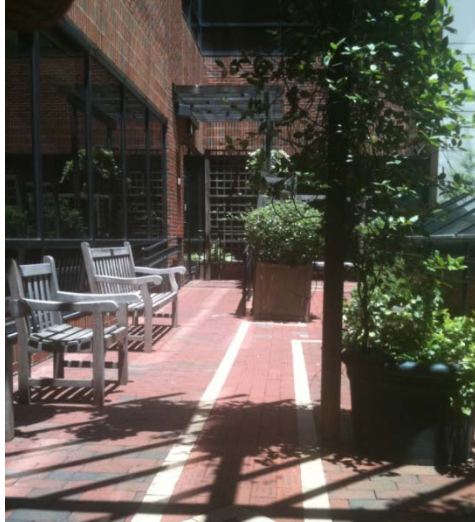


Figure 3.1. Photographs of Healing Garden at UAB Hospital in Birmingham, Alabama. *Note.* These photographs illustrate the major features of the garden: brick flooring, plants contained in planters, a pyramidal glass roof looking down into the main lobby below, and overlooking windows from waiting rooms in the surgery building.

However, for the data analysis of the present study, only data from participants who had viewed the garden were used ($n = 98$ including $n_{\text{visitors}} = 96$ and $n_{\text{employees}} = 2$), after screening out data from six participants who had not used the garden before and those from seven participants who did not complete the survey (leaving 20% or more questions unanswered).

Upon obtaining permission from the institutional review boards (IRBs) at the hospital and Auburn University, the researcher traveled to the hospital to distribute paper-based questionnaires during four visits to the hospital over the months of May and June 2012. To recruit the visitor sample, the researcher approached individuals in the healing garden and in non-emergency waiting rooms in the interior of the hospital nearby and solicited their participation in the study, informing them that their participation was voluntary and their data would be anonymous. The researcher asked potential respondents the screening question regarding age (19 years or older). The researcher then provided each respondent with an information letter explaining the study, a questionnaire, a clipboard, and a pen, and the respondents completed the questionnaire either in the healing garden or in the hospital waiting rooms nearby. The healing garden was fully visible from the waiting rooms nearby due to the full-height glass curtain wall allowing visibility of the garden from all interior waiting rooms adjacent to the garden.

To recruit the employee sample, the researcher employed three methods. First, the researcher provided stacks of questionnaires with sealable envelopes and collection bins to the unit secretaries in the hospital, requesting that the unit secretaries provide the questionnaires to the employees in their respective unit. The researcher returned to the unit secretaries at the end of each day of survey collection to collect any completed questionnaires. Unfortunately, this technique yielded only one survey which was partially complete. The second method was to

recruit employee participants at the garden and waiting room areas while recruiting visitor participants. Two employees who visited the garden during their lunch break participated in the survey through this recruiting method. No other employees were seen in the garden during any of the researcher's visits to the hospital. The last method used was an online survey in an attempt to reach employees at times of their convenience. The online survey was developed in Qualtrics software, and an email invitation to the online survey was sent by the assistant vice president of the hospital to the departmental owners of the mailing lists for UAB Hospital employees. However, this method resulted in zero participants.

Madison Hospital healing garden. The healing garden at Madison Hospital was opened in May 2012 and is an outdoor garden 2.4 acres in size. The garden was funded entirely by donors and, similar to the UAB Hospital Healing Garden, features donor bricks with names of supporters. The garden features a walking path, a paved labyrinth, and areas for sitting in the garden (see Figure 3.2).

Sampling and data collection procedures at Madison Hospital. Upon obtaining permission from the IRBs at the hospital and Auburn University, the researcher offered an online survey, developed in Qualtrics software, to the employees of Madison Hospital in Madison, Alabama. The email invitation to the online survey was sent to the employees by the Director of Annual Giving and Volunteers from the Huntsville Hospital Foundation. A purposeful sample of 26 employees of Madison Hospital participated in the online survey, all of whom provided usable data.



Figure 3.2. Photographs of Healing Garden at Madison Hospital in Madison, Alabama. These photos illustrate the walking paths, seating areas, and paved labyrinth.

Data Cleaning Procedure

Before beginning analysis for the employee and visitor data, the researcher cleaned the data set based on the two garden experience questions, “Have you ever viewed the healing garden in this hospital?” and “How often do you typically visit the healing garden in this hospital?” The researcher deleted six responses that answered “No” to the first question and “Never Have Visited” to the second question.

Next, the researcher recoded “not applicable” responses among the garden perception items according to whether the item was *objectively* or *subjectively* measuring a garden design feature. When respondents marked “not applicable” for objectively measured items (i.e., items that asked whether the garden has a physical feature such as “There is a water feature present in the garden”), the researcher recoded those items as Strongly Disagree. Since the researcher knew for certain that there was not a water feature in the garden, it was logical that the “not applicable” response was intended to mean “strongly disagree.”

When respondents marked “not applicable” for subjectively measured items, such as “The plants in the garden are eye-catching”, the researcher recoded those items as “neutral”. Since those items were subjective, it was assumed that the “not applicable” response was intended to mean “I don’t know” which indicates that the respondents neither agreed nor disagreed with the statement (and thus “neutral”). Table 3.5 presents all items that were recoded through the aforementioned procedures along with the number of participants whose data were recoded.

Table 3.5

Items with the “Not Applicable” Response Recoded

Item 1	Action	#Respondents Recoded
There is a water feature (e.g., a fountain, water wall, or pond) in the garden.	Recode as Strongly Disagree	20 respondents
The size of the water feature is appropriate for this garden	Recode as Strongly Disagree	28 respondents
The water feature makes soothing sounds	Recode as Strongly Disagree	32 respondents
There is a drinking fountain in the garden	Recode as Strongly Disagree	22 respondents
All Garden Perception items except Water Feature and Drinking Fountain items	Recode as Neutral	Range of 1-32 respondents (see Appendix C)

CHAPTER 4: RESULTS

This chapter covers the data analysis procedures and the results from statistical testing of the research questions. Descriptive statistics of the sample characteristics, results from the exploratory factor analysis (EFA) of the scale developed by the research to measure perceptions of healing garden design elements, and regression test results to answer the research questions are presented.

Sample Characteristics

A total of 143 respondents consisting of visitors to UAB Hospital and employees of Madison Hospital and UAB Hospital were recruited for participation in the study. The visitor sample at UAB Hospital consisted of 126 respondents, of which 96 had viewed the healing garden and were thus included in the data analysis.

The visitor sample was largely female (67.6 %), Non-Hispanic White (77.1 %), and mature in age ($M = 49.5$ years old, $SD = 14.17$ with over half of the sample consisting of individuals 50 years of age or older).

The employee sample, consisting of 17 employees including 15 from Madison Hospital and 2 from UAB Hospital, was mostly female (88.2%), Non-Hispanic White (82.4%), and in a nursing position at the hospital (52.9%). Table 4.1 presents frequencies of the demographic characteristics of the sample.

Table 4.1

Descriptive Statistics of Sample Characteristics from UAB and Madison Hospitals

Variable and Categories	Visitors- UAB Hospital (n = 96)		Employees- Madison Hospital and UAB Hospital (n = 17)	
	f	%	f	%
Age				
21-29 years old	11	11.4	6	35.3
30-39 years old	12	12.5	4	23.5
40-49 years old	19	19.8	3	17.6
50-59 years old	26	27.1	4	23.5
60-69 years old	17	17.7	0	0
70 years and up	7	7.3	0	0
Missing	4	4.1	0	0
Gender				
Male	28	29.1	2	11.8
Female	66	68.8	15	88.2
Missing	2	2.1	0	
Ethnicity				
American Indian/ Alaskan Native	2	2.1	2	11.8
Non-Hispanic Black	9	9.4	0	0
Non-Hispanic White	74	77.1	14	82.4
Other	2	2.1	1	5.9
Missing	9	9.4	0	0
Income				
Less than \$10,000-\$39,999	18	18.8	5	29.4
\$40,000-\$79,999	30	31.3	5	29.4
\$80,000-\$149,999	25	26.0	7	41.2
\$150,000 or more	3	3.1	0	0
Missing	20	20.8	0	0
Position at Hospital				
Administrative			3	17.6
Nursing			9	52.9
Other			5	29.4

Visitor Sample Results

Research Question 1

In order to answer RQ1, “Are individuals’ perceptions about healing garden design features categorized into five dimensions addressing the five key healing garden design elements suggested by the literature?,” a series of EFAs were conducted with the data from the 62 perceived healing garden design scale items which were developed by the researcher for this study. The EFAs were conducted in order to identify the underlying structure of the scale and reduce the items to the most parsimonious set of items that measure the construct (De Winter, Dodou, & Weiringa, 2009). Through the EFA of the 62 items addressing perceived healing garden design, RQ1, “Are individuals’ perceptions about healing garden design features categorized into five dimensions addressing the five key healing garden design elements suggested by the literature?,” was answered. For the EFA, the principal components analysis procedure with varimax rotation was run using SPSS Version 20.

Step 1: Separate EFAs for A Priori Dimensions. Due to the small sample size, it was statistically undesirable to run EFA with the entire 62 items of perceived healing garden design at once (De Winter et al., 2009). Therefore, the researcher first conducted a separate EFA on each set of items that the researcher anticipated to belong to each of the five *a priori* healing garden design dimensions (i.e. Sense of Control, Access to Privacy, Social Support, Movement and Exercise, and Natural Distractions) identified through the literature (see Table 3.1).

To decide upon the initial factor structure of items from each *a priori* dimension, the researcher (1) employed Kaiser’s Criterion to determine the number of factors based on Eigen values over 1.0; (2) examined the scree plots for the number of major eigenvalue drops on the

graph, which indicate the number of factors to retain; (3) examined the factor loadings to eliminate items that showed a low loading on all factors ($< .50$) or cross-loaded on multiple factors; and (4) reviewed the conceptual meaning of items with high and clear factor loadings. Through results from each *a priori* dimension based on the aforementioned procedure and criteria, the researcher eliminated 24 low-loading, cross-loading items, and/or items that showed no conceptual clarity or consistency with the other items loading on the same factor. As a result, perceived healing garden design element scale items were reduced to a total of 38 items, which were subjected to further analysis. Table 4.2 – 4.6 present results from the EFA of items from each *a priori* dimension.

Step 2: EFA of 38 Perceived Healing Garden Design Items. With the 38 items retained from Step 1, the researcher conducted a series of EFAs employing the same four criteria used in Step 1. The initial EFA with the 38 items pointed to an 8-factor solution (see Table 4.7).

However, of the eight factors, two factors had only one item each, and thus were eliminated. The items eliminated were “There are places in the garden where staff can sit together during breaks” and “Chairs in the garden are made of proper materials for me to sit comfortably.” The researcher eliminated another factor consisting of two items related to privacy from the view of others outside the healing garden (“There is privacy in the garden from on-looking patient rooms” and “The garden is shielded from the surrounding buildings through tall trees, a canopy or gazebo, or something similar”). This factor was eliminated because (a) it had an insufficient number of items, and (b) the subject matter of the items was not considered to be directly related to healing garden design. Healing garden designers may not always have the ability to determine where the garden is placed on a hospital’s campus in relation to on-looking viewers, particularly if the garden is added to an existing hospital. Finally, another factor

Table 4.2

EFA Results of the A Priori Dimension, Sense of Control

Item	Factor 1	Factor 2	Factor 3
Navigating around the garden is easy.	.737		
The paving of pathways within the garden is smooth.	.685		
The garden provides ease in getting around for individuals in wheelchairs.	.674		
There is a bathroom close to the garden.	.663		
The doors leading into the garden are easy to use.	.626	.366	
There are different views of scenery to choose from in the garden.		.832	
There is a variety of choices in spaces within the garden.		.816	
There are choices of walking routes in the garden.		.743	
There are both sunny and shaded areas in the garden.		.729	
The garden provides a variety of seating arrangement choices.		.618	
There are proper signs leading to the garden.			.805
Maps that show the way to the garden are available at different locations in the hospital.			.783
The garden is easily visible from the hospital entry.			.675
<i>Items Eliminated:</i>			
The garden is easy to see from hallways in the hospital.	.516		.422
The garden provides an inviting entrance.	.507		
People can enter the garden from the hospital without having to use stairs or ramps.	.455		
The concrete in the garden glares in my eyes. (reverse code)			
The seating in the garden is comfortable.		.514	
There is a drinking fountain in the garden.			.574
Eigen value	6.6	1.9	1.4
% Variance explained	34.9	10.2	7.5

Table 4.3

EFA Results of the A Priori Dimension, Access to Privacy

Item	Factor 1	Factor 2
There are places in the garden where people can talk privately.	.828	
There are private areas where people can be alone in the garden.	.776	
There are some private seating areas hidden by plants.	.769	
There are places in the garden where staff can sit together during breaks.	.597	
There is privacy in the garden from on-looking patient rooms.		.811
The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).		.658
<i>Items eliminated:</i>		
There is a feeling of enclosure from the hospital environment when I am in the garden.	.614	.501
There is a feeling of enclosure from the outside world when I am in the garden.	.599	.524
The size of the garden is large enough to keep people from feeling crowded.	.542	.550
Eigen value	4.3	1.1
% variance explained	47.5	12.3

Table 4.4

EFA Results of the A Priori Dimension, Social Support

Item	Factor 1
There are areas in the garden for conversations in small groups.	.748
In the garden, seating is arranged at right angles for talking with others.	.742
Chairs in the garden are made of proper materials for me to sit comfortably.	.732
There is a central space for people to gather.	.714
<i>Items eliminated:</i>	
The garden has some table arrangements.	.586
There is movable seating in the garden.	.575
Eigen value	2.8
% variance explained	47.1

Table 4.5

EFA Results of the A Priori Dimension, Movement and Exercise

Item	Factor 1
The garden has various types (shapes, widths, and routes) of walking paths.	.854
The garden has wide walking paths with smooth surfaces that allow brisk walking.	.844
There are walking paths in the garden that encourage me to walk around.	.830
The walking paths in the garden have changing views, preventing me from feeling bored while walking.	.823
The garden has narrow and curvy walking paths that are appropriate for slowly strolling and meandering.	.748
The garden provides areas that encourage exercise through walking.	.737
Eigen value	3.9
% variance explained	65.2

Table 4.6

EFA Results of the A Priori Dimension, Natural Distractions

Item	Factor 1	Factor 2	Factor 3	Factor 4
The selection of flowers in the garden fits this area/town well.	.796			
There is a variety of plant life (trees, shrubs, and flowers) in the garden.	.748			
The plants in the garden are eye-catching.	.725			
The garden has plants with a variety of colors.	.724			
The plants in the garden have a pleasant fragrance.	.688			
Some plants in the garden are pleasant to touch.	.640			
There are spots of bright colors in the plants.	.629			
The garden has some plants native to this part of the country.	.627			
Leaves of some plants in the garden move easily in the breeze.	.564			
<i>Items eliminated:</i>				
Some plants in the garden attract butterflies.	.597	.431		
The garden is a good place for wildlife, such as birds.	.515	.354		.330
There is a water feature (e.g., a fountain, water wall, or pond) in the garden. ^a		.904		
The water feature is easy to see in the garden. ^a		.903		
The size of the water feature is appropriate for this garden. ^a		.892		
The water feature makes soothing sounds. ^a		.884		
The garden has an unpaved area where I can see earth/soil. ^b		.706	.333	
Plant life (trees, shrubs, and flowers) is the major portion of the garden. ^b	.319		.770	

Item	Factor 1	Factor 2	Factor 3	Factor 4
The plant life in the garden (trees, shrubs, and flowers) is planted densely. ^b	.385		.715	
This garden has a relaxing view of the surrounding nature.		.495	.518	
There are intrusive noises in the garden. (reverse code) ^b				.800
People on upper floors of the hospital can see some of the greenery in the garden.	.359		.433	.527
Eigen value	8.6	2.7	1.4	1.2
% variance explained	41.1	13.1	6.6	5.5

^a These items concerned water features. The healing gardens of the two participating hospitals in this study did not have any water features, and thus these items were eliminated.

^b These items were eliminated because they were the only one or two items with a hard factor loading in the corresponding factor, and the concepts addressed by these items were already explained by Factor 1 which was retained for further analysis.

Table 4.7

Initial EFA Results with 38 Perceived Healing Garden Design Items

Items	F1	F2	F3	F4	F5	F6	F7	F8
There are places in the garden where people can talk privately.	.815							
There are areas in the garden for conversations in small groups.	.793							
There are private areas where people can be alone in the garden.	.729							
There are some private seating areas hidden by plants.	.723							
In the garden, seating is arranged at right angles for talking with others.	.653							
There is a variety of choices in spaces within the garden.	.601			.482				
The garden provides a variety of seating arrangement choices.	.597			.519				
There are choices of walking routes in the garden.	.596			.366				
There are different views of scenery to choose from in the garden.	.543			.441				
There are both sunny and shaded areas in the garden.	.541	.342		.400				
There is a central space for people to gather.	.535			.515				
The garden has plants with a variety of colors.		.786	.386					
Some plants in the garden are pleasant to touch.		.772						

Items	F1	F2	F3	F4	F5	F6	F7	F8
There is a variety of plant life (trees, shrubs, and flowers) in the garden.		.752						
There are spots of bright colors in the plants.		.724	.358					
The plants in the garden have a pleasant fragrance.		.679	.397					
The garden has some plants native to this part of the country.	.317	.666						
The selection of flowers in the garden fits this area/town well.	.435	.651						
The plants in the garden are eye-catching.	.442	.633						
Leaves of some plants in the garden move easily in the breeze.		.566				.383		
The garden has wide walking paths with smooth surfaces that allow brisk walking.		.314	.831					
The garden has various types (shapes, widths, and routes) of walking paths.		.339	.809					
There are walking paths in the garden that encourage me to walk around.			.784					
The walking paths in the garden have changing views, preventing me from feeling bored while walking.	.31	.418	.664					
The garden provides areas that encourage exercise through walking.		.355	.627	.402				
The garden has narrow and curvy walking paths that are appropriate for slowly strolling and meandering.		.356	.557		.314			
The doors leading into the garden are easy to use.				.751			.358	
The paving of pathways within the garden is smooth.				.747				
The garden provides ease in getting around for individuals in wheelchairs.				.741				.435
Navigating around the garden is easy.	.313			.689				
There is a bathroom close to the garden.				.676				
Maps that show the way to the garden are available at different locations in the hospital.					.831			
There are proper signs leading to the garden.					.728			
The garden is easily visible from the hospital entry.			.365	.398	.485	-3.09		
There is privacy in the garden from on-looking patient rooms.						.760		

The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).	.392							.574
There are places in the garden where staff can sit together during breaks.	.388							.781
Chairs in the garden are made of proper materials for me to sit comfortably.	.454	.316						.537
Eigen value	13.8	4.4	2.3	2.0	1.6	1.3	1.1	1.0
% variance explained	36.5	11.6	6.1	5.3	4.2	3.4	2.9	2.8

containing three items on accessibility to the healing garden from other parts of the hospital was eliminated. One of the three items, “The garden is easily visible from the hospital entry,” cross-loaded onto more than one factor, and the other two items, “Maps are available at different locations throughout the hospital” and “There are proper signs leading to the garden,” were considered irrelevant because healing garden designers do not often dictate techniques the hospital uses to provide proper signage and maps to the garden.

Step 3: Final EFA of the 29-Item Perceived Healing Garden Design Scale. After eliminating the aforementioned four factors of seven items, a final EFA was run with the retained 29 items based on the aforementioned four criteria. The final EFA revealed a clear 4-factor structure of visitors’ perceptions of healing garden design (see Table 4.8). The first factor, *Privacy, Social Support, and Control*, contains items related to social needs of individuals in the garden. The component includes nine items which were drawn from three different *a priori* dimensions, (i.e. Social Support, Access to Privacy, and Sense of Control). The second factor, *Natural Distractions*, includes nine items regarding characteristics of plant life in the garden. The third factor, *Movement and Exercise*, includes six items related to the ability to be physically active in the garden. The final factor, *Accessibility*, includes items related to the ease of navigation in the garden. Cronbach’s α s calculated for each of the four perceived healing garden

design factors ranged between .81 and .90, indicate high reliability of the scale items (see Table 4.8).

Table 4.8

Final EFA Results: The 4-Factor, 29-Item Perceived Healing Garden Design Scale

Factor	Items	Loadings
Privacy, Social Support, and Control	There are areas in the garden for conversation in small groups	.805
	There are places in the garden where people can talk privately.	.788
	There are some private seating areas hidden by plants.	.729
	There are private areas where people can be alone in the garden.	.706
	There is a variety of choices in spaces within the garden.	.688
	There are different views of scenery to choose from in the garden.	.666
	In the garden, seating is arranged at right angles for talking with others.	.645
	There are choices of walking routes in the garden.	.633
	There are both sunny and shaded areas in the garden.	.619
	Cronbach's $\alpha = .900$ Eigen value = 10.9 % variance explained = 37.9	
Natural Distractions	The garden has plants with a variety of colors.	.784
	Some plants in the garden are pleasant to touch.	.735
	There are spots of bright colors in the plants.	.725
	There is a variety of plant life (trees, shrubs, and flowers) in the garden.	.720
	The plants in the garden have a pleasant fragrance.	.667
	The selection of flowers in the garden fits this area/town well.	.661
	The plants in the garden are eye-catching.	.643
	The garden has some plants native to this part of the country.	.604

	Leaves of some plants in the garden move easily in the breeze.	.564
	Cronbach's $\alpha = .878$ Eigen value = 3.9 % variance explained = 13.6	
Movement and Exercise	The garden has wide walking paths with smooth surfaces that allow brisk walking.	.882
	The garden has various types (shapes, widths, and routes) of walking paths.	.827
	There are walking paths in the garden that encourage me to walk around.	.796
	The walking paths in the garden have changing views, preventing me from feeling bored while walking.	.695
	The garden has narrow and curving walking paths that are appropriate for slowly strolling and meandering.	.612
	The garden provides areas that encourage exercise through walking.	.602
	Cronbach's $\alpha = .892$ Eigen value = 1.9 % variance explained = 6.8	
Accessibility	The garden provides ease in getting around for individuals in wheelchairs.	.792
	The paving of pathways within the garden is smooth.	.760
	The doors leading into the garden are easy to use.	.728
	Navigating around the garden is easy.	.703
	There is a bathroom close to the garden.	.641
	Cronbach's $\alpha = .807$ Eigen value = 1.7 % variance explained = 6.1	

Research Question 2

To address RQ2, “Do individuals’ perceptions about the key design elements of the healing garden significantly lead to satisfaction with the healing garden?,” the researcher conducted a stepwise regression. Relationships were considered to be statistically significant when $p < .05$. The independent variables consisted of the four perceived healing garden design

factor scores, and the dependent variable was the one item measuring satisfaction with the healing garden. Each perceived healing garden design factor score was calculated by averaging scores of all items belonging to that factor. Table 4.9 presents descriptive and correlation statistics of the four perceived healing garden design factor scores and the satisfaction with the healing garden item score.

The results of the stepwise regression revealed *Privacy, Social Support, and Control* as the only significant perceived healing garden design factor that positively influenced visitors' satisfaction with the healing garden ($\beta = .551, p < .001, \text{Adjusted } R^2 = .296, F_{1,93} = 40.5$). The Adjusted R^2 indicates that 29.6% of the variance in visitors' overall satisfaction with a healing garden can be explained by the variance in their perceptions of the social support, privacy, and control provided by the garden design. The influence of the other perceived healing garden design factors (Natural Distractions, Movement and Exercise, and Accessibility) did not significantly explain visitors' satisfaction with the garden because their relationships (which were significant in bi-variate examinations according to Table 4.9) were subsumed by the

Table 4.9

Visitors' Descriptive and Correlation Statistics of Variables Addressed by RQ2

Key Element	Descriptive Statistics		Correlations				
	<i>M</i>	<i>SD</i>	P	N	M	A	S
Privacy, Social Support, and Control (P)	3.44	.711	1.00				
Natural Distractions (N)	3.19	.727	.49**	1.00			
Movement and Exercise (M)	2.83	.835	.55**	.70**	1.00		
Accessibility (A)	3.92	.649	.46**	.28*	.24*	1.00	
Satisfaction with Healing Garden (S)	3.79	.849	.55**	.22*	.27*	.29*	1.00

* $p < .05$, ** $p < .001$

effect of the Social Support, Privacy, and Control factor; thus, the other factors were excluded from the final regression model.

Research Question 3

To address RQ3, “Does satisfaction with the healing garden lead to behavioral intentions to (a) revisit the healing garden and (b) recommend others to visit the healing garden?,” three simple regressions were conducted. In the simple regressions, the independent variable was the satisfaction with the healing garden score and the dependent variables were each of (1) the average of the two items used to measure the intention to revisit the healing garden, (2) the score of the single item measuring intention to recommend the healing garden to others, and (3) the average score of all three items of intentions to revisit and recommend (Cronbach’s α of the three items = .888). Results of the simple regressions revealed visitors’ satisfaction with the healing garden positively predicted their intent to revisit the garden ($\beta = .546, p < .001, \text{Adjusted } R^2 = .290, F_{1,95} = 38.8$) and intent to recommend the garden to others ($\beta = .606, p < .001, \text{Adjusted } R^2 = .360, F_{1,94} = 53.9$). The adjusted R^2 ’s indicate that 29.0% and 36.0% of the variance in intent to revisit the healing garden and intent to recommend the garden to others, respectively, were explained by the variance in satisfaction with the healing garden. The overall intention score averaging all three intention item scores was also positively explained by satisfaction with the garden ($\beta = .591, p < .001, \text{Adjusted } R^2 = .343, F_{1,95} = 50.5$). Table 4.10 presents descriptive statistics of the dependent variables.

Table 4.10

Visitors' Descriptive Statistics of Satisfaction with the Hospital and Behavioral Intentions toward the Healing Garden and the Hospital

Dependent Variable	<i>M</i>	<i>SD</i>
Intent to Revisit the Garden	3.67	.541
Intent to Recommend the Garden to Others	3.64	.655
Overall Garden Intention Score	3.66	.578
Overall Satisfaction with the Hospital	4.19	.145
Intent to Revisit to the Hospital	4.30	.581
Intent to Recommend the Hospital to Others	4.37	.622

Research Question 4

The mediation relationship proposed in RQ4, “Does satisfaction with the healing garden mediate the relationship between perceptions of the key design elements of the healing garden and behavioral intentions to (a) revisit the healing garden and (b) recommend others to visit the healing garden?,” can be considered to exist when (1) a significant relationship is found between perceived healing garden design factor scores and satisfaction with the healing garden (i.e., results reported for RQ2), (2) a significant relationship exists between satisfaction with the healing garden and behavioral intentions toward the healing garden (i.e., results reported for RQ3), (3) a significant relationship exists between perceived healing garden design factors and behavioral intentions toward the healing garden, but (4) the relationship between perceived healing garden design factors and behavioral intentions toward the healing garden become non-significant when both perceived healing garden design and satisfaction with the healing garden were modeled as independent variables.

The first and second criteria were already met by the aforementioned regression analyses for RQ2 and RQ3. Therefore, in order to examine the third criterion of mediation, the researcher ran a simple regression with the Social Support, Privacy, and Control factor of perceived healing garden design (which was the only significant factor revealed from RQ2 examination) as the independent variable and the average score of the three items of behavioral intent toward the healing garden as the dependent variable. Results revealed a significant relationship ($\beta = .453, p < .001, \text{Adjusted } R^2 = .197, F_{1,95} = 24.3$). Thus, the third criterion of mediation was met. Finally, results from a multiple regression with both the Social Support, Privacy, and Control factor of perceived healing garden design and satisfaction with the healing garden as the independent variables and intent toward the healing garden as the dependent variable showed that the influence of perceived social support, privacy, and control element of healing garden design on behavioral intent toward the healing garden became non-significant ($\beta = .189, p = .055$) in the presence of the satisfaction with the healing garden as another independent variables ($\beta = .591, p < .001$). Thus, satisfaction with the healing garden fully mediated the influence of perceived healing garden design on visitors' behavioral intent toward the healing garden.

Research Question 5

To answer RQ5, "Does visitors' satisfaction with the healing garden lead to their overall satisfaction with the hospital?," the researcher conducted a simple regression with visitors' item score of satisfaction with the healing garden as the independent variable and the average score of the nine items of satisfaction with the hospital as the dependent variable (see Table 4.10 for descriptive statistics of the hospital satisfaction item average score). Prior to the regression analysis, an EFA was conducted to ensure the uni-dimensionality of the nine items of satisfaction

with the hospital, and Cronbach's α of .967 was calculated from the nine items, indicating high reliability of the scale. The regression results revealed that visitors' satisfaction with the healing garden significantly predicted their satisfaction with the hospital ($\beta = .247, p < .05$, Adjusted $R^2 = .051, F_{(1,93)} = 5.99$), indicating that 5.1% of the variance in visitors' satisfaction with the hospital was accounted for by the variance in their satisfaction with the healing garden.

Research Question 6

To address RQ6, "Does visitors' satisfaction with the healing garden lead to their positive behavioral intentions toward the hospital including (a) intention to reuse the hospital for their own future health care needs and (b) intention to recommend the hospital to other patients?," the researcher conducted two simple regressions with the item score of satisfaction with the healing garden as the independent variable and each of (1) the average score of the two of the four items used to measure intent to revisit the hospital for their own health care needs (the two item correlation, $r = .583, p < .001$) and (2) the average score of the two items measuring intent to recommend the hospital to other patients (the two item correlation, $r = .828, p < .001$). Among the four revisit intention items measured, only two were used to calculate participants' revisit intention scores because an EFA of the four items, conducted to prior to the regression analysis, revealed that the two reverse-coded items "Unless it was an emergency this hospital would *not* be my first choice," and "Unless my doctor objects, when I next need a hospital, I will *avoid* returning to this hospital," among the original four items loaded in a separate factor. This EFA result indicates a possibility of a lack of reliability of the reversely worded items due to participants' confusion in reading and interpreting them. Therefore, the reverse-coded items were

omitted from further regression analysis. Table 4.10 presents descriptive statistics of the intention variables.

Results of the two simple regressions revealed that satisfaction with the healing garden significantly predicted both intent to revisit the hospital ($\beta = .270, p < .01, \text{Adjusted } R^2 = .063, F_{1,92} = 7.17$) and intent to recommend the hospital ($\beta = .206, p < .05, \text{Adjusted } R^2 = .032, F_{1,92} = 4.04$). The results indicate that 6.3% and 7.17% of the variance in visitors' intent to revisit and intent to recommend the hospital, respectively, were explained by the variance in their satisfaction with the healing garden. Figure 4.1 presents all results from regression analyses addressing RQs 2-6 related to the visitor sample data.

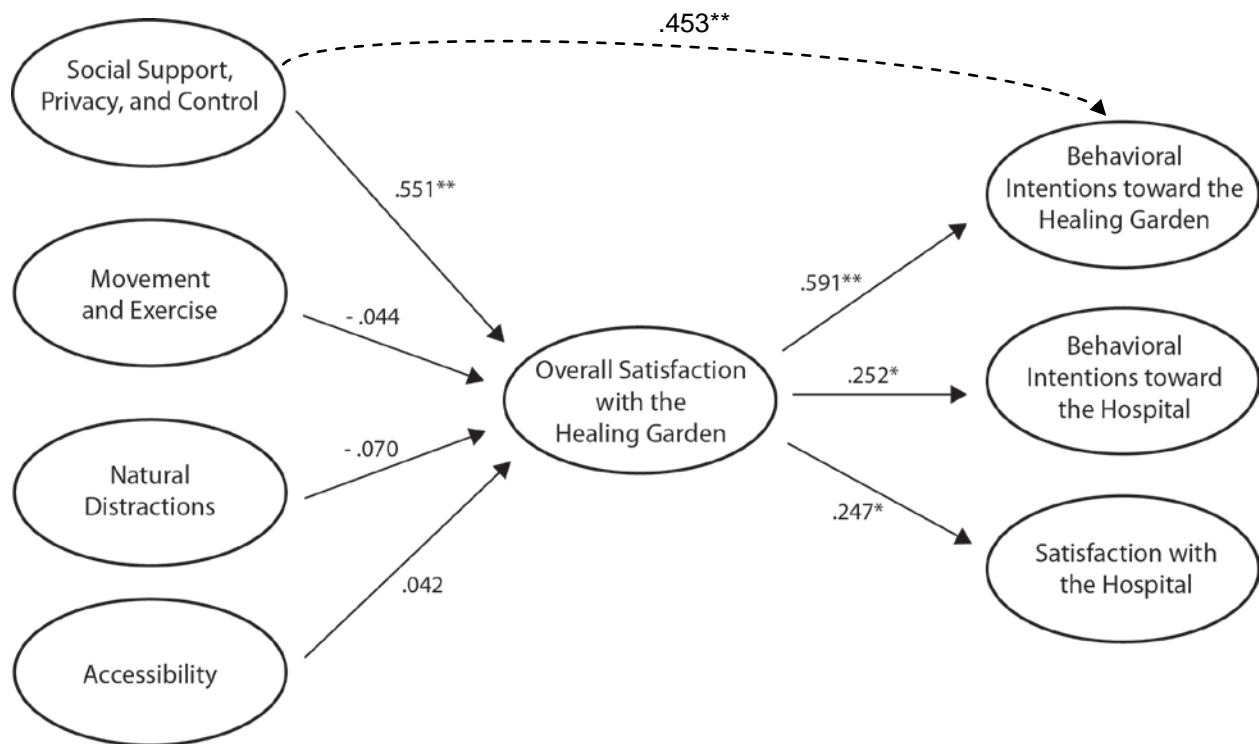


Figure 4.1. Visitor data results related to relationships proposed in research questions. * $p < .05$, ** $p < .001$. The dashed arrow indicate a relationship that was mediated by overall satisfaction with the healing garden according to RQ4 testing results.

Employee Sample Results

Research Questions 2-4 and 7-8

In order to address the research questions regarding employees, regression analyses were run with the employee data, following similar procedures used for the visitor sample. However, no statistical support was found for the relationships proposed in any of the research questions. Considering the strong support for relationships when tested among the visitor sample, the lack of support for similar research questions tested among the employee sample is most likely explained by the lack of statistical power resulting from the small employee sample size ($n = 17$).

Table 4.11 presents descriptive and correlation statistics of the four perceived healing garden design factor scores as well as the score for the item measuring overall satisfaction with the healing garden, relevant to RQ2. Table 4.12 presents descriptive statistics of the dependent variables addressed in RQs 3, 4, 7, and 8 regarding employees.

Table 4.11

Employees' Descriptive and Correlation Statistics of Variables Addressed by RQ2

Key Element	Descriptive Statistics		Correlations (r)				
	M	SD	P	N	M	A	S
Privacy, Social Support, and Control (P)	3.75	.502	1.0				
Natural Distractions (N)	3.88	.393	.522*	1.0			
Movement and Exercise (M)	3.68	.649	.551*	.586*	1.0		
Accessibility (A)	4.04	.408	.568*	.619*	.605*	1.0	
Satisfaction with Healing Garden (S)	4.35	1.057	.254	.330	.222	.433	1.0

* $p < .05$, ** $p < .001$

Table 4.12

Employees' Descriptive Statistics of Satisfaction with the Hospital and Behavioral Intentions toward the Healing Garden and the Hospital

Variable	<i>M</i>	<i>SD</i>	Correlation (<i>r</i>)
Intent to Revisit the Garden	4.56	.609	.208
Intent to Recommend the Garden to Others	4.53	.624	.362
Overall Garden Intention Score	4.55	.552	.290
Job Satisfaction	4.21	.960	-.122
Intent to Remain in Current Job	4.41	1.371	-.193
Intent to Recommend Employer	4.53	.800	-.161

Results after Controlling for Covariate Effects

To enhance the statistical power and partial out the relationships proposed by the research questions with the employee data, the researcher ran further analysis applying potential covariates in the regression models (see Table 4.13). First, to answer RQ2, the researcher ran a hierarchical regression with all potential covariates, some of which were recoded to assure enough group sizes for data analysis – age (3 = 65 or more, 2 = 50-64, 1 = 36-49, 0 = 35 or younger), income (2 = \$80,000 or more, 1 = \$40,000-\$79,999 , 0 = Less than \$40,000), gender (1 = female, 0 = male), ethnicity (1 = White, 0 = non-White), current position at hospital (1 = nursing, 0 = non-nursing), length of employment (1 = Less than 1 year, 2 = 1-2 years, 3 = 3-4 years, 4 = 5-6 years, 5 = 7-8 years, 6 = 9-10 years, 7 = More than 10 years), time taken for breaks (1 = Less than 15 minutes, 2 = 15-29, 3 = 30-44, 4 = 45-59, 5 = 60-74, 6 = 75-89, 7 = 90 minutes or more), perception of being welcome to visit the garden (2 = yes, 1 = unsure, 0 = no), encouragement of employees to recommend the garden to patients (2 = yes, 1 = unsure, 0 = no), and intrinsic and extrinsic job satisfaction (average of item scores from each of the intrinsic and

extrinsic job satisfaction factors) -- entered in a Stepwise manner in the first block, followed by perceived healing garden design factors as the independent variables entered using the Enter

Table 4.13

Regression Results Controlling for Covariates

DV	IV/Covariate	β	<i>P</i>	Adjusted R^2
Overall Garden Satisfaction	Accessibility	.401	.321	-.087
	Social Support, Privacy, and Control	-.062	.879	
	Natural Distractions	.168	.667	
	Movement and Exercise	-.060	.881	
Behavioral Intent toward Garden	Overall Satisfaction with Healing Garden	.296	.266	.022
Job Satisfaction	Extrinsic Job Satisfaction	.478	.026	.658
	Time Taken for Breaks	.366	.036	
	Perception of Being Welcome to Visit Garden	.346	.092	
	Overall Satisfaction with Healing Garden	-.037	.814	
Intent to Remain in Job	Extrinsic Job Satisfaction	.774	.000	.604
	Overall Satisfaction with Healing Garden	-.258	.136	
Intent to Recommend Employer	Extrinsic Job Satisfaction	.301	.081	.755
	Time Taken for Breaks	.291	.046	
	Perception of Being Welcome to Visit Garden	.604	.003	
	Overall Satisfaction with Healing Garden	-.037	.784	

method in the second block, and healing garden satisfaction as the dependent variable. Results revealed that none of the potential covariates were retained significant in the model, and none of the perceived healing garden design factors (Accessibility; Social Support, Privacy, and Control; Natural Distractions; Movement and Exercise) significantly predicted satisfaction with the healing garden ($\beta = .401, -.062, .168, -.060$, respectively; $p = .321, .879, .667, .881$, respectively; Adjusted $R^2 = -.087, F_{4,15} = .700$).

Next, to answer RQ3, a similar hierarchical regression analysis was conducted with the potential covariates in the first block (entered in a stepwise manner), the healing garden satisfaction as the independent variable entered in the second block, and the overall behavioral intention score as the dependent variable. Results revealed that none of the potential covariates were retained significant in the model, and healing garden satisfaction also did not predict behavioral intention toward the healing garden ($\beta = .296, p = .266$, Adjusted $R^2 = .022, F_{1,14} = 1.35$).

Because no significant relationships were observed between perceived healing garden design, healing garden satisfaction, and behavioral intents toward the healing garden among employees through the aforementioned RQ2 and RQ3 related tests, RQ4, which predicted a mediating relationship for these three variables, was not further examined.

To answer RQ7, a hierarchical regression was run with all potential covariates entered in the first block using the stepwise method, healing garden satisfaction as the independent variable in the second block, and overall job satisfaction as the dependent variable. Results revealed that three covariates were significant predictors of overall job satisfaction. They included extrinsic job satisfaction ($\beta = .478, p < .05$), time taken for breaks from work ($\beta = .366, p < .05$), and employees' perception of being welcome to visit the healing garden ($\beta = .346, p < .1$). However,

even after controlling for the effects of these three significant covariates, satisfaction with the healing garden still did not significantly predict overall job satisfaction ($\beta = -.037, p = .814$).

Finally, to answer RQ8, two hierarchical regressions were run with the potential covariates entered in the first block using the stepwise method, healing garden satisfaction as the independent variable in the second block, and (a) intent to remain with the hospital and (b) intent to recommend the hospital to other potential employees as two dependent variables. For intent to remain with the hospital, only one covariate, extrinsic job satisfaction, was significant ($\beta = .774, p < .001$), while healing garden satisfaction remained non-significant ($\beta = -.258, p = .136$) even after controlling for the effect of extrinsic job satisfaction. On the other hand, for intent to recommend the hospital to other potential employees, three covariates (extrinsic job satisfaction time taken for breaks from work, and employees' perception of being welcome to visit the healing garden) were significant ($\beta = .301, .291, \text{ and } .604; p = .081, .046, \text{ and } .003$; respectively). However, even after controlling for the effects of the three covariates, healing garden satisfaction still did not significantly predict intent to recommend one's employer ($\beta = -.037, p = .784$).

CHAPTER 5: DISCUSSION

This chapter discusses the findings reported in Chapter 4 in relation to the literature on healing gardens, satisfaction, and behavioral intent. Because the employee sample was too small to generate sensible conclusions about research questions addressed to employees' perceptions or psychological and behavioral responses related to healing garden designs, the discussion will mainly focus on findings from the visitor study. Additionally, the chapter highlights the importance of the study related to gaps in the literature. Lastly, the chapter addresses the limitations of this study and recommendations for future research.

Key Healing Garden Design Elements

Research Question 1

RQ1 addresses whether individuals' perceptions about healing garden design features are categorized into five dimensions addressing the five key healing garden design elements suggested by the literature. Based on the literature from numerous sources including Cooper Marcus and Barnes (1995, 1999), McDowell and Clark-McDowell (1998), Mitrione and Larson (2007), Naderi and Smith (2008), and Ulrich (1999), the five key healing garden design elements expected to exist were *Sense of Control, Access to Privacy, Social Support, Movement and Exercise, and Natural Distractions*. Through EFA of perceived healing garden design items, four dimensions emerge as key factors of perceived healing garden design in this study. The four factors include (a) Privacy, Social Support, and Control; (b) Natural Distractions; (c) Movement and Exercise; and (d) Accessibility, which are similar but not exactly the same as the five key elements of healing garden design suggested by the literature.

The first dimension, *perceived privacy, social support, and control*, is made up of several social factors that merged together, and is defined by the researcher as “healing garden users’ perception that the healing garden design meets their privacy and social needs.” Example items include, “there are private areas where people can be alone in the garden,” “there are areas in the garden for conversation in small groups,” and “there is a variety of choices in spaces within the garden.” The researcher had anticipated that the three elements which make up the *privacy, social support, and control* component would emerge as distinct components due to the recommendations in the literature. However, the three *a priori* components merged together into a single component due to respondents in this study closely linking the ability to control how their needs for social support and privacy were met with the ability of the garden to provide for those needs. This result shows that visitors to the healing garden value the ability to choose how the garden meets their particular social needs, whether that is private space hidden by plants where they can make a phone call, or a welcoming open seating area where they can converse with others.

The second dimension is *perceived natural distractions*, which is defined by the researcher as “healing garden users’ perception that the healing garden design provides natural environmental features that have potentially restorative influence” (Ulrich, 1999). *Perceived natural distractions* mostly involves items related to the plant life in the garden. Example items include, “the garden has plants with a variety of colors,” “the plants in the garden are eye-catching,” and “the selection of flowers in the garden fits this area/town well.” The foundation of a healing garden is built upon the natural elements within it. Without plants, flowers, and trees, the garden would not be a garden at all. Healing garden designers should strive to select a variety of eye-catching plants, flowers, and trees that provide spots of bright colors. Additionally,

healing garden designers should ensure that the plants have an enjoyable fragrance and that some of the plants have pleasant tactile qualities so that visitors to the garden can not only view the plants but also enjoy interacting with them through the senses of touch and smell. Lastly, healing garden designers should select some plants that are meaningful to the local community to provide a feeling of familiarity to garden visitors.

The third dimension, *perceived movement and exercise*, emerges distinctively as a key healing garden design element as anticipated by the researcher. *Perceived movement and exercise* involves items having to do with individuals' ability to move around in the garden, and is defined by the researcher as "healing garden users' perception that the healing garden design provides an opportunity for them to engage in physical activity" (Ulrich, 1999). Example items include, "the garden provides areas that encourage exercise through walking," and "the garden has wide walking paths with smooth surfaces that allow brisk walking." It is important that healing garden designers provide walking paths for garden users to move around and exercise, because hospital visitors who are waiting in a seated position for a lengthy period of time may benefit from the change of pace, which was demonstrated in this study. It is also important to provide paths where individuals can slowly stroll and meander through the garden rather than walking briskly.

The final dimension, *perceived accessibility*, addresses items from the *a priori* factor of a Sense of Control. However, respondents in the current study uniquely addressed the items making up this component as separate from the other Sense of Control items. *Perceived accessibility* is defined by the researcher as "healing garden users' perception that the healing garden design supports users' need to navigate the garden without restriction." Example items include, "the garden provides ease in getting around for individuals in wheelchairs," "the doors

leading into the garden are easy to use,” and “navigating around the garden is easy.”

Accessibility is an important provision in a hospital healing garden because visitors to the garden cannot enjoy seeing the variety of beautiful plant life or benefit from exercise if they cannot navigate the garden without impediments. There should be unobstructed access through easy-to-use doors leading to the garden, paving should be smooth to prevent tripping, and consideration of the width of paths should be given to allow individuals in wheelchairs easy navigation throughout the garden.

The categorization of perceptions of the four key healing garden design elements implies that visitors to a healing garden may closely link the social aspects of the garden, while considering the other aspects of the garden (i.e. movement and exercise, natural distractions, and accessibility) separately. Although the provision of walking trails for getting around, beautiful plant life, and ease of navigation are important, the social aspects provided by the garden are perhaps most important given that the highest % of the variance of the construct of perceived healing garden design was explained by the perceived privacy, social support, and control factor. Healing garden designers should not only strive to provide proper walking paths, vibrant plants, and accessibility for all healing garden visitors, but they should also consider how individuals will be using the garden socially.

Research Question 2

RQ2 addressed whether perceptions about the key healing garden design elements lead to satisfaction with the healing garden. Drawing on the work of Oliver (2010), satisfaction with the healing garden is defined as a pleasurable feeling of fulfillment resulting from one’s experience with a healing garden (Oliver, 2010). The results among the visitor sample reveal that perceived healing garden design significantly influences visitors’ satisfaction with the healing garden.

RQ2 related results from the visitor sample also confirm perceptions regarding the social aspects of the garden (i.e., *privacy, social support, and control*) as the most important predictor of healing garden satisfaction, among the four perceived healing garden factors. The influence of the other components (*movement and exercise, natural distractions, and accessibility*) is subsumed by the influence of *privacy, social support, and control*, failing to reach statistical significance on their own. Although the ability to move around in the healing garden (i.e. *movement and exercise*), and the pleasing aesthetic and fragrance of the plant life (i.e. *natural distractions*) are related to healing garden satisfaction, the ability of the garden to meet the social needs of individuals is the most important determinant of visitors' satisfaction with the healing garden.

Therefore, healing garden designers should provide spaces where individuals can choose their type of privacy, whether it is to simply be alone or to speak with others without the fear of being overheard. Healing garden designers should provide garden users with *control* over how their social needs are met through providing different types of spaces with varying levels of privacy in the garden. For example, some seating areas may consist of a single chair hidden by plants, whereas other areas may be more open and have group seating centered around an eye-catching plant feature. The social needs of visitors to a healing garden may vary from day to day and from one hospital experience to the next. For example, a family member waiting for a loved one to emerge from a precarious surgery may have a greater need to be alone and undisturbed than someone who is visiting a friend undergoing a routine procedure. A visitor who has been in the hospital for a week waiting for the recovery of a loved one may be bored or lonely and thus visit the healing garden in order to find social support through talking with others. All of these

functions (privacy, social support, and control) must be carefully considered by healing garden designers in order to provide a satisfying space.

Satisfaction with and Behavioral Intention toward the Healing Garden

Research Question 3

Bitner (1992) postulated the notion of the servicescape, which stressed the importance of the physical facility of a service environment. Since services are produced and consumed at the same time, consumers may use the physical environment as a heuristic cue about the quality of the service provider (Bitner, 1992). In this study, the researcher theorized that the Stimulus-Organism-Response (S-O-R) paradigm may explain the ability of satisfaction with the healing garden (an element of the servicescape) to lead to approach/avoidance behaviors toward the healing garden and the hospital.

RQ3 addresses whether satisfaction with the healing garden leads to behavioral intentions to revisit and recommend the garden to others. The results of RQ3 among the visitor sample demonstrate that satisfaction with the healing garden is a significant predictor of approach behaviors toward the garden. Individuals who are more satisfied with the healing garden are more likely to intend to (a) revisit the healing garden when they are in the hospital again and (b) recommend the healing garden to others visiting the hospital. The results thus provide further support for the construct of the servicescape and the S-O-R paradigm.

Additionally, the finding that satisfaction with the healing garden leads to behavioral intentions toward the garden highlights the fact that healing garden designers must pay careful attention to providing a well-designed space that satisfies visitors. It is important that healing garden designers apply the recommendations for four perceived healing garden design factors to

create satisfying spaces from the visitor's perspective, which in turn encourage visitors to desire to return to the garden and recommend the garden to others.

Research Question 4

RQ4 addresses satisfaction with the healing garden as a potential mediator of the relationship between perceptions of the key healing garden design elements and behavioral intentions to (a) revisit the garden and (b) recommend the garden to others. The results indicate that overall satisfaction with the garden functioned as a mediator between perceptions of the key healing garden design elements and behavioral intention to the garden. Thus, individuals' intent to return to the garden occurs not directly through their perception of the key garden design elements, but rather through the pleasurable level of fulfillment that perceptions of the key elements incite.

Satisfaction with and Behavioral Intention toward the Hospital

Research Questions 5 and 6

One of the most important research questions addressed in this study was whether satisfaction with the healing garden leads to overall satisfaction with the hospital and behavioral intentions toward the hospital, which are addressed by RQ5 and RQ6, respectively. The current study reveals that visitors' satisfaction with the healing garden can lead to their overall satisfaction with the hospital as well as positive behavioral intentions toward the hospital. These findings should be of key interest to hospital managers because satisfaction is so highly desired among hospital managers (Atkins et al., 1996), and the satisfaction of visitors, particularly family members of patients, has become an increasingly important trend (e.g. Dodek et al., 2012; Henrich et al., 2011). This study demonstrates that a healing garden can be a powerful enough

space to impact not only visitors' overall satisfaction with the hospital but also their intentions regarding their future behavior toward the hospital such as revisiting or recommending the hospital. This finding provides empirical evidence to justify hospitals' investment in healing gardens, which is an important contribution of this study. Loyalty, indicated by visitors' revisit and recommendation behaviors, is a highly desired outcome of a healthcare service encounter and is perhaps even more necessary when taking into account the highly competitive and changing nature of the healthcare industry of today.

Employees' Responses Related to the Healing Garden

Although this study fails to reveal significant relationships between hospital employees' perceptions of key healing garden design elements, satisfaction with the healing garden, job satisfaction, and behavioral intentions toward the garden and the hospital, the lack of a significant relationship was likely due to the lack of statistical power owing to the small employee sample size ($n = 17$). Thus, the researcher cautions against drawing any conclusions from the non-significant results. In fact, the covariate analysis results reveal that employees' perception of being welcomed to visit the healing garden positively predicts their intent to recommend the hospital to potential employees with a statistical significance ($p < .05$) as well as their job satisfaction with a marginal significance ($p = .09$) in spite of the small sample size. These results provide a rationale for the need for future studies with a sufficient sample of hospital employees that delve into their perceptions and emotional and behavioral outcomes of healing gardens such as the relationships proposed in this study.

Significance of the Study

This study offers several academic and practical implications in the healthcare design field. First, this study fills the need for a validated survey instrument that measures perceptions of key healing garden design elements. Despite the growing body of healing garden research since the 1990s, no single instrument has been published which can be generally adopted to measure perceptions of key design elements in healing gardens. This study developed an instrument that measures perceptions of the key healing garden design elements (Ulrich, 1999) and tested its validity and reliability with a healing garden visitor sample so that the instrument can be used in future healing garden research. It is the desire of the researcher that any hospital may adopt the instrument developed in this study to assess visitors' perceptions of key healing garden design elements in their own healing gardens, affirming positive aspects and pinpointing elements that can be improved. The ability of the instrument developed in this study to aid healthcare managers in assessing their healing gardens to identify strengths and weaknesses of the healing garden design is a key contribution of this study.

Second, this study is the first study in the healing garden literature that has generated empirical evidence for differential effectiveness of perceptions of varying key healing garden design elements in positively influencing users' emotion and behavior. This study provides specific recommendations on healing garden design for healthcare designers by offering knowledge on the relative importance of varying healing garden design elements and their specific features. This study identified that plants, walking paths, and easily navigable design features are important; however, it is of highest importance to ensure that the garden provides choices of spaces where individuals can meet their social needs for privacy or talking with others.

Next, this study contributes to the healing garden literature as one of the first empirical research studies that link healing garden effects to outcomes for the hospital. Despite the

growing body of healing garden research since Cooper Marcus and Barnes (1999) began studying healing gardens in hospitals, the empirical testing of hypotheses related to healing gardens has been a major gap in the literature. Descriptive studies such as that of Whitehouse et al. (2001) have been regarded as evidence for the ability of healing garden to impact satisfaction and intent to recommend the hospital to others, even though the hypotheses were not statistically tested. This study expands the applicability of Whitehouse et al. (2001) and Ulrich's (1999) Theory of Supportive Gardens by applying it and empirically testing it to explain the ability of healing gardens to impact visitors' satisfaction with and behavioral intent toward the hospital. The potential ability of a healing garden to impact emotional (i.e. satisfaction) and behavioral (i.e. intent to return and recommend) responses toward the hospital itself is a crucial discovery.

Finally, findings from this study provide key information to healthcare managers because healing gardens are often only made possible through a large financial contribution provided by donors and subsequent maintenance by volunteers (Whitehouse et al., 2001). Since healing gardens represent such a large investment of finances as well as time, it is vital to provide empirical evidence for the benefits that these gardens may provide (Relf, 2005; Whitehouse et al., 2001). This study reveals that the thoughtful design of a healing garden, including the key healing garden design elements, can potentially impact overall satisfaction with the healing garden as well as positive behavioral intentions toward the healing garden including intent to revisit and recommend. This study further reveals an effect of visitors' satisfaction with the healing garden on their overall satisfaction and behavioral intentions related to the hospital. By providing the empirical evidence through these findings, this study demonstrates that a hospital healing garden can indeed be a worthwhile investment and provides encouraging evidence for

hospital managers who are considering the potential of a healing garden as a venture to invest in and maintain.

Limitations and Future Research Recommendations

Findings of the current study must be understood in light of several limitations. First, this study has limitations related to sampling error and bias which are common among survey research (Fowler, 2009). It is possible that the respondents in the participating hospitals do not represent all hospital visitors and staff in the United States. Additionally, respondents could have exhibited a sample bias, with only individuals who share certain characteristics responding to the survey (Fowler, 2009). For example, it is possible that the most emotionally distressed visitors to UAB Hospital were not represented in the sample. Several individuals who did not elect to participate in the study told the researcher that they could not focus on completing a survey at that time because they were too worried about a family member or friend who was undergoing a critical surgery. Another individual would not take the survey because a family member had just passed away following a surgery. The aforementioned individuals who were in a state of heightened emotional distress might have responded differently to the survey than their counterparts who did complete the survey. Future research could address this limitation by conducting the survey at a healing garden located in a lower-stress setting, such as an outpatient clinic or an assisted living facility.

Second, this study exhibits limitations related to sample size. With a relatively small sample of visitors and employees to the healing garden at UAB Hospital, the results of this study must be interpreted with caution. For example, the finding that social factors having to do with privacy, social support, and a sense of control were so closely linked in the current study could be attributable to the particular sample used in this study and may not be generalizable to other

populations. Further studies are needed to validate the healing garden perception scale developed in this study and further examine the relationships addressed in this study across larger samples and across a wide variety of healing gardens. The small sample size at Madison Hospital was also a major limitation. Although the relationships proposed in the research questions for the employee sample were not supported, this result should be interpreted with extreme caution. Future research is needed which includes a large sample of employees to re-evaluate the relationships proposed in this study.

Next, since a patient sample was not included in the current study, the study does not address all potential users of healing gardens. Healing gardens vary from hospital to hospital in terms of the composition of the typical user (i.e., patient, visitor, or staff). Future studies should seek to attain a sample including patients as well as visitors and employees in order to represent all potential user groups of hospital healing gardens.

Fourth, although the researcher attempted to increase the generalizability of the current study by assessing responses to healing gardens in two different hospitals, the hospitals used in the current study were both located in the same state in the Southeastern United States. Thus, the study may exhibit limitations in relation to regional factors that may influence survey responses. For example, it is possible that perceptions of certain garden design elements might change during the winter months when the plants are not in full bloom. Additionally, certain cultural idiosyncrasies, such as many Alabama residents growing up in rural areas with plentiful vegetation and plant life, might have biased respondents to feel more favorably to the garden. Future research is needed to distribute the survey among various sites throughout the United States.

Fifth, there were some measurement issues which must be considered as limitations when interpreting the results of this study. The inclusion of the “Not Applicable, N/A” category as a potential response for the healing garden perception items may have been confusing for some respondents. Some perception items were related to physical components of the garden that were objectively known to not exist (such as a water feature); yet, some respondents marked “Not Applicable” rather than marking “Strongly Disagree” when responding to items addressing these non-existent garden elements. The researcher re-coded N/A responses as Strongly Disagree or Neutral depending on whether the item was *objective* or *subjective*. To ensure that re-coding did not impact the results of this study, the researcher retested the statistical tests having to do with the garden perception items again without re-coding responses. The retesting revealed that with or without re-coding of the N/A responses, the hypotheses were still statistically significant with very little variation in p values and β scores. However, to avoid confusion in future studies, the researcher strongly recommends changing the Not Applicable N/A category to “I don’t know”.

Next, it is important to note that several *perceived natural distraction* items related to water features, wildlife, and sounds in the garden, were eliminated in the process of factor analysis. Many of these items had low loadings or cross loadings, or there were simply not enough similar items included in the original scale development process to allow them to emerge as a distinct component. Future research should seek to add more items related to water features, wildlife, and sounds in the garden to determine if these items would emerge as distinct components.

Finally, the current study has limitations with regard to the inclusion of only five design elements of healing gardens. The five key healing garden elements were initially identified based on Ulrich (1999), and specific features of the key elements were selected for inclusion in the

scale based on a thorough review of the literature (e.g., Cooper Marcus & Barnes, 1995, 1999; McDowell & Clark-McDowell, 1998; Mitrione & Larson, 2007; Naderi & Smith, 2008; Ulrich, 1999). However, the exclusion of other potential healing garden design elements and features may limit the generalizability of findings to all healing garden contexts.

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Appendix A
Visitor Survey

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The seating in the garden is comfortable.	<i>N/A</i>	1	2	3	4	5
There are both sunny and shaded areas in the garden.	<i>N/A</i>	1	2	3	4	5
The concrete in the garden glares in my eyes.	<i>N/A</i>	1	2	3	4	5
People can enter the garden from the fifth floor of the hospital without having to use stairs or ramps.	<i>N/A</i>	1	2	3	4	5
There are choices of walking routes in the garden.	<i>N/A</i>	1	2	3	4	5
There is a variety of choices in spaces within the garden.	<i>N/A</i>	1	2	3	4	5
There are different views of scenery to choose from in the garden.	<i>N/A</i>	1	2	3	4	5
There is a drinking fountain in the garden.	<i>N/A</i>	1	2	3	4	5
There is a bathroom close to the garden.	<i>N/A</i>	1	2	3	4	5
This garden makes me feel in control.	<i>N/A</i>	1	2	3	4	5
There are private areas where people can be alone in the garden.	<i>N/A</i>	1	2	3	4	5
There are some private seating areas hidden by plants.	<i>N/A</i>	1	2	3	4	5
There are places in the garden where people can talk privately.	<i>N/A</i>	1	2	3	4	5
There is a feeling of enclosure from the outside world when I am in the garden.	<i>N/A</i>	1	2	3	4	5
There is a feeling of enclosure from the hospital environment when I am in the garden.	<i>N/A</i>	1	2	3	4	5
There are places in the garden where staff can sit together during breaks.	<i>N/A</i>	1	2	3	4	5
The size of the garden is large enough to keep people from feeling crowded.	<i>N/A</i>	1	2	3	4	5
The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).	<i>N/A</i>	1	2	3	4	5
There is privacy in the garden from on-looking patient rooms.	<i>N/A</i>	1	2	3	4	5
This garden allows me to have privacy.	<i>N/A</i>	1	2	3	4	5

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There are areas in the garden for conversations in small groups.	<i>N/A</i>	1	2	3	4	5
In the garden, seating is arranged at right angles for talking with others.	<i>N/A</i>	1	2	3	4	5
There is movable seating in the garden.	<i>N/A</i>	1	2	3	4	5
There is a central space for people to gather.	<i>N/A</i>	1	2	3	4	5
The garden has some table arrangements.	<i>N/A</i>	1	2	3	4	5
Chairs in the garden are made of proper materials for me to sit comfortably.	<i>N/A</i>	1	2	3	4	5
This garden offers a space where I can interact with people.	<i>N/A</i>	1	2	3	4	5
The garden provides areas that encourage exercise through walking.	<i>N/A</i>	1	2	3	4	5
There are walking paths in the garden that encourage me to walk around.	<i>N/A</i>	1	2	3	4	5
The garden has various types (shapes, widths, and routes) of walking paths.	<i>N/A</i>	1	2	3	4	5
The garden has wide walking paths with smooth surfaces that allow brisk walking.	<i>N/A</i>	1	2	3	4	5
The walking paths in the garden have changing views, preventing me from feeling bored while walking.	<i>N/A</i>	1	2	3	4	5
The garden has narrow and curving walking paths that are appropriate for slowly strolling and meandering.	<i>N/A</i>	1	2	3	4	5
This garden offers a space where I can move around and exercise.	<i>N/A</i>	1	2	3	4	5
The garden has plants with a variety of colors.	<i>N/A</i>	1	2	3	4	5
There are spots of bright colors in the plants.	<i>N/A</i>	1	2	3	4	5
Some plants in the garden are pleasant to touch.	<i>N/A</i>	1	2	3	4	5
The plant life in the garden (trees, shrubs, and flowers) is planted densely.	<i>N/A</i>	1	2	3	4	5
Plant life (trees, shrubs, and flowers) is the major portion of the garden.	<i>N/A</i>	1	2	3	4	5

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The plants in the garden are eye-catching.	<i>N/A</i>	1	2	3	4	5
The plants in the garden have a pleasant fragrance.	<i>N/A</i>	1	2	3	4	5
There is a variety of plant life (trees, shrubs, and flowers) in the garden.	<i>N/A</i>	1	2	3	4	5
The selection of flowers in the garden fits this area/town well.	<i>N/A</i>	1	2	3	4	5
The garden has some plants native to this part of the country.	<i>N/A</i>	1	2	3	4	5
Some plants in the garden attract butterflies.	<i>N/A</i>	1	2	3	4	5
Leaves of some plants in the garden move easily in the breeze.	<i>N/A</i>	1	2	3	4	5
People on upper floors of the hospital can see some of the greenery in the garden.	<i>N/A</i>	1	2	3	4	5
The garden is a good place for wildlife, such as birds.	<i>N/A</i>	1	2	3	4	5
There is a water feature (e.g., a fountain, water wall, or pond) in the garden.	<i>N/A</i>	1	2	3	4	5
The water feature is easy to see in the garden.	<i>N/A</i>	1	2	3	4	5
The size of the water feature is appropriate for this garden.	<i>N/A</i>	1	2	3	4	5
The garden has an unpaved area where I can see earth/soil.	<i>N/A</i>	1	2	3	4	5
The water feature makes soothing sounds.	<i>N/A</i>	1	2	3	4	5
This garden has a relaxing view of the surrounding nature.	<i>N/A</i>	1	2	3	4	5
There are intrusive noises in the garden.	<i>N/A</i>	1	2	3	4	5
This garden offers me the opportunity to relieve my stress by being around nature.	<i>N/A</i>	1	2	3	4	5

DIRECTIONS: The following question relates to your overall satisfaction with the healing garden in this hospital. Please **CIRCLE** a number on a 5-point scale (1=VERY DISSATISFIED, 5= VERY SATISFIED) to indicate your level of satisfaction.

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Overall, how satisfied are you with the healing garden in this hospital?	1	2	3	4	5

DIRECTIONS: The following questions relate to your future plans toward the healing garden in this hospital. Please **CIRCLE** a number on a 5-point scale (1=VERY LOW, 5= VERY HIGH) to indicate your thought.

	Very Low	Low	Unsure	High	Very High
While I am in this hospital for the current care of my family member or friend, the probability that I will visit the hospital's healing garden again is:	1	2	3	4	5
The likelihood that I would recommend this hospital's healing garden to a friend visiting this hospital is:	1	2	3	4	5
If I had to return to this hospital again, the likelihood that I would visit the healing garden is:	1	2	3	4	5

DIRECTIONS: The following questions relate to your satisfaction with your experience in this hospital. Please **CIRCLE** a number on a 5-point scale (1=DEFINITELY NO, 5=DEFINITELY YES) to indicate your level of agreement with each of the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I received a good quality of service during my time in this hospital.	1	2	3	4	5
I received the kind of service I needed.	1	2	3	4	5
The hospital met my needs during my time here.	1	2	3	4	5
I am satisfied with the help I received at this hospital.	1	2	3	4	5
The patient I am visiting received a good quality of service during their time in this hospital.	1	2	3	4	5
The patient I am visiting received the kind of service s/he needed.	1	2	3	4	5
The hospital met the needs of the patient I was visiting during my time here.	1	2	3	4	5
I am satisfied with the help the patient I was visiting received at this hospital.	1	2	3	4	5
Overall, I am satisfied with this hospital.	1	2	3	4	5
When I need hospital care for myself in the future, I would certainly return to this hospital.	1	2	3	4	5
Unless it was an emergency, this hospital would not be my first choice.	1	2	3	4	5
It is possible that in the future I will use this hospital.	1	2	3	4	5
Unless my doctor objects, when I next need a hospital, I will avoid returning to this hospital.	1	2	3	4	5
If a friend were in need of similar hospital care, I would recommend this hospital to him/her.	1	2	3	4	5
It is likely that I will recommend this hospital's services to others when they are in need of hospital care.	1	2	3	4	5

DEMOGRAPHICS

DIRECTIONS: Please answer the following questions by checking the appropriate selection, filling in the blanks, or writing up your answer.

1. What is your age? _____ YEARS OLD
2. What is your gender?
_____ MALE _____ FEMALE
3. What was your total household income in 2011?
_____ Less than \$10,000 _____ \$60,000-\$69,999
_____ \$10,000-\$19,999 _____ \$70,000-\$79,999
_____ \$20,000-\$29,999 _____ \$80,000-\$89,999
_____ \$30,000-\$39,999 _____ \$90,000-\$99,999
_____ \$40,000-\$49,999 _____ \$100,000-\$149,999
_____ \$50,000-\$59,999 _____ \$150,000 or more
4. Which of the following ethnic groups do you consider yourself to be a member of?
_____ American Indian/Alaskan Native _____ Non-Hispanic Black
_____ Asian/Pacific Islander _____ Non-Hispanic White
_____ Hispanic _____ Other (Please specify: _____)
5. How many times have you been hospitalized at this hospital before?
_____ Never _____ 3 times
_____ 1 time _____ More than 3 times (Please
_____ 2 times specify the number of visits: _____)
6. How many times have you visited this hospital as a visitor for a patient or as an outpatient in the last five years?
_____ Never _____ 4-6 times
_____ 1 time _____ 7-10 times
_____ 2-3 times _____ More than 10 times (Please
specify the number of visits: _____)
7. How long has your current visit to this hospital been? (If you are a caretaker of a patient in this hospital, add all the time that you have stayed at the hospital for the patient during this hospitalization).
_____ Less than 24 hours
_____ Between 24-48 hours
_____ 49-72 hours
_____ More than 72 hours (Please specify the number of days: _____)
8. Do you have any of the following physical conditions that would prevent you from being able to use the garden or enjoy the garden to its fullest potential? Please check **ALL** that apply:
_____ Loss of hearing _____ Sun sensitivity
_____ Loss of vision _____ Color blindness
_____ Loss of touch _____ Inability to walk
_____ Loss of smell _____ Other (Please specify: _____)

Appendix B
Employee Survey

A Survey about Your Experience at This Hospital (Employee)

DIRECTIONS: Please review and answer the following questions regarding your use of the healing garden in this hospital (located on the fifth floor of the North Pavilion). Please **CHECK THE BOX** to indicate your response to each question.

Have you ever viewed the healing garden in this hospital (located on the fifth floor of the North Pavilion)?	<input type="checkbox"/> Yes <input type="checkbox"/> No (If no, please move on to Page 6)
How often do you typically visit the healing garden in this hospital?	<input type="checkbox"/> Never have visited <input type="checkbox"/> Several times per week <input type="checkbox"/> Less than once per week <input type="checkbox"/> Once daily <input type="checkbox"/> Once per week <input type="checkbox"/> More than once daily

DIRECTIONS: The following set of questions relates to your perceptions of various aspects of the healing garden in this hospital. Please **CIRCLE** a number on a 5-point scale (1=STRONGLY DISAGREE, 5= STRONGLY AGREE) to indicate your level of agreement with each of the following statements:

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The garden is easily visible from the hospital entry.	N/A	1	2	3	4	5
The garden provides an inviting entrance.	N/A	1	2	3	4	5
This garden is easy to see from hallways in the hospital.	N/A	1	2	3	4	5
Maps that show the way to the garden are available at different locations in the hospital.	N/A	1	2	3	4	5
There are proper signs leading to the garden.	N/A	1	2	3	4	5
The doors leading into the garden are easy to use.	N/A	1	2	3	4	5
The paving of pathways within the garden is smooth.	N/A	1	2	3	4	5
Navigating around the garden is easy.	N/A	1	2	3	4	5
The garden provides ease in getting around for individuals in wheelchairs.	N/A	1	2	3	4	5
The garden provides a variety of seating arrangement choices.	N/A	1	2	3	4	5

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The seating in the garden is comfortable.	<i>N/A</i>	1	2	3	4	5
There are both sunny and shaded areas in the garden.	<i>N/A</i>	1	2	3	4	5
The concrete in the garden glares in my eyes.	<i>N/A</i>	1	2	3	4	5
People can enter the garden from the fifth floor of the hospital without having to use stairs or ramps.	<i>N/A</i>	1	2	3	4	5
There are choices of walking routes in the garden.	<i>N/A</i>	1	2	3	4	5
There is a variety of choices in spaces within the garden.	<i>N/A</i>	1	2	3	4	5
There are different views of scenery to choose from in the garden.	<i>N/A</i>	1	2	3	4	5
There is a drinking fountain in the garden.	<i>N/A</i>	1	2	3	4	5
There is a bathroom close to the garden.	<i>N/A</i>	1	2	3	4	5
This garden makes me feel in control.	<i>N/A</i>	1	2	3	4	5
There are private areas where people can be alone in the garden.	<i>N/A</i>	1	2	3	4	5
There are some private seating areas hidden by plants.	<i>N/A</i>	1	2	3	4	5
There are places in the garden where people can talk privately.	<i>N/A</i>	1	2	3	4	5
There is a feeling of enclosure from the outside world when I am in the garden.	<i>N/A</i>	1	2	3	4	5
There is a feeling of enclosure from the hospital environment when I am in the garden.	<i>N/A</i>	1	2	3	4	5
There are places in the garden where staff can sit together during breaks.	<i>N/A</i>	1	2	3	4	5
The size of the garden is large enough to keep people from feeling crowded.	<i>N/A</i>	1	2	3	4	5
The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).	<i>N/A</i>	1	2	3	4	5
There is privacy in the garden from on-looking patient rooms.	<i>N/A</i>	1	2	3	4	5
This garden allows me to have privacy.	<i>N/A</i>	1	2	3	4	5

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There are areas in the garden for conversations in small groups.	<i>N/A</i>	1	2	3	4	5
In the garden, seating is arranged at right angles for talking with others.	<i>N/A</i>	1	2	3	4	5
There is movable seating in the garden.	<i>N/A</i>	1	2	3	4	5
There is a central space for people to gather.	<i>N/A</i>	1	2	3	4	5
The garden has some table arrangements.	<i>N/A</i>	1	2	3	4	5
Chairs in the garden are made of proper materials for me to sit comfortably.	<i>N/A</i>	1	2	3	4	5
This garden offers a space where I can interact with people.	<i>N/A</i>	1	2	3	4	5
The garden provides areas that encourage exercise through walking.	<i>N/A</i>	1	2	3	4	5
There are walking paths in the garden that encourage me to walk around.	<i>N/A</i>	1	2	3	4	5
The garden has various types (shapes, widths, and routes) of walking paths.	<i>N/A</i>	1	2	3	4	5
The garden has wide walking paths with smooth surfaces that allow brisk walking.	<i>N/A</i>	1	2	3	4	5
The walking paths in the garden have changing views, preventing me from feeling bored while walking.	<i>N/A</i>	1	2	3	4	5
The garden has narrow and curving walking paths that are appropriate for slowly strolling and meandering.	<i>N/A</i>	1	2	3	4	5
This garden offers a space where I can move around and exercise.	<i>N/A</i>	1	2	3	4	5
The garden has plants with a variety of colors.	<i>N/A</i>	1	2	3	4	5
There are spots of bright colors in the plants.	<i>N/A</i>	1	2	3	4	5
Some plants in the garden are pleasant to touch.	<i>N/A</i>	1	2	3	4	5
The plant life in the garden (trees, shrubs, and flowers) is planted densely.	<i>N/A</i>	1	2	3	4	5
Plant life (trees, shrubs, and flowers) is the major portion of the garden.	<i>N/A</i>	1	2	3	4	5

	<i>Not Applicable</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The plants in the garden are eye-catching.	<i>N/A</i>	1	2	3	4	5
The plants in the garden have a pleasant fragrance.	<i>N/A</i>	1	2	3	4	5
There is a variety of plant life (trees, shrubs, and flowers) in the garden.	<i>N/A</i>	1	2	3	4	5
The selection of flowers in the garden fits this area/town well.	<i>N/A</i>	1	2	3	4	5
The garden has some plants native to this part of the country.	<i>N/A</i>	1	2	3	4	5
Some plants in the garden attract butterflies.	<i>N/A</i>	1	2	3	4	5
Leaves of some plants in the garden move easily in the breeze.	<i>N/A</i>	1	2	3	4	5
People on upper floors of the hospital can see some of the greenery in the garden.	<i>N/A</i>	1	2	3	4	5
The garden is a good place for wildlife, such as birds.	<i>N/A</i>	1	2	3	4	5
There is a water feature (e.g., a fountain, water wall, or pond) in the garden.	<i>N/A</i>	1	2	3	4	5
The water feature is easy to see in the garden.	<i>N/A</i>	1	2	3	4	5
The size of the water feature is appropriate for this garden.	<i>N/A</i>	1	2	3	4	5
The garden has an unpaved area where I can see earth/soil.	<i>N/A</i>	1	2	3	4	5
The water feature makes soothing sounds.	<i>N/A</i>	1	2	3	4	5
This garden has a relaxing view of the surrounding nature.	<i>N/A</i>	1	2	3	4	5
There are intrusive noises in the garden.	<i>N/A</i>	1	2	3	4	5
This garden offers me the opportunity to relieve my stress by being around nature.	<i>N/A</i>	1	2	3	4	5

DIRECTIONS: The following question relates to your overall satisfaction with the healing garden in this hospital. Please **CIRCLE** a number on a 5-point scale (1=VERY DISSATISFIED, 5= VERY SATISFIED) to indicate your level of satisfaction.

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Overall, how satisfied are you with the healing garden in this hospital?	1	2	3	4	5

DIRECTIONS: The following questions relate to your future plans toward the healing garden in this hospital. Please **CIRCLE** a number on a 5-point scale (1=VERY LOW, 5= VERY HIGH) to indicate your thought.

	Very Low	Low	Unsure	High	Very High
The probability that I will visit this hospital's healing garden again is:	1	2	3	4	5
The likelihood that I would recommend this facility's healing garden to a friend visiting this hospital is:	1	2	3	4	5

DIRECTIONS: Think of your job in general. All in all, what is it like most of the time? Make your ratings by checking the appropriate space. For example,

Sad ____ : ____ : ____ : X : ____ Happy

All in all, I would describe my job as:

Bad ____ : ____ : ____ : ____ : ____ Good
 Undesirable ____ : ____ : ____ : ____ : ____ Desirable
 Worse than most ____ : ____ : ____ : ____ : ____ Better than most
 Disagreeable ____ : ____ : ____ : ____ : ____ Agreeable
 Makes me discontent ____ : ____ : ____ : ____ : ____ Makes me content
 Poor ____ : ____ : ____ : ____ : ____ Excellent
 Not enjoyable ____ : ____ : ____ : ____ : ____ Enjoyable

DIRECTIONS: The following set of questions relates to your satisfaction with specific parts of your job at this hospital. Please **CIRCLE** a number on a 5-point scale (1=VERY DISSATISFIED, 5= VERY SATISFIED) to indicate your level of satisfaction with **each of the following items.**

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Being able to keep busy all the time	1	2	3	4	5
The chance to work alone on the job	1	2	3	4	5
The chance to do different things from time to time	1	2	3	4	5
The chance to participate as a member of the community	1	2	3	4	5
The way my boss handles people	1	2	3	4	5
Competence of my supervisor in making decisions	1	2	3	4	5

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Being able to do things that don't go against my conscience	1	2	3	4	5
The way my job provides steady employment	1	2	3	4	5
The chance to help others	1	2	3	4	5
The chance to tell people what to do	1	2	3	4	5
The chance to do something that makes use of my abilities	1	2	3	4	5
The way company policies are put into practice	1	2	3	4	5
My pay and the amount of work I do	1	2	3	4	5
The chances for advancement in this job	1	2	3	4	5
The freedom to use my own judgment	1	2	3	4	5
The chance to try my own methods of performing my job	1	2	3	4	5
The working conditions	1	2	3	4	5
The way coworkers get along with each other	1	2	3	4	5
The praise I get for doing a good job	1	2	3	4	5
The feeling of accomplishment I get from my job	1	2	3	4	5

DIRECTIONS: The following questions relate to your future intentions toward your job at this hospital. Please **CIRCLE** a number on a 5-point scale to indicate your level of agreement with each of the following statements.

	Definitely No	Probably No	No Opinion	Probably Yes	Definitely Yes
If a friend were in need of a similar job, would you recommend this hospital to him/her?	1	2	3	4	5

	Definitely Not Likely	Probably Not Likely	Not Sure	Probably Likely	Definitely Likely
What is the probability that you will stay employed in this hospital for the next five years?	1	2	3	4	5

How long do you desire to continue to be employed at this hospital?

- _____ 1 year
- _____ 2-3 years
- _____ 4-5 years
- _____ 6-7 years
- _____ 8-9 years
- _____ 10 or more years (Please specify number: _____)

DEMOGRAPHICS

DIRECTIONS: Please answer the following questions by checking the appropriate selection, filling in the blanks, or writing up your answer.

1. What is your age? _____ YEARS OLD
2. What is your gender?
 _____ MALE _____ FEMALE
3. What was your total household income in 2011?
 _____ Less than \$10,000 _____ \$60,000-\$69,999
 _____ \$10,000-\$19,999 _____ \$70,000-\$79,999
 _____ \$20,000-\$29,999 _____ \$80,000-\$89,999
 _____ \$30,000-\$39,999 _____ \$90,000-\$99,999
 _____ \$40,000-\$49,999 _____ \$100,000-\$149,999
 _____ \$50,000-\$59,999 _____ \$150,000 or more
4. Which of the following ethnic groups do you consider yourself to be a member of?
 _____ American Indian/Alaskan Native _____ Non-Hispanic Black
 _____ Asian/Pacific Islander _____ Non-Hispanic White
 _____ Hispanic _____ Other (Please specify:
 _____)
5. How would you best describe your current position at this hospital?
 _____ Administrative
 _____ Nursing
 _____ Physician
 _____ Other (Please specify: _____)

6. How long have you been an employee of this hospital?
 LESS THAN 1 YEAR (Please specify the number of months: _____)
 1-2 YEARS
 3-4 YEARS
 5-6 YEARS
 7-8 YEARS
 9-10 YEARS
 MORE THAN 10 YEARS (Please specify the number of years: _____)
7. How much total time do you take for breaks from work in a typical work day, including lunch and all other breaks?
 Less than 15 minutes
 15-29 minutes
 30-44 minutes
 45-59 minutes
 60-74 minutes
 75-89 minutes
 90 minutes or more
8. Is the healing garden a place that you are encouraged to recommend to patients and their family members?
 Yes
 Unsure
 No
9. Is the healing garden in this hospital a place that hospital employees are welcome to visit?
 Yes
 Unsure
 No
10. Do you have any of the following physical conditions that would prevent you from being able to use the healing garden or enjoy the garden to its fullest potential? Please check **ALL** that apply:
 Loss of hearing Sun sensitivity
 Loss of vision Color blindness
 Loss of touch Inability to walk
 Loss of smell Other (Please specify:_____)

Thank you very much for your participation in this study!

Appendix C

**Table for Re-Coded “Not Applicable, N/A”
Garden Perception Items**

Re-Coded “Not Applicable, N/A” Key Healing Garden Design Elements

Key Element	Items	N/A Recoded As	# of Responses Affected
Sense of Control	The garden is easily visible from the hospital entry.	Neutral	13
	The garden provides an inviting entrance.	Neutral	2
	The garden is easy to see from hallways in the hospital.	Neutral	2
	Maps that show the way to the garden are available at different locations in the hospital.	Neutral	14
	There are proper signs leading to the garden.	Neutral	3
	The doors leading into the garden are easy to use.	Neutral	3
	The paving of pathways within the garden is smooth.	Neutral	4
	Navigating around the garden is easy.	Neutral	5
	The garden provides ease in getting around for individuals in wheelchairs.	Neutral	9
	The garden provides a variety of seating arrangement choices.	Neutral	4
	The seating in the garden is comfortable.	Neutral	7
	There are both sunny and shaded areas in the garden.	Neutral	1
	The concrete in the garden glares in my eyes. (reverse code)	Neutral	11
	People can enter the garden from the hospital without having to use stairs or ramps.	Neutral	2
	There are choices of walking routes in the garden.	Neutral	3
	There is a variety of choices in spaces within the garden.	Neutral	1
There are different views of scenery to choose from in the garden.	Neutral	2	
There is a drinking fountain in the garden.	Strongly Disagree	22	
There is a bathroom close to the garden.	Neutral	3	

Key Element	Items	N/A Recoded As	# of Responses Affected
Access to privacy	There are private areas where people can be alone in the garden.	Neutral	7
	There are some private seating areas hidden by plants.	Neutral	5
	There are places in the garden where people can talk privately.	Neutral	4
	There is a feeling of enclosure from the outside world when I am in the garden.	Neutral	5
	There is a feeling of enclosure from the hospital environment when I am in the garden.	Neutral	4
	There are places in the garden where staff can sit together during breaks.	Neutral	14
	The size of the garden is large enough to keep people from feeling crowded.	Neutral	4
	The garden is shielded from the surrounding buildings (through tall trees, a canopy or gazebo, or something similar).	Neutral	3
Social support	There is privacy in the garden from on-looking patient rooms.	Neutral	3
	There are areas in the garden for conversations in small groups.	Neutral	4
	In the garden, seating is arranged at right angles for talking with others.	Neutral	5
	There is movable seating in the garden.	Neutral	9
	There is a central space for people to gather.	Neutral	7
	The garden has some table arrangements.	Neutral	7
Movement and exercise	Chairs in the garden are made of proper materials for me to sit comfortably.	Neutral	3
	The garden provides areas that encourage exercise through walking.	Neutral	2
	There are walking paths in the garden that encourage me to walk around.	Neutral	3
	The garden has various types (shapes, widths, and routes) of walking paths.	Neutral	3

Key Element	Items	N/A Recoded As	# of Responses
Movement and exercise (continued)	The garden has wide walking paths with smooth surfaces that allow brisk walking.	Neutral	3
	The walking paths in the garden have changing views, preventing me from feeling bored while walking.	Neutral	5
	The garden has narrow and curvy walking paths that are appropriate for slowly strolling and meandering.	Neutral	4
Natural distractions	The garden has plants with a variety of colors.	Neutral	3
	There are spots of bright colors in the plants.	Neutral	5
	Some plants in the garden are pleasant to touch.	Neutral	6
	The plant life in the garden (trees, shrubs, and flowers) is planted densely.	Neutral	2
	Plant life (trees, shrubs, and flowers) is the major portion of the garden.	Neutral	1
	The plants in the garden are eye-catching.	Neutral	1
	The plants in the garden have a pleasant fragrance.	Neutral	6
	There is a variety of plant life (trees, shrubs, and flowers) in the garden.	Neutral	1
	The selection of flowers in the garden fits this area/town well.	Neutral	5
	The garden has some plants native to this part of the country.	Neutral	6
	Some plants in the garden attract butterflies.	Neutral	10
	Leaves of some plants in the garden move easily in the breeze.	Neutral	6
	People on upper floors of the hospital can see some of the greenery in the garden.	Neutral	7
	The garden is a good place for wildlife, such as birds.	Neutral	6
	There is a water feature (e.g., a fountain, water wall, or pond) in the garden.	Strongly Disagree	20
The water feature is easy to see in the garden.	Strongly Disagree	25	
The size of the water feature is appropriate for this garden.	Strongly Disagree	28	
The water feature makes soothing sounds.	Strongly Disagree	32	

Key Element	Items	N/A Recoded As	# of Responses Affected
Natural distractions (continued)	The garden has an unpaved area where I can see earth/soil.	Neutral	20
	This garden has a relaxing view of the surrounding nature.	Neutral	9
	There are intrusive noises in the garden. (reverse code)	Neutral	6

**Appendix D:
Approved IRB Protocols**

7. PROJECT ASSURANCES

PROJECT TITLE: Hospital Healing Garden Design and Emotional and Behavioral Responses of Patients, Visitors, and Employees

A. PRINCIPAL INVESTIGATOR'S ASSURANCES

1. I certify that all information provided in this application is complete and correct.
2. I understand that, as Principal Investigator, I have ultimate responsibility for the conduct of this study, the ethical performance this project, the protection of the rights and welfare of human subjects, and strict adherence to any stipulations imposed by the Auburn University IRB.
3. I certify that all individuals involved with the conduct of this project are qualified to carry out their specified roles and responsibilities and are in compliance with Auburn University policies regarding the collection and analysis of the research data.
4. I agree to comply with all Auburn policies and procedures, as well as with all applicable federal, state, and local laws regarding the protection of human subjects, including, but not limited to the following:
 - a. Conducting the project by qualified personnel according to the approved protocol
 - b. Implementing no changes in the approved protocol or consent form without prior approval from the Office of Human Subjects Research
 - c. Obtaining the legally effective informed consent from each participant or their legally responsible representative prior to their participation in this project using only the currently approved, stamped consent form
 - d. Promptly reporting significant adverse events and/or effects to the Office of Human Subjects Research in writing within 5 working days of the occurrence.
5. If I will be unavailable to direct this research personally, I will arrange for a co-investigator to assume direct responsibility in my absence. This person has been named as co-investigator in this application, or I will advise OHSR, by letter, in advance of such arrangements.
6. I agree to conduct this study only during the period approved by the Auburn University IRB.
7. I will prepare and submit a renewal request and supply all supporting documents to the Office of Human Subjects Research before the approval period has expired if it is necessary to continue the research project beyond the time period approved by the Auburn University IRB.
8. I will prepare and submit a final report upon completion of this research project.

My signature indicates that I have read, understand and agree to conduct this research project in accordance with the assurances listed above.

Kelly Martin

Printed name of Principal Investigator

Kelly Martin
Principal Investigator's Signature
(SIGN IN BLUE INK ONLY)

3/26/2012

Date

B. FACULTY ADVISOR / SPONSOR'S ASSURANCES

1. By my signature as faculty advisor/sponsor on this research application, I certify that the student or guest investigator is knowledgeable about the regulations and policies governing research with human subjects and has sufficient training and experience to conduct this particular study in accord with the approved protocol.
2. I certify that the project will be performed by qualified personnel according to the approved protocol using conventional or experimental methodology.
3. I agree to meet with the investigator on a regular basis to monitor study progress.
4. Should problems arise during the course of the study, I agree to be available, personally, to supervise the investigator in solving them.
5. I assure that the investigator will promptly report significant adverse events and/or effects to the OHSR in writing within 5 working days of the occurrence.
6. If I will be unavailable, I will arrange for an alternate faculty sponsor to assume responsibility during my absence, and I will advise the OHSR by letter of such arrangements. If the investigator is unable to fulfill requirements for submission of renewals, modifications or the final report, I will assume that responsibility.
7. I have read the protocol submitted for this project for content, clarity, and methodology

Wi-Suk Kwon, Ph.D.

Printed name of Faculty Advisor / Sponsor

Wi-Suk Kwon
Signature (SIGN IN BLUE INK ONLY)

3/26/2012

Date

C. DEPARTMENT HEAD'S ASSURANCE

By my signature as department head, I certify that I will cooperate with the administration in the application and enforcement of all Auburn University policies and procedures, as well as all applicable federal, state, and local laws regarding the protection and ethical treatment of human participants by researchers in my department.

Carol Warfield, Ph.D.

Printed name of Department Head

Carol L. Warfield
Signature (SIGN IN BLUE INK ONLY)

3/26/2012

Date

8. PROJECT OVERVIEW: Prepare an abstract that includes:

(400 word maximum, in language understandable to someone who is not familiar with your area of study):

I.) A summary of relevant research findings leading to this research proposal:

(Cite sources; include a "Reference List" as Appendix A.)

II.) A brief description of the methodology,

III.) Expected and/or possible outcomes, and,

IV.) A statement regarding the potential significance of this research project.

I. In keeping with the revived awareness of the relationship between designed natural environments and health, hospital managers have begun to incorporate healing gardens within the hospital environment (McKahan, 1997; Mitrione & Larson, 2007). A healing garden is a designated green space within a health care facility that is designed to influence visitors in a positive way (Cooper Marcus & Barnes, 1999; Relf, 2005; Stigsdotter & Grahm, 2003). Healing gardens are intended to be places for individuals to relax, connect with nature, and ease negative feelings (Whitehouse et al., 2001). The lack of formal research providing credible evidence for the benefits of healing gardens in healthcare facilities is a major problem preventing their implementation (Relf, 2005). To justify the space required for a healing garden, it is crucial for healthcare designers to have sufficient empirical research evidence for the benefits that these spaces provide to patients, visitors, and staff in a hospital environment (Relf, 2005).

II. The sample consisting of patients, visitors, and employees drawn from a Southeastern hospital will be recruited to complete a paper-based survey. Estimated time of questionnaire completion is 10-12 minutes. Survey distribution will occur on-site with the permission of the hospital (see attached permission letter in Appendix E). Potential respondents will be verbally asked for their participation and provided a copy of the appropriate IRB approval letter, the questionnaire, a clipboard, and a writing instrument. Participants will complete the survey on-site and return it to the researchers.

III. The researchers expect to find a significant and positive relationship between the respondents' satisfaction with the healing garden and the respondents' overall satisfaction with the healing garden and the hospital. Additionally, the researchers expect to find a significant and positive relationship between the previous factors and behavioral intent toward the healing garden and the hospital. The study is anticipated to provide feedback on the key design features of healing gardens that are most satisfying to garden visitors.

IV. Previous research has not empirically tested the relationships between satisfaction with healing gardens, the hospital, and behavioral intent. Therefore, this study will add to the overall body of knowledge regarding healing gardens and may provide suggestions that allow for the most satisfying healing garden possible for all user groups. Additionally, the study will provide empirical support for the importance of providing healing gardens in hospitals.

9. PURPOSE.

a. Clearly state all of the objectives, goals, or aims of this project.

The objective of this project is to gain a better understanding of the potential impact that healing gardens have on employees, patients and visitors to hospitals. Specifically, how satisfaction with the healing garden, satisfaction with the hospital, and behavioral intents toward the garden and the hospital are influenced by satisfaction with various key features of the healing garden will be examined.

b. How will the results of this project be used? (e.g., Presentation? Publication? Thesis? Dissertation?)

This project is the principal investigator's thesis research, and it will be published in academic journals and presented at professional conferences.

10a. KEY PERSONNEL. Describe responsibilities. Include information on research training or certifications related to this project. CITI is required. Be as specific as possible. (Attach extra page if needed.) *All non AU-affiliated key personnel must attach CITI certificates of completion.*

Principle Investigator Kelly Martin Title: Graduate Student E-mail address roperkl@auburn.edu
Dept / Affiliation: Department of Consumer Affairs

Roles / Responsibilities:

Distributing and collecting questionnaires, analyzing data, writing reports and publications.

Individual: Wi-Suk Kwon, Ph.D. Title: Assoc. Professor E-mail address kwonwis@auburn.edu
Dept / Affiliation: Department of Consumer Affairs

Roles / Responsibilities:

Major Professor. Responsible for overseeing the principal investigator in carrying out the study, analyzing data, and writing the Master's thesis and other publications.

Individual: _____ Title: _____ E-mail address _____
Dept / Affiliation: _____

Roles / Responsibilities:

Individual: _____ Title: _____ E-mail address _____
Dept / Affiliation: _____

Roles / Responsibilities:

Individual: _____ Title: _____ E-mail address _____
Dept / Affiliation: _____

Roles / Responsibilities:

Individual: _____ Title: _____ E-mail address _____
Dept / Affiliation: _____

Roles / Responsibilities:

11. LOCATION OF RESEARCH. List all locations where data collection will take place. (School systems, organizations, businesses, buildings and room numbers, servers for web surveys, etc.) Be as specific as possible. Attach permission letters in Appendix E. (See sample letters at <http://www.auburn.edu/research/vpr/bhs/sample.htm>)
UAB Hospital, Birmingham, Alabama

12. PARTICIPANTS.

a. Describe the participant population you have chosen for this project.

Check here if there is existing data; describe the population from whom data was collected & include the # of data files.
Employees, patients and visitors in the participating hospital who are 19 years old or older.

b. Describe why is this participant population is appropriate for inclusion in this research project. (Include criteria for selection.)

This population is appropriate for this study because they are actual or potential users of the healing gardens in the participating hospital. For patients, one selection criterion (i.e., they must have been hospitalized in the hospital for at least 24 hours) will be used to recruit the sample along with the age criterion (19 years or older). For visitors and employees, only the age criterion will be used.

c. Describe, step-by-step, all procedures you will use to recruit participants. Include in Appendix B a copy of all e-mails, flyers, advertisements, recruiting scripts, invitations, etc., that will be used to invite people to participate.
(See sample documents at <http://www.auburn.edu/research/vpr/ohs/sample.htm>.)

Recruitment will be conducted by the researcher on-site. Individuals will be verbally asked if they would like to participate in the study and told that participation is voluntary and that their information will be anonymous. If they agree, the researcher will provide them with the IRB approval information letter along with the actual questionnaire.

What is the minimum number of participants you need to validate the study? ¹⁸⁰ _____

Is there a limit on the number of participants you will recruit? No Yes - the number is _____

Is there a limit on the number of participants you will include in the study? No Yes - the number is _____

d. Describe the type, amount and method of compensation and/or incentives for participants.

(If no compensation will be given, check here .)

Select the type of compensation: Monetary Incentives

Raffle or Drawing Incentive (Include the chances of winning.)

Extra Credit (State the value)

Other

Description:

13. PROJECT DESIGN & METHODS.

a. Describe, step-by-step, all procedures and methods that will be used to consent participants.

(Check here if this is "not applicable"; you are using existing data.)

The researcher will approach individuals in the healing garden and in interior waiting rooms nearby and ask them if they are interested in participating in the study, that participation is voluntary, and that their information will be anonymous. If they agree, the researcher will ask the screening questions (i.e., age for all groups, hospitalization period for the patient group). Those who meet the screening criteria will be provided with a copy of the information letter, the questionnaire, a clipboard, and a pen. Participants will read the information letter and decide whether to participate or not. Those who decide to participate will continue to complete the questionnaire, and return the completed questionnaire to the researchers.

b. Describe the procedures you will use in order to address your purpose. Provide a step-by-step description of how you will carry out this research project. Include specific information about the participants' time and effort commitment. (NOTE: Use language that would be understandable to someone who is not familiar with your area of study. Without a complete description of all procedures, the Auburn University IRB will not be able to review this protocol. If additional space is needed for this section, save the information as a .PDF file and insert after page 6 of this form.)

Participants will complete a paper-based survey which is anticipated to take no longer than 10-12 minutes. The survey data will be coded and analyzed using the Statistical Package for the Social Sciences (SPSS). For the data analysis, regressions will be mainly used to examine effects of satisfaction with key healing garden features on satisfaction with the garden, satisfaction with the hospital, and behavioral intentions toward the garden and the hospital.

- 13c. List all data collection instruments used in this project, in the order they appear in Appendix C.
(e.g., surveys and questionnaires in the format that will be presented to participants, educational tests, data collection sheets, interview questions, audio/video taping methods etc.)
Appendix C included (1) Patient Questionnaire, (2) Employee Questionnaire, and (3) Visitor Questionnaire

d. Data analysis: Explain how the data will be analyzed.

Regression analyses examining the relationships between the variables will be conducted using the Statistical Package for the Social Sciences (SPSS).

14. **RISKS & DISCOMFORTS:** List and describe all of the risks that participants might encounter in this research. *If you are using deception in this study, please justify the use of deception and be sure to attach a copy of the debriefing form you plan to use in Appendix D.* (Examples of possible risks are in section #6D on page 1.)

There are no risks or discomforts associated with this study greater than that encountered in daily activities. Participation in this study will be completely voluntary, and the participants may stop completing the questionnaire at any time. No identifiable data will be collected, and the results of the survey will be completely anonymous.

15. **PRECAUTIONS.** Identify and describe all precautions you have taken to eliminate or reduce risks as listed in #14. If the participants can be classified as a "vulnerable" population, please describe additional safeguards that you will use to assure the ethical treatment of these individuals. Provide a copy of any emergency plans/procedures and medical referral lists in Appendix D.
All IRB protocols and guidelines will be followed during the entirety of this research project.

If using the Internet to collect data, what confidentiality or security precautions are in place to protect (or not collect) identifiable data? Include protections used during both the collection and transfer of data.
(These are likely listed on the server's website.)

16. **BENEFITS.**

- a. List all realistic direct benefits participants can expect by participating in this specific study.
(Do not include "compensation" listed in #12d.) Check here if there are no direct benefits to participants. ✓

- b. List all realistic benefits for the general population that may be generated from this study.
This study is anticipated to generate a better understanding of the impact that healing gardens have on patients, employees, and visitors to hospitals. Additionally, satisfaction with key design features of the garden will provide specific design recommendations for hospitals with healing gardens or who are considering adding a healing garden on campus.

17. PROTECTION OF DATA.

- a. Will data be collected as anonymous? Yes No *If "YES", skip to part "g".*
(*"Anonymous" means that you will not collect any identifiable data.*)
- b. Will data be collected as confidential? Yes No
(*"Confidential" means that you will collect and protect identifiable data.*)
- c. If data are collected as confidential, will the participants' data be coded or linked to identifying information?
 Yes (If so, describe how linked.) No

d. Justify your need to code participants' data or link the data with identifying information.

e. Where will code lists be stored? (Building, room number?)

f. Will data collected as "confidential" be recorded and analyzed as "anonymous"? Yes No
(If you will maintain identifiable data, protections should have been described in #15.)

g. Describe how and where the data will be stored (e.g., hard copy, audio cassette, electronic data, etc.), and how the location where data is stored will be secured in your absence. For electronic data, describe security. If applicable, state specifically where any IRB-approved and participant-signed consent documents will be kept on campus for 3 years after the study ends.

The hard copies of the questionnaires will be stored in the principal investigators office in Spidle Hall, Room 266, behind a door that is locked during non-business hours. Once the data have been entered into SPSS software, the hard copies will be kept for one year and then destroyed.

h. Who will have access to participants' data?
(The faculty advisor should have full access and be able to produce the data in the case of a federal or institutional audit.)

Principal Investigator, Faculty advisor (major professor)

i. When is the latest date that confidential data will be retained? (Check here if only anonymous data will be retained.)

j. How will the confidential data be destroyed? (NOTE: Data recorded and analyzed as "anonymous" may be retained indefinitely.)

**AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS
REQUEST for PROTOCOL MODIFICATION**

For Information or help contact THE OFFICE OF HUMAN SUBJECTS RESEARCH, 307 Samford Hall, Auburn University
Phone: 334-844-5966 e-mail: hsubjec@auburn.edu Web Address: http://www.auburn.edu/research/vpr/ohs/index.htm

Complete this form using Adobe Acrobat Writer (versions 5.0 and greater). Hand written copies are not accepted.

1. Protocol Number: 12-143 EP1204 2. IRB Approval Dates: From: 4/25/12 To: 4/24/13
3. Project Title: Hospital Healing Garden Design and Emotional Behavioral Responses of Patients, Visitors, and Employees
4.

<u>Kelly Martin</u>	<u>Grad Student</u>	<u>Consumer Affairs</u>	<u>(334) 844-7364</u>	<u>roperkl@auburn.edu</u>
Principal Investigator	Title	Department	Phone	AU E-Mail
<u>Kelly Martin</u>	<u>308 Spidle Hall, Auburn University, AL 36849</u>	<u>Consumer Affairs</u>	<u>(334) 844-7364</u>	<u>kellymartindesigns@gmail.com</u>
PI Signature	Mailing Address	Alternate E-Mail		
<u>Wi-Suk Kwon, Ph.D.</u>	<u>Wisuk Kwon</u>	<u>Consumer Affairs</u>	<u>(334) 844-4084</u>	<u>kwonwis@auburn.edu</u>
Faculty Advisor	FA Signature	Department	Phone	AU E-Mail
Name of Current Department Head:	<u>Carol Warfield</u>	AU E-Mail: <u>warficl@auburn.edu</u>		
5. Current External Funding Agency: none
6. List any contractors, sub-contractors, other entities or IRBs associated with this project: none
7. Briefly list (numbered or bulleted) the activities that occurred up to this point, particularly those that involved participants.

Survey data have been collected from approximately 80 participants (mostly visitors to the participating hospital) using paper-and-pencil questionnaires according to the IRB-approved procedure.

8. Describe the requested changes to your research protocol, with an explanation and/or rationale for each.
(Additional pages may be attached if needed to provide a complete response.)



The survey participants must consist of patients, visitors, and employees of the participating hospital. However, most participants thus far are from visitors of the hospital. In order to increase participation among the hospital employees, the hospital approved recruiting their employees for an online survey which can provide them the convenience of completing the survey at the time and place of their convenience. The employee online survey site will be generated using Qualtrics and the link to this online survey will be emailed to the employee listservs by the Assistant VP of UAB Hospital.



9. Are there any changes in the "key research personnel" that have access to participants or data? NO YES
(If "YES", identify each individual and explain the reason(s) for each change.) Attach CITI proof of completion for all new key personnel.

10. Identify any changes in the anticipated risks and / or benefits to the participants.

There are no changes in anticipated risks, since the online survey will be set to not track any identifiable information from respondents.

11. Identify any changes in the safeguards or precautions that will be used to address anticipated risks.

The online survey will be set to not track any identifiable information from respondents.

12. Attach any additional supporting documentation to assist the IRB in evaluating your request for protocol modifications, including other agency or IRB approvals or renewals.

13. If research is being conducted at sites other than Auburn University or in cooperation with other entities, a letter from the site or program director must be included acknowledging their acceptance of the proposed changes.
(See OHSR website for guidance: <http://www.auburn.edu/research/vpr/ohs/sample.htm> .)

14. Attach a copy of any and all "stamped" IRB-approved forms you are currently using (information letters, consents, etc.)

15. Attach a new copy of your consent document(s), including updated information regarding the requested changes.
(Be sure to review the OHSR website for current consent document guidelines and updated contact information.)

When complete, submit hard copy with signatures to the Office of Human Subjects Research,
307 Samford Hall, Auburn University, AL 36849

2 of 2

11/13/12

Permission to recruit at Madison Hospital

Permission to recruit at Madison Hospital

Human Subjects [HSUBJEC@auburn.edu]

Sent: Monday, August 06, 2012 2:47 PM

To: Kelly Martin

Cc: Wi-suk Kwon

Dear Kelly,

Your informal request to recruit and collect data at Madison Hospital has been approved. Your protocol continues as "Expedited", under 45CFR46.110(7).

You may use your existing, stamped information letter at this new location.

Best wishes,

Susan

Susan Anderson, IRB Administrator

IRB/Office of Research Compliance

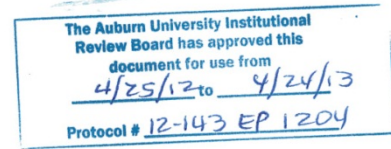
115 Ramsay Hall, basement

Auburn University, AL 36849

hsubjec@auburn.edu

fax 334-844-4391

**Appendix E:
Information Letters Used for the
Paper-Based and Online Surveys**



(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMATION LETTER for a Research Study entitled "*Hospital Healing Garden Design and Emotional and Behavioral Responses of Patients, Visitors, and Employees*"

You are invited to participate in a research study to provide feedback on the design of healing gardens in hospitals. The study is being conducted by Kelly Martin, Graduate Student in the Auburn University Department of Consumer Affairs, under the direction of Dr. Wi-Suk Kwon, Assistant Professor in the Auburn University Department of Consumer Affairs. You were selected as a possible participant because you are currently present in the hospital and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete a short survey and return it to me. Your total time commitment will be approximately 12 minutes or less. There are no foreseeable risks associated with participating in this study greater than those encountered in daily activities.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Consumer Affairs, or this hospital.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by not asking for any identifiable information. Information collected through your participation will be used to fulfill an educational requirement, publish in a professional journal, and present at a professional meeting.

If you have questions about this study, please ask them now or contact Kelly Martin by phone at 256-577-8630 or roperkl@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS LETTER IS YOURS TO KEEP.


Investigator's signature 3/26/12
Date

Kelly Martin
Print Name


Co-Investigator 3/26/12
Date

Wi-Suk Kwon, Ph.D.
Printed Name

Department of Consumer Affairs
308 Spidle Hall
Auburn, AL 36849-5601



Telephone 334-844-4084
Fax 334-844-1340
www.auburn.edu

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL
INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

INFORMATION LETTER for a Research Study entitled "*Hospital Healing Garden Design and Emotional and Behavioral Responses of Patients, Visitors, and Employees*"

You are invited to participate in a research study to provide feedback on the design of healing gardens in hospitals. The study is being conducted by Kelly Martin, Graduate Student in the Auburn University Department of Consumer Affairs, under the direction of Dr. Wi-Suk Kwon, Assistant Professor in the Auburn University Department of Consumer Affairs. You were selected as a possible participant because you work in this hospital and are age 19 or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete a short online survey. Your total time commitment will be approximately 12 minutes or less.

Are there any risks or discomforts? There are no foreseeable risks associated with participating in this study greater than those encountered in daily activities.

If you change your mind about participating, you can withdraw at any time by closing your browser window. Once you've submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Consumer Affairs or this hospital.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by not asking for identifiable information in the survey and by setting the web server to not collect email or IP addresses. Information collected through your participation will be used to fulfill an educational requirement, publish in a professional journal, and present at a professional meeting.

If you have questions about this study, please contact Kelly Martin by phone at 256-577-8630 or roperkl@auburn.edu, or Dr. Wi-Suk Kwon at kwonwis@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Kelly Martin 6-13-12
Investigator Date

Wi-Suk Kwon, Ph.D. 6-13-12
Co-Investigator Date

The Auburn University Institutional Review Board has approved this document for use from June 21, 2012 to April 24, 2013. Protocol #12-143 EP 1204.

[LINK TO SURVEY](#)