INCORPORATING RESTORATIVE EXPERIENTIAL QUALITIES AND KEY LANDSCAPE ATTRIBUTES TO ENHANCE THE RESTORATIVE EXPERIENCE IN HEALING GARDENS WITHIN HEALTH CARE SETTINGS

By

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the thesis of Deborah Ann Bowers find it satisfactory and recommend that it be accepted.

____________________________
Chair
I would like to recognize Keith Diaz Moore as chair of this committee and thank him for his support and friendship throughout my dual ID/LA program of study for without his help this thesis may have never come to pass. I would like to thank Nancy Clark Brown for her efforts and encouragement in supporting my pursuit of a dual Master degree in both Landscape Architecture and Interior Design. I would like to thank Kerry Brooks for his insight and editorial comments that further strengthened this thesis. I would like to recognize Catherine Bicknell for her direction in the study of the English manor house and gardens while studying abroad in Cambridge, England, summer 2000. I would also like to recognize Katherine Benzel for her mentorship of the Italian villa and garden while studying abroad with her in Florence, Italy, summer 2001. Lastly, I would like to thank my husband, Steve Reich, for his love, encouragement, and support during this demanding process.
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Abstract

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This thesis explores how certain landscape attributes lend support to restorative experiential qualities which are relevant to healing gardens in health care settings. A multi-method approach has been taken utilizing an extensive literature review along with a case study analysis of historical precedents. The data was analyzed employing an interpretative conceptual clustering of the information to draw conclusions and design principles for consideration in restorative garden design. Through this conceptual clustering three restorative experiential qualities were identified from the literature review: sensory stimulation, movement, and control. In addition, traits and characteristics of four key landscape attributes were identified through the case study analysis -- enclosure, water, spatial configuration, and materiality—each recognized as being key contributors to the restorative experience. The relationships between these experiential qualities and the traits of the key landscape attributes result in twelve design principles that could inform more meaningful, goal-directed healing garden design by providing
clear direction in how those attributes may facilitate the essential experiential qualities of restoration. Limitations and further expansions of this study are discussed.
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CHAPTER 1

The hospital is a place to heal, yet, today’s existing hospital environment is the antithesis of healing. The physical setting is confusing, intimidating and thus stressful for patients, their families, visitors, caregivers, and the staff. Negative sensory overload can occur with the bright lights, noise, and lack of privacy for all who inhabit the hospital environment which can increase perceived stress. A person, when ill, has compromised coping skills to handle stress. Stress manifests itself in many ways. The documented health effects are physical, psychological, and behavioral. Physical manifestations of stress include increases in heart rate, respiratory rate, and blood pressure (Ulrich, 1991). Psychological experiences of stress include fear, anger, depression, and isolation (Marcus & Barnes, 1999). Stress often manifests itself behaviorally in terms of sleeplessness, anger, passiveness, and noncompliance with medical regimen (Ulrich, 1999). Thus stress, arising from the healthcare setting itself, is actually detrimental to one’s physical and mental health, counter to the place’s inherent purpose of healing.

Shouldn’t a hospital environment which is meant to be a healing environment offer alternate solutions for persons seeking restoration from stress? Historical medical models cared for a person’s body, mind, and spirit utilizing a holistic approach, leading to an integration of nature with the healing process. Modern medicine focuses on the illness in isolation rather than the “whole” person. In these sterile settings there seems to be a need for an alternate place where one can go to calm and regroup. Recently, there has been a resurgence and interest in the concept of “healing gardens”.

The forgotten garden in today’s medical arena might be thought of as analogous to the ignored psyche and spirit in the treatment of illness. The value of a garden and the role of the psyche in healing are both difficult to quantify or
prove. Just as alternative or complementary medicine is beginning to reexamine the intricacies of the mind-body connection, so also are the design professions beginning to rediscover the therapeutic possibilities of sensitive garden design (Marcus & Barnes, 1999, p. 17).

The problem is the hospital experience is overwhelming and quite stressful for the patient, the family members, caregivers, and staff. Yet the information that exists about stress establishes the need for a restorative environment within the hospital complex to provide for “de-stressing” and maintenance of good health (Marcus & Barnes, 1999; Ulrich, 1999). This researcher sees the “healing garden” as a conceptual precedent, which is itself holistic, as a solution to a growing problem in health care.

**Background**

Today’s hospital in the United States is designed for maximum efficiency, sanitation, and profit. The modern medical model is technology driven, focusing on “cure” versus “care”- the emphasis on medical issues in isolation from the whole person and his or her environment. Technology exploded into the healthcare market in the 1970’s and the design of the hospital has been to adapt technology to the facility (Verderber, 2000). As hospital complexes continue to expand, the institutional feel becomes increasingly dehumanizing. Although a hospital’s purpose is to heal the disease, the emotional and mental toll on patients and their loved ones is significant.

From a historical viewpoint, one can easily understand why the modern medical model has evolved, as it has proven both efficient and effective in curing many physical illnesses. Yet that efficiency comes at oftentimes significant mental and emotional cost to the users. The simple and beneficial aspects of the pavilion hospitals and chapel-wards, which preceded the modern hospital, have been eliminated. Various converging forces,
including time, money, and real estate values, have overridden the benefits of allowing patients, health care staff, and family members access to green space, natural light, and fresh air all which decrease stress and aid restoration as found in those previous care models.

While the modern hospital excels at curing biologically related illnesses, it does so by engaging in interventions that largely ignore higher-order human needs. For instance, the modern hospital can be noisy, hectic, and even malodorous (either bad odors or odors of strong disinfectants). Patients and visitors lose a sense of control over these aspects of their environment. Simple tasks such as the ability to regulate temperature and humidity of one’s room, or the ability to control the level of lighting in one’s room are frustrating and contribute to stress (Evans, 1982). The lack of natural light and tinted glazing contribute to time disorientation and confusion. Windows are sealed permanently closed, thus restricting fresh air from entering the space. A window with a view not only admits daylight, but reflects that the world outside still exists and reminds the patient of the time of day, and season of the year. The view of nature offers visual stimulation and is important in recovery and restoration from stress (Ulrich, 1984). Unfortunately, the loss of the ability to control one’s environment increases stress, compromising healing or restoration.

The beginning of a patient’s perception of loss of control of their environment occurs when they are admitted to the hospital and the nurse removes their “street” clothes and presents a hospital gown to wear. Control is lost further as the patient is assigned to a room, institutional in character and lacking in personalization, with no preference given to the patient as to location of the room. The patient leaves their safe, comfortable home
and now enters a seemingly hostile and sterile environment in which they have no
control, compromising their sense of self (Maslow, 1954). Stress levels for that individual
are likely to rapidly heighten.

Where is the stressed patient, stressed family member, stressed health care giver,
or stressed staff member to go to gain relief? Is there an area within the hospital complex
that has access to nature which can provide stress relief? And does this area offer
restoration or is it a view of the urban concrete jungle which encompasses the hospital
complex?

Herein lies part of the problem associated with healing gardens located in health
care complexes. How does one design for a restorative, healing environment? What
qualities, attributes, goals, or performance requirements are necessary? Current literature
lacks consensus in terms of both terminology and design recommendations regarding
restorative/healing gardens. Various researchers have difficulty in describing the terms
healing and restorative. They use the words interchangeably without assigning definition.
Then there are several view points or perspectives concerning restoration and their design
suggestions. One perspective views restoration as a relief form stress, while another
views restoration as a relief from mental fatigue, and yet another perspective views
restoration as emotional healing. As one can imagine, this lack of consensus leads to the
confusion regarding healing/restorative gardens and their specified design goals or
recommendations.

Thesis Question

In regards to the dilemma presented above, this thesis asks the question “How are
essential restorative experiential qualities supported by certain landscape design attributes
that are relevant to health care settings?” This question is conceptualized as having three discrete parts. First, what are the relevant restorative experiential qualities in a healing garden design? Secondly, what are the design attributes ascribed to healing gardens? Lastly, how do the experiential qualities relate to the attributes for a restorative experience in the garden?

**Method**

A qualitative multi-method approach has been taken in this exploratory study utilizing an extensive literature review along with case study analysis of historical precedents. The intent of the literature review was to assemble the leading theoretical perspectives regarding the restorative aspects of gardens and develop an integrative review that would provide a meaningful categorization of what are herein termed “restorative experiential qualities.” The multiple case study analysis was designed so as to render insight into defining and characterizing of the “key design attributes” employed in the design of healing gardens in historical healthcare settings. Each case is analyzed in three ways: historically, descriptively, and phenomenologically. Historical analysis was completed so as to situate each case within its socio-historical context. The physical setting of each case is described objectively so that the object aspects of each design attribute could be identifiable. The phenomenological description is written as a narrative that reflects the personal experience of the researcher. This description facilitates the qualifying traits of each attribute relevant to restoration.

**Sample**

The sample of the multiple case studies is a mixture of a theoretical and a convenience sample. Theoretically, the sample is linked to the prevailing medical models
employed at different points and time in western civilization that maintained integrity between nature and the conceptualization of healthcare. The convenience aspect of this sample is that the four gardens were all accessible to the researcher during two study abroad opportunities, one to England and the other to Italy.

Analysis

In both cases, the data was analyzed employing an interpretative conceptual clustering of the data to draw conclusions and goals for design considerations in healing gardens. According to Miles and Huberman (1994), the intent of such conceptual clustering is to cluster certain pieces of data together that are related to the same or similar concepts and then aggregating (as appropriate) to identify the fewest higher order constructs needed to accommodate the greatest amount of data. As will be seen, this qualitative analysis technique results in this study identifying three essential restorative experiential qualities from the review of the literature and the traits which define the restorative aspects of the four key landscape design attributes from the multiple case study analysis.

Summary

While the modern healthcare setting excels at curing a broad range of biological health problems in an efficient and effective manner, other dimensions of health, such as mental, emotional and spiritual, are often compromised in this effort. The modern healthcare setting is often a stressful environment, extorting a significant cost from both patients as well as their loved ones. While there is significant literature extolling the virtues of providing healing gardens within healthcare settings, there is ambiguity in terms of both the experiential qualities essential for restoration and the key landscape
design attributes that should be employed in the design of healing gardens to promote these qualities. The remainder of this thesis will address the following question: “How are essential restorative experiential qualities supported by certain landscape design attributes that are relevant to health care settings?”

Chapter Two will introduce the reader to the literature review regarding restoration from differing perspectives and address the question: “What are the relevant restorative experiential qualities in a healing garden design?” In Chapter Three, the reader will be presented historical garden precedents relevant to western medical models employed over time. These cases are analyzed in an effort to respond to the question, “What are the key landscape design attributes ascribed to healing gardens?” Chapter Four presents the findings via conceptual clustering concerning the relationship that exists between the restorative experiential qualities and design attributes thereby answering the overall thesis question. Chapter Five will address the contribution to the body of knowledge to Landscape Architecture, ideas for further study, the limitations of this study, and the final conclusions.
CHAPTER 2
Review of the Restorative Environment Literature

Introduction

What exactly is a restorative environment? By restorative, one would expect these environments “to renew, refresh, to invigorate, to balance, or to allow centering of oneself” (Merriam-Webster, 2002). But exactly how can an environment be designed to accomplish these lofty ambitions? In her book, Restorative Gardens: The Healing Landscape, Nancy Gerlach-Spriggs (1998, p.2) suggests that restorative environments by design should “evoke rhythms that energize the body, inform the spirit, and ultimately enhance the recuperative powers inherent in an infirm body or mind”. Such direction is part design directed (e.g. “evoke rhythms” and “inform the spirit”) and part outcome oriented (e.g. “enhance the recuperative powers”), with neither being particularly rigorously defined. It would be quite difficult to achieve consensus on what design elements would “inform the spirit” for instance, and no doubt would vary depending upon enculturation and personal experience.

In a similarly titled book, Martha Tyson’s (1998) The Healing Landscape: Therapeutic Outdoor Environments (p. 3), it is suggested that a “healing” environment should be designed to reflect “the universal desire for human interaction with nature, with humans as the stewards of the land”. This definition suggests that the design process is driven by human behavior (the desire to interact with nature) “to produce therapeutic goals and a language of design patterns” that will result in helpful curative benefits for the users (p.8). These therapeutic benefits are not defined by Tyson, however, she identifies the process (or path of travel) as a “point of departure...designed to bring the
restorative qualities of the landscape into the lives of those who are in need of physical, emotional, and spiritual healing” (p.10). These restorative qualities are quite nebulous except for the four recurring values cited from historical gardens: “the importance of fresh air, sunshine, access to nature, and the ability to work the land” which aid in the healing process (p. 6). Tyson suggests that each “healing garden” be designed to user specific needs and therapeutic goals by utilizing design patterns identified by Alexander, et al (1977) to support those needs and goals. The latter is subject to personal interpretation, therefore lacking in consensus, which aids in the confusion in this relatively new field of study.

These two examples illustrate problems that exist throughout the restorative environment literature. First, is confused terminology as exemplified by the words restorative and healing being used interchangeably among various authors. This limits the consensus in the field and perhaps reflects its embryonic state. Second, the guidance for design is either too opaque, such as Gerlach-Spriggs, or too place and user specific, such as Tyson’s work on healing environments for those with dementia, and thus hinders the development of a consensus in understanding restorative environment design. These points are clearly reflected in Marcus and Barnes’ (1999) *Healing Gardens: Therapeutic benefits and Design Recommendations* which was published for the Wiley Series in Healthcare and Senior Living Design. In *Healing Gardens*, there are particular chapters that address the theoretical development of the restorative environment domain and a set of chapters dealing with building type specific design recommendations. The conceptual approaches used in these chapters are so varied that one can easily suggest that the state of the domain remains pluralistic and fragmented. This results in Marcus and Barnes
establishing three broad conditions that structure how they would identify a healing or restorative landscape. The first condition is that the garden helps to achieve a “degree of relief from physical symptoms”. Secondly, the garden allows for “stress reduction and increase levels of comfort for the individual dealing with emotionally and physically trying experiences”. The third benefit is an “improvement in overall sense of well-being and hopefulness that an individual is experiencing and assisting in his physical improvement” (Marcus & Barnes, Eds., 1999, p.3). Even if there is agreement to the necessity of these three conditions, it remains ambiguous as to how a designer attempts to create these conditions.

This chapter will attempt, through a review of the leading lines of theoretical development in the restorative environment literature, to distill a set of restorative experiential qualities that can structure a designer’s goal-oriented problem-solving. These experiential qualities, once clearly defined, would establish the dimensions along which design goals for a restorative/healing garden in a health care setting would be created, thereby informing design decision-making for these types of gardens. The theories reviewed include the theoretical lines of inquiry of restoration from a stress perspective, restoration from a mental fatigue perspective, and restoration as emotional healing.

Restoration from a Stress Perspective

Roger S. Ulrich contends that for a garden to be labeled “healing”, the garden should have “beneficial effects on the great majority of users” (Ulrich, 1999, p.30). These beneficial effects are regarded as “health outcomes” which are used as indicators of a patient’s progress or in this example a measure for restoration from stress. Ulrich asserts that stress is related to people’s physical surroundings (Ulrich, 1999). Ulrich broadly
defines stress as “a process of responding to events and environmental features that are challenging, demanding, or threatening to well-being” (Ulrich, 1999, p. 32). Stress is a major contributing factor in our everyday hectic life and negatively affects our health both physically and psychologically. The psychological component includes emotions such as anger, fear, sadness, and coping mechanisms (Ulrich, 1991). Negative physiological measures are increased heart rate, increased blood pressure, and increased muscle tension. The behavioral component of stress can vary from withdrawal, avoidance, alcohol or tobacco use, and decreased cognitive task performance (Ulrich, 1991).

Ulrich’s theory posits that restorative environments are those that provide relief from stress. One of his key findings is that simple views of nature promote restoration from stress by a combination of positive effects (Ulrich, 1984). Views generate an increase in positive feelings, reduce negatively toned emotions (like anger, fear, and sadness), and hold interest, thereby, diverting stressful thoughts.

Beyond views of nature, Ulrich cites four design resources that are needed to facilitate restoration. These four resources are “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).

Control

Research studies demonstrate that a person’s ability to cope with stress is directly linked to his ability to maintain a sense of control of his immediate environment. Ulrich cites a sense of control as a “persons’ real or perceived ability to determine what they do, to affect their situations, and to determine what others do to them” (Ulrich, 1999, p. 37;
Gatchel et al., 1989). Restoration from stress, therefore, is enhanced by encouraging feelings of control of one’s situation and environment. Ulrich suggests that control of one’s environment is fostered by design considerations that promote effective way finding, provide opportunities for privacy, limit personal access, and offer choice and variety of spaces (Ulrich, 1999, pp.41-42).

Marcus and Barnes (1995) found the single most important benefit derived from people using gardens was restoration from stress by providing an “escape”. Gardens provide a “temporary escape” from stressors which then aids restoration. The “escape” may be passive as when looking out a window or active as when walking in a park. Ulrich and Addoms in their 1981 study conclude that “escape” achieves perceived control (Ulrich, 1999). Marcus and Barnes results corroborate Ulrich and Addoms 1981 study. A garden that is easy to navigate and provides a variety of spaces which support privacy or socialization would mitigate stress and therefore enhance restoration.

**Social Support**

Ulrich cites Brannen and Feist (1997) for their definition of social support as “perceived emotional support or caring, and material or physical aid that a person receives from others” (Ulrich, 1999, p. 42). Ulrich surmises from Cohen in 1988 that “social support enhances health through a combination of effects that prominently include reduction of deleterious stress effects, and protection through buffering or dampening of stress responses when difficult challenges are experienced”(1999, p.43). Design considerations that promote social support were identified in computer studies of preferable outdoor settings conducted by Barnhart et al (1998). Areas that were natural and enclosed with opportunities for conversation and privacy were preferred as well as
natural open spaces for meditation and view. Ulrich cautions designers against promoting social interaction over privacy. Both are necessary to reduce stress effects.

Social support is given further credence from medical studies which related positive patient outcomes of cardiac patients and increased survival lengths for cancer patients who experienced “higher” social support (Spiegel et al., 1989). Further design considerations may be gleaned from many studies utilizing non-patient users in urban parks who utilize parks for social interaction and privacy (Marcus & Francis, 1990).

**Movement and Exercise**

Physical movement and exercise is defined as moving your body through space. The benefits of aerobic exercise are well known in reducing risks for heart disease and cancer. The psychological component of exercise is important in mitigating the effects of stress. Exercise is also important in reducing depression (Ulrich, 1999). Light exercise such as walking for twenty minutes a day three times per week reduces stress and lowers anxiety levels (Brannon & Feist, 1997). Reducing stress perceived by an individual will help foster restoration of said individual.

Design considerations that facilitate movement and exercise in the garden include ease of way finding, planning walking paths that loop and also have destinations as goals, planning for views and including areas for play for children and adolescents (Ulrich, 1999, p. 48). The degree of difficulty for exercise should be varied to include all levels of fitness and all ages. With these design considerations in mind, a garden can be designed to promote exercise and at the very least, movement through space that allows restoration from stress and promote overall well-being.
Natural Distractions

A positive natural distraction is “an environmental feature or situation that promotes an improved emotional state in the perceiver” (Ulrich, 1999, p. 49). Ulrich found in his 1992 studies that positive distractions may lower blood pressure and stress hormones. In healthcare settings, positive distractions include laughter, companion animals, music, art, and nature. These distractions all stimulate the senses. Laughter involves sound and touch, while animals also involve touch, sight, sound, and smell, art utilizes our sight and touch, while music stimulates our sense of sound. Nature, on the other hand, involves all five senses: sight, sound, touch, smell, and taste.

Ulrich focuses on nature as a positive natural distraction that reduces stress and fosters restoration of individuals (Ulrich, 1992; Marcus & Barnes, Eds., 1999). Ulrich’s retrospective study, spanning 1972 to 1981, examined records of cholecystectomy (gall bladder surgery) patients from a suburban hospital in Pennsylvania to assess if a room with a view to nature had any effect on length of stay and request for pain medication. The conclusion of his study demonstrated that patients with window views of nature had shorter postoperative hospital stays, less negative evaluative comments from nurses, used less analgesic medication, and had slightly lower scores for post operative complications than those patients with views of an urban brick wall. Ulrich recommended that “hospital design and siting decisions should take into account the quality of patient window views” (Science, Vol. 224, 1984, p.421). This study renewed interest in nature as a restorative element that positively contributes to the healing process within a hospital setting.

There are four theories as to why nature has this restorative effect. The first theory states that learned behavior (as in vacation and holiday retreats in rural areas) reduces
stress. People learn to relax when on holiday or vacation and therefore feel restored after their trip. The next theory is cultural in origin and states that people are conditioned by society to find nature relaxing. The third theory cites advocates of arousal versus overload for restoration. Environments that provide lower levels of complexity as found in nature are stimulating and should therefore provide restoration. However, cityscapes which are stimulating have the tendency to be overly stimulating due to high levels of visual complexity, noise, pollution, and movement. Overly stimulating environments provide negative distractions which are not restorative. The last theory cites genetics as an explanation for nature being restorative. This theory refers to the evolutionary theory of areas of prospect/refuge being the physical environment that humans prefer (Appleton, 1975). Humans evolved from the savannah and respond positively (meaning reduced stress) to these physical characteristics: green plants, slow moving water, savannah or open plains, birds and other unthreatening wildlife, and a low risk environment (Ulrich, 1993).

Restoration from a Mental Fatigue Perspective

The Kaplans suggest that natural environments are aesthetically satisfying to experience and foster recovery from mental fatigue because they provide a framework that people can readily understand and prefer (Kaplan & Kaplan, 1989, 1998). “A preferred environment is thus more likely to be a restorative environment, and since nature plays such a powerful role in what is preferred, in general terms, there is a theoretical basis for expecting natural environments to be restorative” (Kaplan & Kaplan, 1989, p. 189). The restorative effects of nature have sequential deepening levels: “clearing the head … recovery of directed attention …cognitive quiet… fostered by soft
fascination … and reflection of one’s life (Kaplan & Kaplan, 1989, pp.196-197). The
restorative experience promotes health benefits with both mental and physical

In order to place their approach in context, it is important to discuss their
information processing model of environmental experience. In 1998, the Kaplans’
focused on two factors that people have for understanding their environment in With
People in Mind: Design and Management of Everyday Nature. The first factor is that the
environment communicates information and the second factor is that people need to
understand and explore their world. The Kaplans’ identify four informational dynamics
that assist in understanding and exploration. These dynamics are 1) coherence and
complexity of the environment, and 2) legibility and mystery of the environment.
Coherence is repeating themes and unifying textures that help an environment to be
understood. Coherence refers to a level of control and/or comfort that a person feels in his
environment. Complexity offers “greater richness” in texture and visual interest with
sensory stimulation. Legibility (landmarks, visual cues for orientation) applies to
movement/circulation within the environment. Mystery in the environment makes us
want to explore and find out what’s next and is accomplished with curving paths and
partially blocked views. What is significant for this discussion is that they see
environmental experience as predicated upon information processing dynamics. That is,
that the environment provides “x” amount of information and people have the ability to
effectively cognize “y” amount of information. When these amounts are too far out of
balance, the person is mentally challenged and will begin to mentally fatigue. As one
fatigues, one’s ability to cope with the environment is compromised, necessitating the “clearing of the head” mentioned above.

**Kaplans Four Factors**

In 1989, the Kaplan’s published *The Experience of Nature: A psychological perspective*, in which they suggest that there are four factors in achieving a restorative experience, or, in their parlance, a relief of mental fatigue: being away, extent, fascination, and compatibility (Kaplan’s, 1989).

**Being Away**

Being away “implies involving oneself in cognitive content different from the usual… (the experience) involves what is going on in the head as well as what is going on in the environment” (Kaplan & Kaplan, 1989, p.189). The Kaplans feel that the “distinct and separateness” of the experience is as important as the physical distance. In developed countries, the experience of the urban environment is the norm whereas the experience of nature or green space is limited and not “the usual everyday content” (Kaplan & Kaplan, 1989, p.190).

The Kaplans’ concept of “being away” is similar to Driver & Knopf’s idea of temporary escape (Ulrich, 1999). Temporary escape is defined by Driver and Knopf as “passive… as when daydreaming … (or) active …when a person goes to a park” (Ulrich, 1999, p. 40; Driver & Knopf, 1976). Being away “implies involving oneself in cognitive content different from the usual” and the “distinctiveness and separateness of the experience from the workday experience may be as important as the literal distance” (Kaplan & Kaplan, 1989, pp. 189-190). This mental distancing allows for restoration from mental fatigue of everyday life. Being away occurs when one takes a vacation from...
their job and travels to a different locale. For example, a city dweller in New York may take a long weekend in the Catskill Mountains as a respite from the hustle and bustle of the city and take refuge in the wooded area of the mountains. According to the Kaplans’, another example of being away could be a walk in Central Park during one’s lunch hour. Both examples provide relief from mental fatigue and thus promote restoration.

**Extent**

Extent is defined as “being related to some larger context” (Kaplan & Kaplan, 1989, p.195). Extent encompasses the “the imagined as well as the seen” and “promises a continuation of the world beyond what is immediately perceived” (Kaplan & Kaplan, 1989, p. 190). Extent provides a whole other world that can be explored on a small scale. For example, a Japanese garden provides a world in miniature that invites exploration yet provides areas for meditation. Kaplan cites Thoreau at Walden Pond as an example of extent: “Walden represented a world unto itself, a place in which one might be self sufficient and encounter a wide variety of meaningful experiences” (Kaplan & Kaplan, 1989, p. 191). Walden was Thoreau’s small world in the countryside to be inhabited and explored yet it was part of a larger community of Massachusetts. Extent would encourage exploration and is similar in its effect for restoration from mental fatigue as “being away”. The environment is different and stimulating and one uses different behavior patterns than in an urban cityscape.

**Fascination**

Fascination engages us and keeps our attention directed. Nature provides us with many objects, creatures, and processes that we as humans find fascinating. Foliage, the play of light on water, life cycles and seasons, breezes, and clouds are all examples of
things that fascinate us and engage our attention. Soft fascination like sunsets, sunrises, clouds, leaves moving in a breeze “permits a reflective mood” (p.192) according to the research by Kaplan and Kaplan in 1989. A reflective mood may produce a pleasurable experience and therefore reduce the need for directed attention and allow for restoration (Kaplan & Kaplan, 1989).

**Compatibility**

Compatibility is “… a special resonance between the natural environment and human inclinations” (Kaplan & Kaplan, 1989, p. 193). The Kaplans identify roles that humans associate with in the natural environment. Humans act as predators (hunters, fisherman), locomotors (hikers, boaters), domesticators of the wild (gardeners, caregivers of pets), observers of animals (bird watcher), survivors (fire builder, constructor of shelter) and other roles (Kaplan & Kaplan, 1989). The natural environment is a context for humans just as is the urban cityscape. The natural environment, however, allows for “clearing of one’s head… permits recovery of directed attention… and fosters soft fascination … and examination of one’s life” (Kaplan & Kaplan, 1989, pp. 196-197). The cityscape environment is diametrically opposed to permitting recovery of directed attention and thus creates mental fatigue.

Hartig and colleagues (1991) performed a study that explored the theoretical components proposed by the Kaplan’s for restorative environments. These components: fascination, being away, extent, and compatibility were measured according to a ZIPER scale (Zuckerman Inventory of Personal Reactions) of individual perceptions. These ZIPERs consists of twelve, five point scales that measure emotional states at the time of testing (Hartig, 1991, p. 9). Induced cognitive fatigue was the indicator of the restorative
effects of the three natural environments: an urban park in a mixed-use area, a natural area with a stream, and a laboratory. The results of the study presented strong evidence that natural settings had restorative effects, offering empirical support for the Kaplan’s theorizations.

Restoration as Emotional Healing

A psychological study consisting of university students was conducted by Marcus and Barnes in 1992 in regard to “places of emotional healing” (1999). Students were asked to recall any stressful situation and the place they went to make themselves feel better. The students were then asked to identify “significant elements and qualities” of these “de-stressing places”. The elements and qualities identified were: natural elements, sensory qualities, evoke safety/comfort, provide privacy/ solitude, viewpoint, urban milieu, opportunity for movement, and opportunity for exploration/challenge (Marcus & Barnes, Eds., 1999).

Marcus and Barnes define healing as “beneficial process that promotes overall well-being” (1999, p. 3). “Gardens can be healing and restorative” states Marcus and Barnes by their very nature aesthetic (1999, p.4). The first condition is the garden helps to achieve a “degree of relief from physical symptoms”. Secondly, the garden allows for “stress reduction and increase levels of comfort for the individual dealing with emotionally and physically trying experiences”. The third benefit is an “improvement in overall sense of well-being and hopefulness that an individual is experiencing and assisting in his physical improvement” (Marcus & Barnes, Eds., 1999, p. 3). Healing according to Marcus & Barnes can be described as one, or a blend, of the conditions mentioned above.
Marcus and Barnes feel that a garden does not reach its healing potential without certain design elements that motivate people to spend time outside (1999). These elements provide for socialization, privacy, strolling, vigorous exercise, shade or sun, sitting or exploring, and the aesthetics of nature.

**Socialization**

Healing gardens should encourage people to socialize or congregate together outside. The healing opportunity of socialization is to achieve a degree of relief from physical symptoms. When one is actively participating in a group, one may forget his or her own ailments for a short time. This person may feel a reduction of stress when surrounded by others and not feel so alone. The group may provide an overall sense of well being, belonging, and offer hopefulness for the individual as well as his situation. These three opportunities afforded by socialization are defined by Marcus & Barnes as healing. Examples where socialization may occur in the garden are at focal points, water fountains, and grouped benches encouraging conversation. For children, the social area may be a play area where slides, swings, and other equipment would encourage interaction with other children.

**Privacy**

Private areas in the garden allow for self reflection, thought, and meditation. Meditation in the garden can be used for pain control for physical symptoms. Private thoughts allow for stress reduction and private spaces offer a diversion from the stressful hospital environment. The ability to have solitude in an environment where the patient has little privacy can improve the overall sense of well-being or quality of the patient’s life while resident in the hospital. These explanations fulfill the criteria set by Marcus &
Barnes as healing. Private areas in gardens can be placed at reflection pools, coves in a pond, or a grove of trees. These areas can provide seating that would promote self reflection, thought or meditation.

**Strolling**

Opportunities for walking at a leisurely pace or stroll should encourage people to walk outside and explore need to be present in a healing garden according to Marcus & Barnes. Strolling allows for physical exercise which should offer a degree of stress relief, stress reduction, and provide a feeling of overall well-being thus fulfilling Marcus & Barnes definition of healing. Meandering paths, including brooks, with a focal points for destinations would encourage people to discover their environment. Looping pathways would provide a sense of accomplishment at the end of an explorative journey.

**Vigorous Exercise**

Prospects for more vigorous exercise like jogging or fast-paced walking would encourage people to spend time outside in the garden. More vigorous exercise would offer all the benefits of strolling and more by providing occasion for aerobic cardiovascular exercise. This type of exercise offers stress reduction and an improvement in overall sense of well-being by allowing the person to feel that they are actively participating in their own health. Marcus & Barnes’s definition of healing has been met. Running paths would provide opportunity for jogging and brisk walking. A callisthenic area would afford the possibility to “work out”.

**Shade or Sun**

The choice of being in the sun or sitting in the shade would entice people outside. The garden naturally offers both sun and shade by its very nature. Allowing people the
choice of either would enhance the healing properties of the garden. Sitting in the sun or shade could provide a relief from physical symptoms if only for a few moments. The sun or shade may offer comfort and thus stress reduction for the person sitting in it and give a feeling of overall well-being even for just a few moments. Again, the criteria for Marcus & Barnes definition of healing are met. Offering choices for seating in either sun or shade is easily met within a garden. Trees provide natural shade but pavilions or gazebos also offer shade. A benched area in a clearing near a water feature is an example of providing sunny choices for seating (weather permitting, of course).

**Choice of sitting or exploring**

A garden that offers the choice of active or passive participation enhances its opportunity for healing. Exploration encourages active involvement within the garden. Sitting and viewing allows for passive participation within the garden. Both, however, provide possibilities for relief from physical symptoms, stress reduction, and an overall sense of well-being. Again this embodies Marcus & Barnes definition for healing. Examples for exploration are a looping pathway, meandering brook, vistas, focal points, and destinations. Judicious bench placement in areas of sun and shade, private areas as well as social areas provides choice for sitting.

**Aesthetic of Nature**

Aesthetics of nature is “creating a beautiful verdant place that will be a powerful enticement to go outdoors” (Marcus & Barnes, Eds., 1999, p. 4). Nature offers stimulation of our senses: a feast for our eyes; sounds for our ears; fragrances for our noses; textures to touch; and some edible fruits for our tastes. These experiences as well as “the other elements that make up a garden can have measurable stress-reducing
benefits” (Marcus & Barnes, Eds., 1999, p. 4). Thus, the aesthetics of nature is healing on its own merit.

**Distilling Experiential Qualities from Restorative Environment Theory**

Based upon the above discussion, it is argued that all of the key aspects identified by the theories of Ulrich (four resources), the Kaplan’s (factors and patterns) and Marcus and Barnes (elements) may be summarized by three restorative experiential qualities: sensory stimulation, movement and control. The following Table 1 below presents a summary of such a conceptual clustering of the design resources, factors and patterns, and elements of the researchers - Roger Ulrich, Stephen and Rachel Kaplan, and Clare Cooper Marcus and Marni Barnes - and assigns the experiential qualities that help to structure restoration from stress.

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<th>Design….</th>
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<td>Resources per Ulrich</td>
<td>Sensory Stimulation</td>
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<td>• Movement/Exercise</td>
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<td>• Control/ Access to Privacy</td>
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<td>• Social Support</td>
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<td>Factors and Patterns per Kaplans’</td>
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Sensory Stimulation

This thesis defines sensory stimulation as visual and tactile stimulation with opportunities to interact with or view nature. Providing sensory stimulation is critical when designing for a restorative experience. Our sense organs are designed to detect change in stimuli rather than static input (Olds, 2001). “Moderate degrees of stimulation create comfort and optimize performance...whereas too much stimulation leads to a decrease in performance” (Olds, 2001, p. 9). Nature provides a “difference-within-sameness” that is neither too much similarity nor too much contrast (Olds, 2001, p. 10). Designers can provide “difference-within-sameness” using a variation of architectural elements such as “scale, floor height, ceiling height, and lighting, variety in the texture and finish materials and the presence of soft elements” to add visual interest and complexity (Olds, 2001, p. 10).
Ulrich cites four design resources that are needed to facilitate restoration, one of which is access to nature and other positive distractions. A positive natural distraction is “an environmental feature or situation that promotes an improved emotional state in the perceiver” (Ulrich, 1999, p. 49). In healthcare settings, positive distractions include laughter, companion animals, music, art, and nature. These distractions all stimulate the senses. Laughter involves sound and touch, while animals also involve touch, sight, sound, and smell, art utilizes our sight and touch, while music stimulates our sense of sound. Nature, on the other hand, involves all five senses: sight, sound, touch, smell, and taste.

Fascination engages us and keeps our attention directed (Kaplan & Kaplan, 1989). Nature provides us with many objects, creatures, and processes that we as humans find fascinating and stimulating to our senses. Foliage, the play of light on water, life cycles and seasons, breezes, and clouds are all examples of things that fascinate us and engage our attention and our senses. Soft fascination like sunsets, sunrises, clouds, leaves moving in a breeze “permits a reflective mood” according to the research by Kaplan and Kaplan in 1989. A reflective mood may produce a pleasurable experience and therefore reduce the need for directed attention and allow for restoration (Kaplan & Kaplan, 1989).

In 1998, the Kaplans’ focused on two dynamics that impact people’s understanding of their environment. These dynamics are coherence and complexity of the environment. This information is simulated through our senses. Coherence is repeating themes and unifying textures that help an environment to be understood. Complexity in the environment offers “greater richness” in texture and visual interest. In other words, complexity stimulates our senses of touch and sight.
Marcus and Barnes define healing as “beneficial process that promotes overall well-being” (1999, p. 3). “Gardens can be healing and restorative” states Marcus and Barnes and are by their very nature aesthetic (1999, p.4). Marcus and Barnes feel that a garden does not reach its healing potential without seven design elements that motivate people to spend time outside (1999, p.4). Of the specified design elements, shade or sun and the aesthetics of nature provide sensory stimulation.

Movement

This thesis defines movement as using the large muscle groups in the human body to move through space and exercise and strengthen the body. Marcus & Barnes have stated that exercise helps to lower anxiety, decrease depression, and physically decreases stress (1999) which is rehabilitative and therefore restorative. The design elements that relate to movement and circulation through a space are sequence, focus, balance, arrangements, way finding, and orientation. These spatial elements used effectively result in unity (Malnar, 1992). “Form uses these organizational principles … to order and unify the visual characteristics or elements into a coherent statement of visual perception” (Malnar, 1992, p. 37) and the environment then is “whole and visibly harmonizes all of the people and its parts and... becomes a (restorative) agent” (Daniels, 1987; Olds, 2001, p.1).

Ulrich similarly identifies the importance of physical movement and exercise. The benefits of aerobic exercise are well known in reducing risks for heart disease and cancer. The psychological component of exercise is important in mitigating the effects of stress (Ulrich, 1999). Reducing stress perceived by an individual will help foster restoration of said individual.
Design considerations that facilitate movement and exercise in the garden include ease of way finding, planning walking paths that loop and also have destinations as goals, planning for views and including areas for play for children and adolescents. The degree of difficulty for exercise should be varied to include all levels of fitness and all ages.

The Kaplans’ suggest that people have a fundamental need to understand and explore their world. Two important aspects of this are the legibility and mystery of the environment. Legibility (landmarks, visual cues for orientation) applies to movement/circulation within the environment. Mystery in the environment makes us want to explore and find out what’s next and is accomplished with curving paths and partially blocked views. Movement is accomplished through exploration in a legible environment.

The factors of “being away” (as in a change from the usual as in a vacation trip) and “extent” (providing a whole other world to be explored like a Japanese garden) may be thought of as alluding to movement. Getting away from one’s usual routine in a new space provides restoration from stress. In order to “be away” one must change location physically. (It could be argued, however, that one could slip away mentally as in a reverie or daydream and still benefit restoration.) Extent prompts one to explore their environment or “move” through the physical space.

Two of the elements identified in the 1992 study of university students in regard to “places of emotional healing” were opportunity for movement and opportunity for exploration/challenge (Marcus & Barnes, Eds., 1999, p. 7). This important qualities aided restoration from stress for these students. Marcus & Barnes identify strolling and more
vigorous exercise as motivators to get people outside and into the garden where they can relieve stress and gain an overall well-being by actively participating in their own health.

**Control**

This thesis defines control as being enabled to exercise choice. Providing people with choices of opportunities for movement, play, privacy, social activity, and safety in their environment is vital in a design that supports restoration.

Scale, light, temperature manipulation of space, and areas of prospect (wide open spaces) and refuge (enclosed areas for privacy) are components of a design that can enhance a sense of control (Appleton, 1985).

Predictability is an important concept of control (Olds, 2001). “Space designed to support predictability often involve a vista or an elevated position so that occupants can scan all areas of the room and anticipate future events” (Olds, 2001, p.11). Opportunities for passive participation also promote predictability.

Beyond views of nature, Ulrich cites “a sense of control and access to privacy or social support” as resources that are needed to facilitate restoration (1999, p.36). Research studies demonstrate that a person’s ability to cope with stress is directly linked to his ability to maintain a sense of control of his immediate environment. Ulrich defines a sense of control as a “persons’ real or perceived ability to determine what they do, to affect their situations, and to determine what others do to them” (Ulrich, 1999, p. 37, Gatchel et al., 1989;). Restoration from stress, therefore, is enhanced by encouraging feelings of control of one’s situation and environment.

In the Kaplans’ use of the term, coherence refers to a level of control and/or comfort that a person feels in his environment. Compatibility is “… a special resonance
between the natural environment and human inclinations” (Kaplan & Kaplan, 1989, p.193). Humans play roles in their environment and these roles are about control or choice. Compatibility in the environment promotes restoration.

Two of the elements and qualities identified by Marcus and Barnes in their 1992 study of university students in regard to “places of emotional healing” were places that evoke safety/comfort and provide privacy/ solitude (1999, p.7). These issues of control offer choices and participation in one’s health recovery. Also, Marcus & Barnes identify socialization and privacy as design elements necessary to aid a garden to reach its healing potential which motivate people to spend time outside. These elements again promote choice or provide control.

Conclusion

This chapter started by illustrating some of the current challenges presented by the literature in the emerging domain of restorative environments, including the lack of agreement on key terminology and the disparate levels of analysis at which inquiry has taken place. Through a review of the theoretical literature, a set of experiential qualities that should inform restorative environmental design were developed. Here it is argued there are three such restorative experiential qualities: sensory stimulation, movement and control. Sensory stimulation refers to visual and tactile stimulation with opportunities to interact with objects as provided in nature. Movement uses the large muscle groups in the human body to move through space and exercise and strengthen the body. Control simplified means being enabled to exercise choice.

While this set of experiential qualities may help structure restorative environmental design decision-making, the question remains what landscape attributes
are used to address such experiential qualities? The next chapter will utilize an historical analysis of restorative landscapes in an attempt to identify such key landscape design attributes. Chapter Four will focus on how these key attributes have supported the restorative experiential qualities of sensory stimulation, movement and control which may be relevant to health care settings.
CHAPTER 3

Precedents

Recall that, for the reasons articulated in Chapter One, the research question for this thesis is “How are essential restorative experiential qualities supported by certain landscape design attributes that are relevant to health care settings?” The previous chapter outlined the key experiential qualities of restoration: sensory stimulation, movement and control. This chapter will focus on identifying the qualifying traits of each landscape design attribute significant to restoration employed historically within relevant healthcare settings.

In order to understand the uniqueness of a restorative/healing garden in a health care setting, one needs to have an understanding of the historical western medical model and its relationship with nature. By examining historical garden precedents and respective case studies that are relevant to the the time frames of the historical medical models, one begins to recognize a repetition of certain design attributes which occur in these restorative gardens. Recognition of these attributes and their connections to the experiential qualities identified in chapter two might better inform the design of restorative/healing gardens in present day health care settings.

Historical Medical Model

Gardens became integral to the idea of healing and wellness in the twelfth century. Travelers who would make pilgrimages to monasteries would arrive weak, ill, and weary. The monks would bring them to the Infirmary to rest and heal. The infirmary
of the monastery was located next to a cloister garden and a nearby medicinal herb garden (Landsberg, 1998). The cloister garden provided sunshine and fresh air that aided the healing process. St. Bernard, in Clairvaux, France in the 12th century wrote of his hospice:

> Within this enclosure many and various trees... make a veritable grove... The sick man sits upon the green lawn... he is secure, hidden, shaded from the heat of the day...; for the comfort of his pain, all kinds of grasses are fragrant in his nostrils. The lovely green of herb and tree nourishes his eyes... (Marcus and Barnes, 1999, p. 10, quoted in Warner, 1995, p. 8)

The role of caring for the ill in the Middle Ages fell to the religious orders. Monasteries, convents, and nunneries became the first hospitals. These communities were self-sufficient and relied on their gardens for food, rest, and delight. These self-sufficient communities also provided for the needs of the greater community or surrounding townships. In this way, the monasteries were connected to the larger society.

The prototypical plan for the design of a monastery fulfilling this caring role is that for St. Gall. “The plan is not a specific building plan but a fairly detailed design of an entire monastery to give guidance and suggestions to someone who was intending to build one” (Thompson, 2001). The St. Gall plan cites obedientiary gardens, a green court, and a cloister garth. The obedientiary gardens were private gardens used by the officials of the monastery. These gardens resembled the small herber (a small enclosed garden) that existed on the estates. The green court was a formal garden where special guests were met and served as the main entrance where visitors would enter. This court followed the quadrant geometry. In the court center, a water fountain or a tree would serve as a focal point rich in its symbolism. The smaller cloisters of the monasteries also followed
this quadrant geometry. The garth (the area enclosed by the cloister) was located in the center of the monastery and was enclosed with passageways which the monks passed through at habitual intervals during their daily routine to other parts of the monastery. The garth was typically planted with turf, an occasional symbolic tree, and water was frequently present as a fountain or lavabo (Thompson, 2001). The garth contained walkways dividing the area into quadrant symmetry.

On the east end of the monastery was the physic garden, the orchard/cemetery, and vegetable garden. At the west end of the monastery lay the Infirmary garden and to the north was the green court. The physic garden contained a variety of medicinal herbs and flowers which were grown for the tending of ill and ailing monks and pilgrims. The variety would consist of poisonous herbs used as narcotics, herbs specific for blood letting, and aesthetic and fragrant herbs that would refresh the patients with their visual appeal and scent. The orchard planted around the headstones of deceased monks provided fruit for the monastery and was only fitting that the dust of past monks helped to feed the monks still living. The vegetable garden provided vegetables for kitchen to prepare for the monastery and its inhabitants. The infirmary garden (a small cloister garden) was the location where weary pilgrims and ill monks were placed in the sunshine and fresh air for recuperation (Landsberg, 1998).
The monastery was holistic in its approach to healing. The whole person: body, mind, and spirit were considered integral to the healing process as evidenced by the series of gardens, each with distinct purposes related to these three aspects. The cloister garden provided access to nature, movement, and sensory stimulation but also afforded security and control of the enclosed environment.

The restorative garden in a healthcare setting faded with the abolition of the monasteries during the reign of King Henry VIII. Some hospital gardens remained in the nunneries of France and Italy during the Renaissance but the return of the garden, as a medicinal element, did not reoccur until the eighteenth century. After the decline of monasteries in Western Europe in the 16th century, the role of care fell to the church (Goldin, 1994). The design of the chapel became the design of the hospital ward. The hospital ward was long and linear in design like the chapel with access to a courtyard. The courtyard varied in size and shape. This plan became known as the chapel-ward of the 15th century.

This chapel ward plan was holistic in that the hospital was located next to or near the chapel. The church and hospital were one “whole”. The patients had access to nature for sensory stimulation, and were allowed to ambulate for movement within an enclosed courtyard which offered control and safety within that enclosure.
In 1456, an architect in Milan named Filarete, designed the Ospedale Maggiore, in Milan, Italy in 1456, in the plan of two crosses. This design consisted of a central courtyard that separated the two “crosses”: one cross held the men’s ward and the other cross held the women’s ward (See Figure 5). However, it would be 350 years before the women’s ward would be built (Goldin, 1994, p. 64). The symbolism of the cross for the design of the church’s hospital plan is appropriate; however, symbolism did not drive the plan. The very utility of centering the chapel so all four wards would have a chance to hear mass did (Figure 5) (Goldin, 1994, p. 58). The design allowed immediate access to courtyards and nature See Fig. 6).

The cross plan was holistic in that the hospital was self sufficient and a “whole”. The patient’s body was not the only consideration in the healing process. The patient’s soul, mind, and spirit were nurtured. Mass was offered for all to hear and access to nature was provided with courtyards for ambulation when the patient had strength.

In the seventeenth and eighteenth century, pavilion designs became popular. Because of various diseases, the design for cross-ventilation, fresh air, and good hygiene were important for patients’ health recovery. The pavilion design had a long backbone with elongated wards stemming from the spine and was one to three stories in height. The architectural plan resembled a hair comb. This design afforded the incorporation of
gardens in between the wards to promote fresh air and circulation, which eliminated germs via cross-ventilation.

“Meanwhile, the rise of Romanticism was prompting a reconsideration of the role of nature in bodily and spiritual restoration” (Marcus and Barnes, 1999, p. 13) and access to nature was considered an integral part of the healing process. Florence Nightingale, a prominent nurse of the 19th century, wrote of the new, low rise pavilion hospital:

I mention from experience, as quite perceptible in promoting recovery, the being able to see out of a window, instead of looking against a dead wall; the bright colors of flowers; the being able to read in bed by the light of the window close to the bed head. It is generally said the effect is upon the mind. Perhaps so, but it is not less so upon the body on that account (Marcus and Barnes, 1999, p. 13, quoted in Warner, 1995, p.24).
The pavilion hospital took into account the patient’s mental attitude in the recovery of health as evidenced by Florence Nightingale’s statement. Sensory stimulation via views and physical access to nature was very important. The patient had some control over his environment, however, it was limited. The control came as choice of settings: natural light via electric; fresh air from an open window or no breeze, etc. Restoration of one’s spirit was important in the restoration of one’s health in the pavilion plan.

It is important to understand that the emphasis for these pavilion wards was on hygiene and not the therapeutic use of the garden. The plan was common sense driven to take advantage of the fresh air and sunlight, which would encourage ambulation that would be beneficial to the patients. However, it was during the 18th century that the revival of the picturesque landscape and the Romantic Movement coincided. The picturesque landscape was designed to create scenes reminiscent of the paintings of Gaspard, Rosa, and Lorrain (Phillips & Foy, 1995). The Romantic Movement endowed gardens and landscapes with attributes of bodily and spiritual restoration and gifted nature with therapeutic qualities.

![Figure 10. Campus Pavilion Design: Architect: McCarl Pfeifer, New York, Early 20th Century](Image)

However, this type of hospital design was not without cost. The “campus” pavilion hospital was expensive to maintain and inefficient for the workflow of the nurses and the doctors. This type of treatment required financial support and lacked governmental funding. The “Moral Treatment” demised into custodial care and the asylum became a storage place for lost hope.

Efficiency for health care workers, advancements in medical science, knowledge of asepsis (germ theory), technological advances in construction, the invention of the elevator, and interests in profits drove the design of new high rise medical complexes (Goldin, 1994). Modern hospitals in the United States are now planned with work efficiency and profit at the forefront of design process. The pavilion designs still exist and are used today in Western Europe. The campus pavilion hospital model (on a much smaller scale) is used even now in the United States as treatment centers for those with diminished mental capacity. New facilities built for treatment of Alzheimer’s and other dementia diseases integrate nature into the built environment by incorporating an internal courtyard. This aspect of one’s mental health is not overlooked.

**Historical Hospital Precedents Conclusions**

From the historical medical models, one can surmise that gardens have been an integral part of the built healing environment with nature aiding the restoration of good health and spirits of ill individuals. From the monasteries, the chapel wards, the cross plans, and pavilion designs, the benefit of nature was prevalent in the healing process of the ailing individual. It was not until the 20th century that access to nature became limited with the advent of high rise hospitals and real estate at premium prices. Nature was no longer considered a vital part of the healthcare experience. The advance of technology
encouraged efficiency, promoted profit margins, and focused on disease process rather than the care of the whole individual. While medical science has made miraculous discoveries and cures in the past 100 years, the neglect of one’s psyche in the healthcare process is evident. It is for this reason that there has been resurgence in the literature regarding the concept of “healing gardens” as an important addition to the healing environment and its restorative effect to overall well-being (Marcus & Barnes, 1999). Because of this renewed interest, research studies, such as Ulrich, the Kaplans’, and Marcus & Barnes, are most salient in that gardens or natural settings provide restoration from either stress, mental fatigue or emotional pain. A return to incorporating nature or at least providing access to nature to the healing process would address the neglected psyche or spirit of the individual and provide a more holistic approach to healthcare. It is to this end that this researcher argues that the split in the healthcare model from nature occurred after the pavilion hospital. By looking at the similarities of the historical hospital models and their garden precedents, basic landscape design attributes may be identified that are important in the restorative/healing process.

**Garden Precedents**

Taking into account the historical medical models, this author chose to look at four case studies demonstrating historical garden precedents that coincide with nature as a restorative agent for health. The monastic cloister and infirmary seem the logical starting point when looking at the history of western medicine. Once the monasteries were dissolved by King Henry VIII in 1530, the role of the hospital fell to the church in England and Western Europe. The hospital plans that developed such as the chapel ward plan, the cross plan, etc. all included access to courtyards, fresh air, and sunshine.
However, it needs to be noted that the emphasis was not on nature as a healing element but rather practicality of design for light and utility for church services. The return of the garden, as a medicinal element, reoccurred in the eighteenth century with the advent of low-rise pavilion hospitals. The precedents of gardens during this time frame that viewed nature with restorative qualities were the Picturesque and the Italian Renaissance.

The common factor that binds these two types of gardens is that England looked to Italy for design approaches for their gardens. At this time Hunt, (1986) suggests that wealthy Englishmen were making the Grand Tour on the continent and becoming exposed to the classics of Rome and Greece in literature, art, architecture, and landscapes. The English then traveled home and brought with them new ideas and adapted them into the English climate and countryside. Hunt goes on to suggest that the English admired the groves of the Italian villa estate because of the contrast between the structure and order of the estate and the wildness (1986). The estate was divided into garden and grove while the grove provided the necessary variety which provokes imagination (Hunt, 1986). John Dixon Hunt describes the relationship of the English with Italy as:

“…what the English admiration for Italian Renaissance gardens constantly emphasized in addition to this potential for that kind of public and political theatre, is the opportunities for individual entertainment surprise and discovery; visitors seemed to participate more imaginatively than they were required to in French gardens where simple admiration was in order” (1986, p. 144).
It is the description of experiential qualities (surprise, discovery, participate, imagination, etc.) within both the English picturesque and the Italian renaissance garden that lend them to be excellent case studies to research for attributes that may contribute towards restoration.

Identification of Landscape Design Attributes

This author derives a definition for attribute from the *Oxford American Dictionary* (1980) which states that an attribute “is a quality that is characteristic of a person or a thing” and for this thesis: a garden. This thesis builds upon the work of the British landscape architect Dame Sylvia Crowe, who suggests that “only by understanding why certain forms were adopted by certain peoples shall we be able to select, eliminate, adapt, and finally evolve for ourselves gardens which will express our ideas, our wants, and the character of our surroundings…” (1994, p. xii). Crowe describes what this thesis would call six attributes of the garden: land form, plants, water, sculptural forms, garden boundaries, and ground patterns (1994). However, her description of garden boundaries goes beyond delimiting the extent of the garden, to also discuss giving definition to that which surrounds the garden and offer context. Here, this concept shall be referred to as enclosure to address the boundaries of the garden as context refers to the attribute of landform. Also, Crowe’s discussion of plants, sculptural forms and ground pattern may be usefully combined within the concept of materiality as they are discussed primarily as materials employed in garden design. Thus, for the purposes of this thesis, this author has condensed Crowe’s six materials of design into four attributes of the garden: enclosure (garden boundaries), water (water), spatial composition (land form), and materiality (plants, sculptural forms, and ground pattern).
It is this author’s hope that by looking at case studies that are relevant to the time periods when nature was integral to health care that a meaningful definition of these attributes may result. Once these attributes are defined, they may be meaningfully connected with the experiential qualities defined in chapter two and thereby have the potential to inform the design process of present day restorative gardens in health care settings.

With these four attributes in mind—enclosure, water, spatial configuration, and materiality—this author will discuss four case studies on three garden precedents which are relevant to the time frames of the corresponding historical medical models. Each precedent will be discussed in terms of a brief history which validates inclusion into the case study analysis, followed by a general description of the case study, ensued by a narrative describing the experience of this researcher while visiting the case study, and resulting with a summary of design attributes found to be present in each case study.

**Case Study Method**

There were three tactics employed to develop each case study. The first was a historical analysis from published books, visitor guides, pamphlets, and internet articles. The description and narrative was developed from personal experiences from visiting each garden. The description is a condensation of material relevant to the framework of four key landscape attributes discussed above. This description renders the descriptive information regarding each attribute in Tables 2–6. The experiential narrative presented herein represent
edited and condensed phenomenological reflection of the researcher’s personal experience conducted post factum.

**Case Studies**

**Monastic Precedents**

The monastic cloister gardens or garths have been chosen as garden precedents because of their connection to the earliest forms of healthcare. The monks believed that fresh air and sunshine were integral to the healing process. By looking at monastic precedents, one can discern the basic design attributes present in these healing/restorative gardens.

**Monastic Cloister of Salisbury Cathedral, Wiltshire, UK, 1220**

The Cathedral of the Blessed Virgin Mary at Salisbury was begun in 1220 and finished in 1258. This gothic Cathedral has the tallest spire in England and was completed by 1310. Salisbury Cathedral was never a monastery rather a church attended by a body of secular clergy recognized as canons and presided over by a dean and acknowledged as the Old Foundation (Harvey, 1956). Whereas this cathedral was not originally a monastery, its cloister “equaled or surpassed anything produced by the monasteries” (Harvey, 1956). The Salisbury Cathedral Cloisters are the largest and earliest examples of cathedral cloisters that remain today (Harvey, 1956).

The cloister consists of four arcaded and vaulted walks around an open space or garth. The east walk, connected to the cathedral by means of a door in the west wall of the south transept, gives access to the chapter house (Roberts, M., unpublished). The cloister is of geometrical decorated style (Harvey, 1956). The garth is also a cemetery for
the canons. Located in the center of the garth endures a Cedar of Lebanon tree planted in 1837.

While Salisbury Cathedral is not a monastery, the architects did emulate the cloisters of the monasteries. A difference seen in this cloister garth from a true monastic cloister garth most notably is the absence of water. However, the Cedar of Lebanon was added in the 19th century following the monastic tradition.

_experience of the Salisbury Cathedral Cloister Garth_

_It is a beautiful summer day to be enjoyed in the countryside of Wiltshire, England. Standing in the Salisbury Cathedral cloister garth, I feel very serene and peaceful. As I am the only person in the garth at this time, I experience privacy and am in awe of the contrast of the rich, plush, green turf against the white walls of the cloister adorned with decorated geometry. The old Cedar of Lebanon tree lends a sense of history – a passage of time that has transpired within these closed walls. Its huge branches filter the sunlight into a dappled pattern of shadows upon the turf. There is an order and a balance felt in the garth while the rhythm of the vaulted arches beckons me to follow the perimeter of the garth. This place feels distinctly different – perhaps reverent? – to the outside close of the cathedral._

Photographs and plans of Salisbury Cathedral are shown below.
Summary of Design Attributes of Salisbury Cathedral

<table>
<thead>
<tr>
<th>Precedent</th>
<th>Enclosure</th>
<th>Water</th>
<th>Spatial Configuration</th>
<th>Materiality</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Salisbury Cathedral, Wiltshire, UK</em></td>
<td>Built form surrounds cloister</td>
<td>No Water</td>
<td>Square geometry, Cemetery Arches: protection from elements, passageways</td>
<td>Turf &amp; Cedar tree</td>
</tr>
</tbody>
</table>

Monastic Cloister of Santa Maria Novella, Florence, Italy, 1279

Santa Maria Novella monastery was originally founded in the 9th century outside the city of Florence. In 1279, the new church’s foundation was laid under the instruction
of two friars of the Dominican Order inside the city of Florence (Orlandi, date unknown). The friars were inspired by examples of Gothic Cistercian architecture and thus Santa Maria Novella is the first large Gothic style construction in Florence. The Green Cloister was begun in 1230 and was completed in 1250. The Large Cloister was begun in 1240 and completed in 1260. In 1456, Leon Battista Alberti was asked to redesign the façade of the church to be contemporaneous with the Renaissance. He completed the polychromatic marble structure seen today in 1470. Santa Maria Novella is known as the first monastic church of Florence and thus serves as a fine example for this case study analysis (Nesti, 2000).

The Green Cloister will be the focus of this particular case study. Whereas, Santa Maria Novella has two cloisters, the Large Cloister is closed to the public as it is now used by the Carabinieri (police) as a training school for officers. It is important to note the siting of both cloisters and their close proximity to the buildings surrounding them. The Green Cloister, thus named for the green and reddish colors painted on the walls of the cloister as frescoes depicting scenes of the Old Testament by Paolo Uccello, was centrally located between the Large Cloister and the Church itself. The rooms that surround the Green Cloister are integral to the monastery: one functioning as a hostel where important Florentine guests were received and the other serving as a chapter house or now as the Spanish Chapel. The Green Cloister and the Spanish Chapel together now operate as the museum of Santa Maria Novella while the Green Cloister functions as passageway from the entrance into the church itself.

The Cloister is quadrangular in plan, containing four colonnades, “each made of five arches with depressed curves and ribbed cross vaults that intersect at right angles,
forming four cornerstone arches with identical spans. The vaults are supported by twenty octagonal hard stone pillars which rest on low wall plinths and have finely carved capitals with acanthus leaves. On the outer side of the shafts of the pillars, under the capitals, are carved the coats of arms of the Florentine families, who provided money for the building of the large architectural complex” (Bonelli, 2000). The interior court of the cloister consists of turf planted in quadrangles with one tree in each and a now defunct center water feature (either a well or a lavabo). The cloister is enclosed by the colonnades that function as loggias decorated with painted frescoes and other built forms: the west wall of the church and the east wall of the Refectory, the north wall of the Spanish Chapel, and the south wall is the entrance.

*Experience of Santa Maria Novella Green Cloister*

It is a delightful day in Florence – warm yet not too hot as it is still June. I am standing under the loggia of the Green Cloister and wonder why it is thusly named. I am enlightened by the brochure that points out the “wonderful frescoes” in the shades of green that adorn the walls of this loggia. However, this part of the cloister is in need of serious repair as the frescoes have suffered damage over the years of neglect and lack of funds. The garth looks neglected too. Four evergreens stand in each quadrant and the focus of the garth is a defunct well that cooled the thirst of many a monk in its days of operation. I must admit I feel a bit of disappointment concerning the lack of lushness present. That being said, I do feel a sense of peace standing under the loggia. I am not standing in the hot Tuscan sun but under the protection of the loggia that has a warm
palette of colors despite its need for refurbishment. I do feel a sense of balance and rhythm of the columns that progress around the garth with their striped painted arches that inspire me to walk around the cloister. There is harmony in its simple symmetry and the shadows cast by the evergreens remind me that it is time to move on if I am going to continue to explore the grounds.

Photographs and plans of Santa Maria are shown below.
Summary of Design Attributes of Santa Maria Novella:

Table 3: Design Attributes Present at Santa Maria Novella Green Cloister

<table>
<thead>
<tr>
<th>Precedent</th>
<th>Enclosure</th>
<th>Water</th>
<th>Spatial Configuration</th>
<th>Materiality</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Santa Maria Novella, Florence, Italy</em></td>
<td>Enclosed cloister</td>
<td>Water as defunct well, lavabo, or fountain</td>
<td>Quadrant Geometry Loggia: protection from elements, passageway</td>
<td>Turf, trees, frescoes</td>
</tr>
</tbody>
</table>

**Romantic/Picturesque Movement Precedent**

The Romantic Movement endowed gardens and landscapes with attributes of bodily and spiritual restoration and gifted nature with therapeutic qualities. During this period, access to nature was considered an integral part of the healing process and healthcare as demonstrated in the low rise pavilion hospitals.
The era of Picturesque coincided with the Romantic Movement. The term picturesque was originally a word used in art referencing “material that was suitable for inclusion in a painting …” (Mosser & Teyssot, Eds., 1990, p.231). When referring to the Landscape Movement (1720-1820) occurring in England, picturesque meant “the desire to create a landscape which was picturesque, in the sense akin to a picture… but the strength behind the landscape school was the idealization of the normal in nature” (Crowe, 1994, p. 58). In other words, the landscape school used a “painterly approach” to create idealized nature (Adams, 1991). Gardens became scenes where some action took place whether outward or inward (Mosser & Teyssot, Eds., 1990).

By analyzing a garden precedent from the picturesque period, one can discern the basic design attributes present in this type of “natural” restorative gardens.

**Stourhead Gardens, Wiltshire, England 1724-1785**

Stourhead Gardens is a wonderful example of an intact picturesque garden built in the mid eighteenth century. “In this landscape the inspiration of the paintings of Claude Lorrain, Pussin and Salvator Rosa are more strongly evident than in any other surviving 18th century landscape” (Joyce, Ed., 1986, p. 75). Henry Hoare bought the “Stourton House” in 1717. He immediately demolished the old house and in its place built the beautiful Palladian villa known as Stourhead. Henry Hoare II inherited the estate in 1724 and began transforming the surrounding landscape into what Horace Walpole called “one of the most picturesque scenes in the world” (Phillips & Foy, 1995, p. 132). Henry Hoare was an amateur landscaper but he was an avid collector of art. He owned many paintings of Italian scenes by Gaspard and Claude Lorrain, both notorious picturesque painters. Hoare was also well traveled throughout Europe and Italy during the years of 1738 and
1741 and it was in Italy that he became acquainted with the ideas concerning siting of the country house by Leon Battisti Alberti (Phillips & Foy, 1995). Alberti wrote in the 15th century that in the gardens “should be Columns, Pyramids, Obelisks, and other memorials to remind us of great men....” (Phillips & Foy, 1995, p. 132). Henry Hoare employed Alberti’s ideas when he placed both classical and gothic architecture in his landscape. For example, he built a Pantheon that can be seen from the turf bridge but from the Pantheon the view is of a gothic parish church known as St. Peter’s and a medieval Bristol cross. Hoare also built classical temples and from the Temple of Apollo there is a spectacular view of Alfred’s Tower that is two to three miles away. While Hoare was influenced greatly by the Italian gardens and classical architecture seen in Italy for his own design at Stourhead, he also had “an instinct to honour their purely English context” (Hunt, 1986, p. 219).

Hoare broke away from the established standard of villa design when he dammed the river Stour (1754) to form a lake not seen from his Palladian villa. “The garden at Stourhead became an unusual exception to the classical ideal of the relationship between architecture and the landscape, separated but not completely isolated from each other. For the first time, water became the dominating, organizing focus for the entire garden (Adams, 1991, p. 176). The lake therefore became the strolling circuit which one could wander at a leisurely pace. There were open vistas of pastureland, secured by ha-has: “a sunken boundary wall which effectively eliminated the boundary between garden and surrounding countryside” (Brimacombe, 1998, p.12) yet there were many places for private moments. The built forms in the landscape provided visual interest, variety, provoked the imagination and invited exploration while the “wild nature” allowed for passive viewing and reflection.
Experience of Stourhead House and Gardens

I am in awe of the grandeur in front of me and all that surrounds me. This landscape is picturesque indeed! Although I am here with a group of twenty or more students, I find myself alone along the path. I am lost in reverie of the peaceful surroundings that seem open for framed views of a Pantheon, or a grotto, or a temple. This is “wild nature” although I know in my mind that all these delights were so contrived! I pass a quaint gothic cottage and long to go in and explore but there are so many things to see and I have such a short time to take it all in. The path takes me along the shore of the lake and scenes of pastoral rural England flash in front of me – rhododendrons in bloom, cattle grazing, the tinkling of the sheep bells. The lush green of the landscape contrasts with the flowers ablaze in bright pinks and fuchsias! The old, gnarly trees remind me that this garden was established in the 18th century and has matured beautifully! I am amazed that an amateur’s eye could capture such beauty for centuries! The still waters of the lake reflect the clouds, sky, and trees that surround. The swans create ripples upon sheets of glass as they glide through the water. The shoreline around the lake beckons me on to the next folly. Oh, there are so many things to see and do yet I do not feel rushed. I continue my journey and feel restored.

Photographs of the villa and gardens are shown below.
Figure 25. Stourhead House from Back Lawn

Figure 26. Stourhead Garden Plan

Figure 27. Turf bridge & Pantheon

Figure 28. Turf Bridge & Bristol Cross

Figure 29. Pantheon

Figure 30. Gothic Cottage
Figure 31. Temple of Apollo

Figure 32. Temple of Flora & Grotto

Figure 33. Grotto

Figure 34. Statue in Grotto

Figure 35. St.Peter’s Church and Turf Bridge
Summary of Design Attributes at Stourhead Garden:

<table>
<thead>
<tr>
<th>Precedent</th>
<th>Enclosure</th>
<th>Water</th>
<th>Spatial Configuration</th>
<th>Materiality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stourhead Gardens and House, Wiltshire, UK</strong></td>
<td>Looked Open, Natural form, but enclosed by Ha-has Attached to a country estate with other built forms in LS</td>
<td>Water is present as a major feature; lake</td>
<td>“wild” nature interspersed with built forms Choices: grottoes, pantheon, temples, paths, lake, follies</td>
<td>Natural plants, gnarly trees, turf, bridges, statues</td>
</tr>
</tbody>
</table>

**Italian Renaissance Garden Precedent**

The Renaissance gardens of Italy were based on ideals that recapture the aesthetic and intellectual principles of the classical world of the ancient Greek and Roman Empire (Adams, 1991). The Italian countryside contained many ruins of classical villas, whereas, the classical garden had fallen unrecognizable. The new garden was built on the antique fragments found at the sites and reconstructed with the classical mathematical theories of proportion (Adams, 1991). The ideals of the arts, literature (including poetry), and history were enjoyed in the garden of the country estates. Alberti wrote in his treatise *De re aedificatoria* (1485) that “the ideal country estate is a place where one can enjoy to the fullest all the pleasures nature has to offer, a place conducive to contemplation” (van Zuylen, 1994, p. 46). Cosimo de’ Medici, the patriarch of Florence in the Renaissance, wrote in 1462 “Yesterday I came to my Villa of Careggi, not to cultivate my fields but my soul” (Adams, 1991, p. 89). The villa and garden became a place of restoration for the mind, body, and spirit from the city life of Florence and Rome. The villa, garden, and site were built to form a harmonious whole (van Zuylen, 1994). The garden “had to be walled, but its location on sloping terrain should draw one’s attention from the area immediately around the houses to the distant view beyond” (van Zuylen, 1994, p. 47).
This wall provided control to the villa and garden and its siting created visual interest. Water was incorporated into the garden as fountains and some villas included humor in the garden with hidden jets and amusing water games. Water added sensory stimulation, movement, and interaction in the garden. Most of the gardens of the villas were symmetrical and rectilinear in spatial organization. The rectilinear approach dictated the movement through the garden. The Italian gardens contained giardino segreto or the secret garden, a remnant of the herber from the middle ages, which “provided a haven of tranquility secluded from the vast expanses and sweeping vistas of the rest of the garden beyond” (van Zuylen, 1994, p.51). In contrast to the regulated, symmetrical plan of the formal gardens, there existed a sacro bosco or natural wilderness area of woods near the garden and villa. This untamed nature idealized pastoral life, which is a recurring theme of the Italian garden that promotes restoration of mind, body, and spirit (holism) from the hectic pace of city life.

By analyzing a garden precedent from the Italian renaissance period, one can discern the basic design attributes present in this type of restorative garden. The ideals embodied in the renaissance of “cultivating one’s soul” and experiencing nature coincides with the ideals of the Romantic Movement in the 18th century.

**Villa Gamberaia, Settignano, Italy, 1744**

The Gamberelli family of Settignano originally owned the piece of property in 1412 known as Gamberaia. The name of Gamberaia translates as a pond for crayfish which was a prominent feature in the countryside surrounding Florence. Over the next several hundred years, the villa and garden would be sold off and developed by many, but it would be in the mid 18th century that the villa and garden would acquire its appearance
that it has today. The Capponi family is responsible for the development of the gardens. The differences in the garden seen today and the garden that existed in the mid 18\textsuperscript{th} century are the parterre and belvedere exedra. In the mid 1700’s, the parterre was more a “broderie” (an area planted with box and colored gravels) than the water parterre presently seen and terminated into a “gareenna” (a curved rabbit island surrounded by water). The restoration of the garden began in the 20\textsuperscript{th} century by Princess Ghika and it is she who is responsible for the water parterre and cypress belvedere and exedra pond. She preserved the original intent of the parterre with its quadrant design and “play of solids and voids” but inverted them whereas the enclosed beds became pools of water (Pozzano, 1999, p.14). She converted the gareenna into a cypress belvedere and exedra / amphitheatre as seen today. The other attributes in the garden were restored to the 18\textsuperscript{th} century plan with the garden sloping down the hillside in the Italian tradition. The garden contains a bowling green for lawn sports, a Rocaille garden made of decorative stone and pebbles with stairs leading up to the lemonaia (translated as the lemon garden and house), a nymphaeum (mysterious monumental fountain), and a selvatico or sacro bosco (artificial woods). From the belvedere, one has a view of the town of Settignano. From the front lawn, one has a lovely view of Florence.

The garden again went through different ownerships and suffered hardships during the Second World War. However, the Marchi family restored the garden in 1955 and opened it to visitors. In 1994, the villa and garden was inherited by the Zalum family and is maintained as a private residence but they continue the work of conservation and restoration (Pozzana, 1999). Guests are allowed to visit this 18\textsuperscript{th} century Italian Renaissance garden with permission. The setting maintains the ideals important during
the Renaissance movement: vistas, views, sacro bosco, ordered, geometrical plantings, etc.

**Experience of Villa Gamberaia Gardens**

I am excited as I take the bus (No. 10) to Settignano to visit the Villa Gamberaia and gardens. They have granted special permission for Katherine and me to visit and we are to be the only guests!! As we walk up the village road to the gate, I am surrounded by the rolling Tuscan hills. It will be hot today and I can feel the sun already on my neck. The manicured lawn is distinctly different to the vineyards planted below. Looking from the front lawn, I see Florence and the heat haze that has settled over the city. As I walk along the path I find myself able to choose a variety of “rooms” which to explore and all have a different feel and focus. The Bowling Green beckons me to take off my sandals and walk its length to see the view of the town of Settignano below. An old umbrella pine tree (not originally part of the design) adds height and balance to the cypress belvedere and exedra and pond. Upon entering the parterre, I immediately place on my sandals as the gravel is hot and crunches under my heels. I feel a sense of peace within the symmetrical parterres with the still pools of water with fish and beautiful water lilies. The slight splashing of the central fountain adds a bit of music to this garden. As I depart the parterre, I pass the framed arch of the selvatico or wild wood. Although this looks interesting, I am far more interested in the ornate Rocaille Garden and its stairs up to the fragrant limonaia!! The lemon trees and
roses intermixed is not only colorful but a fragrant feast for my nose. As the sun begins to bear down; I seek the quiet shade and coolness of the nymphaeum. The sound of the trickle of the water is soothing and the bench in this shade is welcome for resting and cooling off.

Photographs and plan of the garden are shown below.
Figure 39. Parterres with Belvedere

Figure 40. Exedra and Cypress Belvedere

Figure 41. Rocaille Garden and Grotto

Figure 42. Gate to Sacro Bosco/Selvatico

Figure 43. Bowling Green

Figure 44. Partial view of Limonaia & Rocaille Garden
Summary of Design Attributes at Villa Gamberaia:

Table 5: Design Attributes Present at Villa Gamberaia Garden

<table>
<thead>
<tr>
<th>Precedent</th>
<th>Enclosure</th>
<th>Water</th>
<th>Spatial Configuration</th>
<th>Materiality</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Villa Gamberaia, Settignano, Italy</em></td>
<td>Enclosed by shrubs and low walls with vistas of Settignano, views to Sacro Bosco Garden is attached to a villa</td>
<td>Water as seen in pools, fountain, nymphaeum</td>
<td>Rectilinear &amp; Quadrant Geometry, Belvedere &amp; exedra Choices to visit: limonaia, Rocaille Garden, sacro bosco/selvatico nymphaeum, parterres, belvedere, exedra</td>
<td>Turf, flowers, sculpture, topiary, mosaics</td>
</tr>
</tbody>
</table>

Defining the Landscape Design Attributes found in Healing Garden Precedents

From these precedents, four important attributes of a restorative garden have been identified through case study analysis and interpretation in Table 6. In each case study the four attributes were observed to be present and contribute to the restorative “feel” of the garden. In Table 6, each attribute was described in terms of the physical properties of the attributes as well as the traits (or character) experienced in the garden. A joint explanation of the physical and the traits will help to define each attribute.
<table>
<thead>
<tr>
<th>Case Studies</th>
<th>Enclosure</th>
<th>Water</th>
<th>Spatial Configuration</th>
<th>Materiality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Descr.</td>
<td>Traits</td>
<td>Descr.</td>
<td>Trait</td>
</tr>
<tr>
<td>Salisbury Cathedral, Wiltshire, UK</td>
<td>Built form</td>
<td>Solitude</td>
<td>No</td>
<td>Balanced Symmetry</td>
</tr>
<tr>
<td></td>
<td>surrounds cloister</td>
<td>Quiet</td>
<td>Water Absent</td>
<td>Symmetry, Completed unity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serene</td>
<td></td>
<td>Rhythm of arches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shadows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santa Maria Novella, Florence, Italy</td>
<td>Built form</td>
<td>Peaceful</td>
<td>Water is defunct</td>
<td>Turf, Cedar tree</td>
</tr>
<tr>
<td></td>
<td>surrounds cloister</td>
<td>Cooling</td>
<td>well, lavabo, or fountain</td>
<td>Tree, Decorated geometry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quiet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time: Permanence, Diurnal</td>
</tr>
<tr>
<td>Stourhead Gardens and House, Wiltshire, UK</td>
<td>Appears Open, Natural form, but enclosed by Ha-has Attached to a country estate</td>
<td>Clearing, Unseen separation Trees create backdrop, Frame views</td>
<td>Water is present as a major feature; lake</td>
<td>Balanced Symmetry, Repetition, Rhythm of columns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Turf, 4 trees, Frescoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Shadows, color (warm)</td>
</tr>
<tr>
<td>Villa Gamberaia, Settignano, Italy</td>
<td>Enclosed by shrubs and low walls with vistas of Settignano Views to Sacro Bosco, Garden is attached to a villa</td>
<td>Private, Controlled expanse</td>
<td>Water is seen in pools, fountain Nymphaeum</td>
<td>Clearing of Wild nature, Collection of experiences, Contrived framed views</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Still, Reflective</td>
<td>Natural plants, gnarly trees, turf, bridges, statues</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Still with slight ripples, Differing collection of reflections</td>
<td>Contrast Variety of textures, Time: Permanence, Diurnal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Swans</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“wild” nature interspersed with built forms</td>
<td></td>
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<td>Choices: grottoes, pantheon, temples, paths, lake, follies</td>
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<tr>
<td>Summary</td>
<td>Contrast or distinction to surrounding, Focus (solitary)</td>
<td>Still or subtle movement, Soothing noise, Reflectivity, Life sustaining</td>
<td>Balance, Rhythm of design elements &amp; rhythm as flow of human activity</td>
<td>Time (predictable): Permanence (life cycles) &amp; Diurnal (shadows), Immersion into plushness</td>
</tr>
</tbody>
</table>
Enclosure Defined

Enclosure implies a physical boundary that is meant to give shelter and definition, or as Crowe suggests to offer “a place of peace” (1994, p.175). An enclosure consists of “limiting surfaces having certain physical, visual, and symbolic characteristics, and the finite space they surround (Malnar, 1992, p.85). Enclosures create a quality of contrast or distinction to the surroundings while facilitating a singular focus or a series of singular foci. Santa Maria Novella and Stourhead create contrast similarly by utilizing negative space. At Santa Maria Novella, negative space is affected by a “clearing out” between the built structures creating the cloister garth that is distinct from its surroundings. Stourhead utilizes negative space by creating distinct areas where trees are cleared from the natural environment to promote views. Salisbury Cathedral is enclosed on three sides by walls and is completed by the fourth wall which is the wall of the nave. The enclosure of the garth creates contrast and distinction to the open “close” (or grounds) surrounding the Cathedral. At Villa Gamberaia, low walls and high hedges create the enclosure which defines the garden distinctly different from the open countryside of Settignano.

The other part of the definition of enclosure includes the facilitation of a singular solitary focus or a collection of singular foci upon which to reflect. At both Santa Maria Novella and Salisbury Cathedral the solitary focus is the center of the cloister garths. Santa Maria Novella’s garth encloses a defunct well while Salisbury Cathedral surrounds an old Cedar of Lebanon tree. Both Stourhead and Villa Gamberaia include a series of singular foci to be experienced within the gardens. Stourhead utilizes built follies in the garden to accomplish a series of singular foci to be experienced along the path. Villa Gamberaia has a collection of garden rooms to be experienced singularly with different
foci in each “room” which defines each “room” or enclosure distinctly, i.e. the nymphaeum versus the exedra and pond.

In the garden, the physicality of enclosures can be accomplished by shrubs, low walls, fences, and ha-has. The type of boundary used is dependent on the atmosphere that one wants to project. The built walls of the cloisters of the monastic garden precedents are an obvious example of physical enclosure whereas the enclosure of the picturesque garden seen at Stourhead Garden is invisible to the eye with the use of ha-has as boundaries. Scale, light, and manipulation of space with areas of prospect (wide open spaces) or refuge (the nooks and crannies to hide) are components of enclosure demonstrated at Stourhead. Villa Gamberaia utilizes both built walls and the verticality of shrubbery to accomplish physical enclosure to denote the distinctness of the garden from the countryside.

Enclosure contributes to the psychological aspect of feeling safe within an environment. Dame Crowe, states “the garden, after all, is a humanized, protective shell against the unmanageable immensities of the outer world” (1994, p. 102). This author interprets her remarks to imply that the garden also offers a form of “mental enclosure” which defines the space as distinct and different from the environment in which we are exposed on a daily basis. This mental enclosure as well as the physical enclosure fosters a sense of security, comfort, and allows for a perceived sense of control for privacy or social activity while in the garden. Enclosure is therefore an important attribute which contributes towards restoration within the garden.
Water Defined

Water is the essential element of life. The earth’s surface is composed mainly of water and so are our bodies. Without water, we can not survive. Water is a life sustaining physical element yet it has a psychological component. Water refreshes us when we are thirsty, cleanses us when we are dirty, and symbolically during baptism, purifies our soul. Water engages our senses. Water calms us with still or subtle movement and soothes us with sounds of gentle trickles over rocks, splashes from a swan or duck, or with the tender drop of leaves falling into the water. Water invigorates us when we bathe or take a cold plunge into the sea and lends for interaction or play. Reflection of the sky, clouds, trees, and light on the still surface of the water permits the mind to wander and contemplate. Water provides orientation to the seasons of the year (snow, sleet = winter, rain, mist, = spring, heat haze = summer, etc) and has the capability to renew life when we irrigate our gardens during the dry months.

Water can be a static element in the garden yet is also a dynamic part of the garden. Dame Crowe asserts that “playing water is the only element, besides birds and human beings, which brings life and movement into the garden, while an expanse of still water gives a unique sense of space and unity” (1994, p. 152). Water in the cloister garth at Santa Maria Novella originally was intended to sustain life. The well provided water to quench the monks’ thirst. Stourhead utilizes still water where the reflective components of water are maximized to encourage a serene and tranquil environment. The water at Stourhead also sustains life at the basest of forms: the evaporative cycle. The lake contributes to the climate and life cycle of the land. Villa Gamberaia utilizes water as a
singular focus in several of its collections of rooms to foster tranquility and impart a
degree of coolness from the hot Tuscan sun.

Water, physically, as seen in the garden precedents most commonly appears as
still water in the form of a fountain, pool, or lake. The monastic cloister garth differs in
that a well or lavabo is the physical form of water rather than a fountain or, more
commonly, water is symbolized by an evergreen tree. The still form of water as seen in
the case studies lends a tranquil atmosphere to the garden. Water’s restorative effects,
both physically and mentally, qualify water as an essential attribute in a
healing/restorative garden.

Spatial Configuration Defined

Physical spatial configuration of the garden is dictated by landform. Contouring
the garden into the site will make use of the natural features available for wind shelter,
seclusion, shade, light, and space division. Dame Crowe maintains that “the fundamental
pattern of landscapes and gardens results from the distribution and proportion between
open space and solid mass. The solids divide the land into space enclosures giving a
pattern of closed and open…” (1994, p. 107). Thus spatial configuration results from the
proportion of mass and void with the mass creating enclosures within the open landscape.
The resulting space division gives visual structure to the garden (Crowe, 1994).

The spatial configuration of the monastic cloister garths is rectilinear in pattern
and the size is determined by the length of the nave of the church that serves as one wall.
The visual structure of the garth is very easy to read and therefore navigate. The spatial
configuration of both the picturesque and Italian renaissance gardens are dictated by the
site whether contoured into a “wild” landscape or terraced into the hills of Italy. The
Italian renaissance garden is also rectilinear in its configuration at Villa Gamberaia while the visual structure of the picturesque garden at Stourhead is organized by the paths around the lake. The visual structure, therefore, comprises sequence, focus, balance, way finding, and orientation. “Form uses these organizational principles … to order and unify the visual characteristics or elements into a coherent statement of visual perception” (Malnar, 1992, p. 37) or in this instance a coherent restorative experience.

It is this principle of balance in the spatial configuration which is important to the restorative experience in the healing garden. The balance can be either symmetrical or asymmetrical. Both Santa Maria Novella and Salisbury Cathedral have a balanced symmetry unique to its square geometry of the cloister garth. Villa Gamberaia is asymmetrical in its spatial configuration by plan yet there is symmetry in each element in each “room” that is balanced. The asymmetry of balance at Stourhead is owed to the contrived “wild nature”.

Within the spatial configuration, rhythm takes on two forms. In the singular focused gardens (both monastic case studies) there is a rhythm in the designed elements. A rhythm of ribbed vaulted arches exists at Salisbury Cathedral while at Santa Maria Novella rhythm is demonstrated in the progression of columns. The second form of rhythm is the flow of human activity. This type of rhythm is present in the collections of rooms or series of singular foci as seen at both Stourhead and Villa Gamberaia. There is a progression of flow of human activity through the separate “rooms” of each garden.

**Materiality Defined**

Materiality, too, reflects rhythm in two aspects of time. There is the permanence of time (predictable) as seen in life cycles and the dynamic of time as seen in shadows
and other diurnal characteristics. Physically speaking, materiality refers to objects or forms used in the landscape to add visual interest and texture. Plants, sculptural forms, mosaics, stones, bricks, and built forms in the landscape can all add visual interest and texture thus developing the foundation for materials to be used in the garden.

It is the immersion into “plush-ness” that speaks to the tactile and visual qualities of materials that are important in a restorative setting. Plant materials include flowers, herbs, shrubs and trees. Sculptural forms can be statues, obelisks, and artwork placed within the garden to add interest. Mosaics (tiles, stones, bricks) can be used to pattern walks, floors, or walls in the garden to give visual interest and texture. Built forms can include but are not limited to architectural elements like temples or bridges or nature-like grottoes. Built forms not only add visual interest but provoke the imagination within the garden providing an escape to every day life that in itself is restorative.

Materiality is present in every garden precedent. In the monastic precedent, the cloister garth has turf and trees but it is the “plush-ness” of the turf that invites one to take off their shoes and walk barefoot and “feel” their surroundings. The striking contrast of lush green with the white decorated geometry of the built walls at Salisbury Cathedral supports a rich experience in the cloister garth. The walls of the loggia surrounding the garth at Santa Maria Novella are decorated with frescoes which are warm in color and pleasing to the eye. The trees in both cloister garths cast shadows indicating time of day. The “light play” as sun is filtered through the branches offers visual interest. The picturesque garden at Stourhead offers many uses of materials. There is a structured “wild” nature with the plant materials (old, gnarly, deciduous trees contrasted with the many shades of greens of leaves) with many built forms such as temples, cottages,
bridges, obelisks (medieval Bristol cross), and grottoes. Inside the grottoes, one can see mosaics on the floor made of stone and classical Greek statues that foster the cool feel of the trickling water. Materials like these add visual interest and lend texture to the surroundings and foster the healing/restorative process.

Case Studies Conclusion

Four key attributes discovered in the garden precedents have been identified as fundamental to the restorative characteristic found in healing gardens. The first attribute of the gardens is enclosure. In the monastic garden, enclosure provides privacy and protection from the outside world. The enclosure is a built physical form that creates a contrast or distinction to the surrounding area. In the romantic and renaissance garden, the enclosure may be a built physical form such as a wall or a ha-ha, or an implied wall with shrubbery. Whatever the means of enclosure, the garden is protected like the secreto giardino, limonaia, or grottoes for example and allows for privacy or socialization. Vistas or views are provided to the surrounding landscape.

The next attribute identified is water. Water serves as a central theme in all of the garden precedents. In the case studies analyzed, water that is still or has subtle movement promoted the restorative experience. The life sustaining properties that water inherently has also adds to the restorative experience whether directly or subliminally. The reflective properties of the still water help to induce a meditative mood. In the monastic garden, water is present as a well to provide water to drink or use, a lavabo where the monks could cleanse their hands, or as a fountain to soothe the senses with the sound of splashing water. In the Renaissance gardens, water is both playful and soothing. Fountains exist for pleasure and delight and ponds are stocked to fish and provide food.
The Romantic gardens are more naturalistic in their presentation of water as ponds, lakes, streams, rivers, and waterfalls.

The third attribute common to each garden is spatial configuration. The balance found in the spatial configuration either symmetrical or asymmetrical is important as well as the rhythm of the designed elements and flow of human activity. Most of the gardens in the case studies are composed in a rectilinear geometry while parts of the garden are composed on a quadrant system. In the monastic setting, the cloister’s geometry developed based on the length of the nave of the church (also the fourth wall of the cloister). The nave of the church had to be of certain length to form a square (Thompson, 2001). The cloister, and therefore cloister garth, was “usually square and always rectangular, enclosed on three sides and attached to a monastic church on the fourth” (Thompson, 2001, p. 33).

The last attribute identified from the case precedents is the materiality of the garden. Materiality is the immersion into “plush-ness” that addresses the tactile and visual qualities in the garden. There also exists a rhythm of time in the garden that yields a sense of permanence and a daily cycle. The physical materiality refers to the plants, materials, and built structures found in the garden. This attribute varies by region according to available plant material but all of the precedents used turf and plant material to enrich the sensory experience of the garden.

The relevance of these garden precedents lies in their longevity and continued success towards restoration. The value obtained in discussing the common attributes in these garden precedents is to clearly identify those elements employed in traditional healing garden design that are likely to retain their saliency for contemporary healing
garden design. This is precisely the effort exhorted by Crowe when she wrote that “it is worth studying certain of the great historic gardens which have these qualities to a marked degree, to discover whether they have any common characteristics which may still be applicable today” (1994, p. ix). Consequently to summarize what has been discovered about the precedent gardens which have restorative properties, healing gardens are likely to be characterized in part by enclosures that create distinction to that which surrounds while facilitating a singular focus or a series of singular foci; the life sustaining qualities of water, utilizing water as a static element (reflection pool, calm lake) while capturing its dynamic qualities (interactive over rough rock, fish, swans); the spatial configuration of balance and rhythm integrated with materiality to be reflective of two rhythms of time and immerses into plush-ness. In the next chapter, this author will explore how these attributes have addressed the restorative experiential qualities of sensory stimulation, movement and control to structure restorative environments.
CHAPTER 4

Interpretation of the Relationships between Design Attributes and Restorative Experiential Qualities

As shown in the preceding chapter, four key design attributes have been identified and defined from the case study precedents: enclosure, water, spatial configuration, and materiality. Each of these attributes in some way assists the restorative experience in the garden but how? This chapter will explore the connections between these four key design attributes and the three restorative experiential qualities identified in Chapter Two to identify design principles that will enhance the restorative experience of healing gardens in healthcare settings.

Restorative Experiential Qualities

In Chapter Two, three restorative experiential qualities—sensory stimulation, movement, and control—were distilled from the research on healing gardens stemming from a stress perspective (e.g. Ulrich, 1999), a mental fatigue perspective (e.g. Kaplan & Kaplan, 1989) and from an emotional healing perspective (Marcus & Barnes, 1999). The definitions for these qualities have been summarized for the convenience of the reader.

Sensory stimulation refers to visual and tactile stimulation with opportunities to interact with or view nature. Nature provides a “difference-within-sameness” which designers can mimic by employing a variation of architectural elements such as “scale, floor height, ceiling height, and lighting, variety in the texture and finish materials and the presence of soft elements” to add visual interest and complexity (Olds, 2001).

Movement uses the large muscle groups in the human body to move through space and exercise and strengthen the body. Exercise helps to lower anxiety, decrease
depression, and physically decreases stress (Marcus & Barnes, 1999). The design elements that relate to movement and circulation through a space are sequence, focus, balance, arrangements, way finding, and orientation. These spatial elements used effectively result in unity and therefore enhance restoration.

**Control** simplified means choice. Providing people with choices of opportunities for movement, play, privacy, social activity, and safety in their environment is vital in a design that supports restoration. Scale, light, temperature, manipulation of space, and areas of prospect (wide open spaces) and refuge (enclosed areas for privacy) are components of a design that can enhance a sense of control (Appleton, 1985).

This chapter will interpret the relationships between the four key design attributes and these three restorative experiential qualities. Each landscape design attribute will be discussed in terms of traits that further define as well as describe the characteristics of each attribute. Examples from the case studies presented in the preceding chapter will help illustrate the interpreted relationship of the attributes from the “traits” perspective and the restorative experiential qualities (see Table 7). The end result is to develop design principles that are speculated to enhance the restorative experience of healing gardens in healthcare settings.

The section following Table 7 will redefine the key attributes in terms of their traits and offer verbal descriptions of the relationships of the key attributes and the restorative experiential qualities present in the case studies. Examples and photographs will help to further illustrate the restorative relationship.
### Table 7: Interpreted Relationship between Attributes and Restorative Experiential Qualities

<table>
<thead>
<tr>
<th>Design Attributes:</th>
<th>Restorative Experiential Qualities:</th>
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<tbody>
<tr>
<td><strong>Terms:</strong></td>
<td><strong>Traits:</strong></td>
</tr>
<tr>
<td><strong>Sensory Stimulation</strong></td>
<td><strong>Movement</strong></td>
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<tr>
<td><strong>Control</strong></td>
<td><strong>Control</strong></td>
</tr>
<tr>
<td><strong>ENCLOSURE</strong></td>
<td><strong>Contrast</strong></td>
</tr>
<tr>
<td></td>
<td>* Contrain conflicting stimulation of surrounding environs * Avoid negative stimulation within healing garden</td>
</tr>
<tr>
<td>Focus</td>
<td>Enhance sensory stimulation by having enclosure act as a container</td>
</tr>
<tr>
<td><strong>WATER</strong></td>
<td><strong>Still/Subtle Movement</strong></td>
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<td></td>
<td>Provide water that is either still or subtle in movement to foster a tranquil environment</td>
</tr>
<tr>
<td>Soothing Noise</td>
<td>Provide a water element characterized by providing white noise to mask negative distractions</td>
</tr>
<tr>
<td>Reflectivity</td>
<td>Water that is reflective adds a subtle yet dynamic visual interest</td>
</tr>
<tr>
<td>Life Sustaining</td>
<td>Provide a water feature that captures its life sustaining quality for flora, fauna, and/or humans</td>
</tr>
<tr>
<td><strong>SPATIAL CONFIGURATION</strong></td>
<td><strong>Balance</strong></td>
</tr>
<tr>
<td></td>
<td>Balance in visual interest minimizes potential sensory overload or deprivation</td>
</tr>
<tr>
<td>Rhythm: Design Elements</td>
<td>Creates patterns in sensory stimulation</td>
</tr>
<tr>
<td>Rhythm: Human Activity</td>
<td>Creates activity stimulation while leading or piquing interest</td>
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<td>------------------------</td>
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<tr>
<td><strong>MATERIALITY</strong></td>
<td></td>
</tr>
<tr>
<td>Time: Permanence</td>
<td>Utilize materials that respond &amp; reflect changing of the season to rouse sensory interest</td>
</tr>
<tr>
<td>Time: Diurnal</td>
<td>Utilize materials &amp; composition of elements to capture changing daily conditions</td>
</tr>
<tr>
<td>Immersion into “Plush-ness”</td>
<td>Provide a variety of harmonious contrasting sources of stimulation to enhance sensory interest</td>
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</tbody>
</table>

**Enclosure**

Enclosure implies a physical boundary that is meant to give shelter and definition, or as Crowe suggests to offer “a place of peace” (1994, p.175). An enclosure consists of “limiting surfaces having certain physical, visual, and symbolic characteristics, and the finite space they surround (Malnar, 1992, p.85). Enclosures create a quality of contrast or distinction to the surroundings while facilitating a singular focus or a series of singular foci. The contrast to surroundings and the focus are the traits or characteristics of enclosures. It is the relationships of these traits with the experiential qualities that highlight the restorative aspect of healing garden design.

**Sensory Stimulation**

Enclosures constrain conflicting stimulation of the surrounding environment which helps to minimize negative stimulation. A busy urban environment is the very
essence of conflicting stimulation (traffic, noise, crowds, etc.) which increases stress. In order to reduce stress and promote restoration, designers must address those issues related to negative stimulation. Enclosures provide noise buffers when the garden is placed in a busy urban environment to enhance a feeling of peace and quiet (Kaplan & Kaplan, 1998). The Green Cloister at Santa Maria Novella is sited in a busy neighborhood of Florence. However, upon entering the cloister garth, there is a feeling of tranquility as the city sounds are hushed and only the bees and gardeners are heard.

Enclosures which act as “containers” can enhance sensory stimulation while providing a solitary focus. Enclosures can stimulate our sense of smell. With the idea that confined spaces will increase the intensity of the aromas, fragrance is heightened by herbs, flowers, or fruits placed within an enclosure. In the limonaia at Villa Gamberaia, the wonderful combined scent of citrus and rose is a delight to the nose within this enclosed part of the garden.

Movement

Movement uses the large muscle groups in the human body to move through space and exercise and strengthen the body. Enclosures can create smaller settings or partitions that create contrast within an environment which will reduce the amount of information that needs to be understood, thereby increasing legibility within
the landscape (Kaplan & Kaplan, 1998). If the boundaries are visible with entrances and exits clearly defined, the garden is easy to read and therefore navigate. Providing a solitary focus within the enclosure creates a landmark or a node thereby also enhancing legibility. The monastic precedents are simple examples of enclosure defining wayfinding within the garden. The entrances and exits are readily visible as are the paths which are linear and cross. The focus of the Green Cloister at Santa Maria Novella is the defunct well which can be interpreted as a node where the monks used to gather. The Cedar of Lebanon tree at Salisbury Cathedral is the solitary focus of the cloister garth as it is in the center and serves as a landmark. The monastic enclosures confine circulation and permit movement within the garden which facilitates restoration from stress.

Figure 48: Salisbury Cathedral Cloister Garth
Cedar of Lebanon tree acts as landmark for orientation in this simple garden.
The enclosed cloister garth enhances legibility of environment which facilitates movement.
Copyright permission Alan Soedring

Figure 49: Stourhead Gardens: Pantheon
A solitary focus via a framed view becomes a landmark in the path around the lake at Stourhead.
Photo by author
Control

Enclosure creates a sense of territoriality or ownership which fosters a sense of perceived control. A sense of control is necessary to facilitate restoration according to Ulrich (1999). An enclosure can provide a sense of focus that directs attention of the user to assist his ability to control distractions. A sense of focus can also enhance what the Kaplans’ refer to as coherence (1989) – a level of control that a person feels in his environment and thus aid in restoration.

Figure 50: Salisbury Cathedral

The area of the cloister garth is distinct from the “close” surrounding the cathedral.

“Close” is green area outside the cathedral.

Copyright permission requested Sealand Aerial Photo

Figure 51: Villa Gamberaia: cypress belvedere, exedra, and pond.

The arch in the cypress belvedere creates a focus (and frames a view) to minimize distractions. The pond is another option for a focus.

Photo by author

Two Enclosure Design Principles

To summarize the interpreted relationship between the key design attribute of enclosure with the restorative experiential qualities of sensory stimulation, movement, and control, two proposed design principles have emerged. The first principle speaks to
the trait of contrast while the second principle speaks of focus. These principles are summarized below:

1. Employ enclosure to constrain conflicting stimulation of surrounding environment thus avoiding negative stimulation yet promoting contrasting and distinctive positive stimulation which will enhance legibility and create a sense of territoriality or ownership by user.

2. Employ enclosure to limit distractions, thereby, enhance sensory stimulation; or to create a landmark or node to enhance legibility; or to direct attention of the user to aid his or her ability to control distractions.

**Water**

Water is a life sustaining physical element with a psychological component. Water is a natural element that covers seventy one per cent of the earth’s surface and composes sixty five per cent of the human body. Water has the capabilities to renew, refresh, invigorate, and balance us – the very definition of restorative. Moving water brings life to the garden while still water encourages contemplation (Crowe, 1994). A well maintained water feature is a restorative attribute in the garden (Kaplan & Kaplan, 1998).

**Sensory Stimulation**

Water, inherently, has both visual and tactile qualities that invite us to interact or passively view. Water engages our senses and its therapeutic values are “doubly enhanced if it engages our hearing and our sight” (Marcus & Barnes, 1999, p.226). Water that is either still or subtle in movement fosters a tranquil environment however moving
water that provides “white noise” to mask negative distractions also fosters a tranquil environment. Water that is reflective adds a subtle yet dynamic visual interest. Light play on the water, reflected clouds and leaves support the Kaplan’s (1989) concept of “fascination” – that which engages us and keeps our attention directed thus promoting restoration. While water can be a static element, by providing a feature that captures its life sustaining qualities of flora, fauna, and/or humans adds another dynamic aspect that is restorative.

Figure 52: Stourhead Lake
Still water is reflective of the sun, trees, and clouds.
Swans and other wildlife use the lake.
Photo by author

Figure 53: Villa Gamberaia: parterres
Small fountain in middle of parterres provides “white noise” for the garden.
Copy right permission Villa Gamberaia
Movement

Water elements can provide movement in the garden. The splash of the fountain spilling over into a pool creates movement whereas a meandering brook also supplies physical movement in the garden. Water elements, also, can direct human movement within the garden. At Villa Gamberaia, the water seen in the parterres dictates the path that a visitor must travel through the parterres. In the precedent at Stourhead, the path through the garden is dictated by the lake with temples, grottoes, and other follies becoming destinations along the path.

A water element can provide an auditory landmark to help guide orientation. The slight splash of the fountain in the center of the parterres at Villa Gamberaia is an auditory landmark that gently cues the visitor. A water element, too, animates the garden by providing refuge for wildlife and/or by encouraging human interaction. The lake at Stourhead encourages swans, birds, fish, and other small animals to inhabit the garden.
Figure 55: Villa Gamberaia: parterres
The path through the parterres is dictated by the water.
Copyright permission Villa Gamberaia

Figure 56: Villa Gamberaia Plan
The center fountain is an auditory cue orient oneself to the garden.
Copyright permission Villa Gamberaia

Figure 57: Stourhead Garden
Reflection on the water provides its own sense of movement.
Wildlife, such as these swans, animates and brings life into the garden.
Photo by author

Control

Since the experiential quality of control means literally having the opportunity to make choices, water offers many options. Water can serve as a place for solitude, meditation, or privacy (Marcus & Barnes, 1999). Still or subtle movement encourages a tranquil environment thereby fostering and cueing passive interaction and contemplation. Water may also serve as an activity pocket or a place for social interaction. People may gather at the fountain to enjoy others company. Subtle moving water may provide white
noise to mask negative distractions in the garden. The reflections in the water promote reverie or fascination thereby aiding restoration. Water contains life sustaining properties which individuals can either choose to participate or not. In the monastic precedents water is present as a well or a lavabo from which one gets a drink to quench his thirst or wash his hands. Since water is a natural element, it is inherently restorative and adds these restorative properties to the garden.

Figure 58: Stourhead Lake

Still (glass-like areas) or subtle moving water (ripples produced by the wind or swans) fosters a tranquil environment.

Reflection of the trees, sky, clouds, etc. in the water promotes contemplation.

Figure 59: Villa Gamberaia: parterres

Center fountain provides white noise to mask negative distractions.

Figure 60: Stourhead Garden Plan

The lake has life sustaining properties but it is the choice of the visitor whether or not he will interact (actively or passively) with the lake.

Copyright permission Villa Gamberaia

Copyright permission Dorling Kindersley Pictures, 1977
Four Water Design Principles

To summarize the interpreted relationship between the key design attribute of water with the restorative experiential qualities of sensory stimulation, movement, and control, four proposed design principles have emerged. The first principle refers to the trait of still or subtle movement, the second principle references the trait of soothing noise that water can provide, while the third principle acknowledges the restorative quality of reflection of the water, and the last principle speaks of the life sustaining quality that is inherent in water. These principles are summarized below:

1. Water that is either still or subtle in movement can provide its own movement and/or direct human movement and thus encourages a tranquil environment thereby fostering and cueing passive interaction and contemplation.

2. A water feature (element) can provide an auditory landmark to help guide orientation/circulation within the environment and can provide white noise to mask negative distractions.

3. Water that is still or subtle in movement and is reflective adds a subtle yet dynamic visual interest; provides its own sense of movement; and encourages a tranquil environment thereby fostering and cueing passive interaction and contemplation.

4. Providing a water feature that captures its life sustaining quality for flora, fauns, and/or humans will animate the environment with wildlife and presents humans the choice for interaction or not.
**Spatial Configuration**

Spatial configuration results from the proportion of mass and void within the landscape. The mass creates enclosures within the landscape while the void creates open areas of openness which results in space division and presents visual structure to the garden (Crowe, 1994). The visual structure, in design terminology, comprises sequence, focus, balance, way finding, and orientation. In the garden precedents, the spatial configurations of the gardens were not only dictated by landform but also by balance and two distinct types of rhythm: rhythm of the designed elements as well as the rhythm of the flow of human activity.

**Sensory Stimulation**

Spatial configuration in the garden offers visual interest and complexity (Crowe, 1994). The proportion of mass and void provides visual sensory stimulation. The balance in visual interest minimizes potential sensory overload or deprivation. The parterres at Villa Gamberaia are a wonderful example of balance of mass and void with the plantings serving as the mass and the water becoming the void. The parterres offer visual interest to observe and enjoy while not overloading or depriving the senses.

In the spatial configuration, the rhythm of design elements creates patterns in sensory stimulation. These patterns are visible in the visible structure of the garden which can accent color, heighten fragrance, and provide tactile variation in the design elements. The spatial configuration of the garden also creates stimulation for the flow of human activity by leading or piquing interest.
Balance is seen in the mass and void. This area of the garden is neither sensory overloading nor depriving.

Mass = plantings

Void = water

Figure 62: Salisbury Cathedral

Rhythm of design elements seen in the vaulted arches creates a pattern of sensory stimulation.

Copyright permission Alan Soedring

Figure 63: Stourhead Garden Plan

The plan or spatial configuration leads human activity around the lake.

Copyright permission Dorling Kindersley Pictures, 1977

Movement

Movement refers not only to exercise but also circulation through space. The design elements that relate to movement and circulation through space are sequence, focus, balance, way finding, and orientation (Crowe, 1994). These elements are important considerations when space planning the garden, however, it is the balance in the spatial
configuration that fosters greater environmental coherence and therefore legibility of the environment. The rhythm of the design elements in the spatial configuration encourages progression of movement through the garden while the rhythm of the flow of human activity also encourages movement in the garden.

Figure 64: Villa Gambreaia Plan

Balance as seen in the parterres fosters coherence and therefore enhances legibility of the garden.

Rhythm of human activity encourages movement through the various “rooms” of the garden.

Copyright permission Villa Gambreaia

Control

Spatial configuration in the garden provides choices in the garden. Choices of destinations and opportunities for either privacy or social interaction in the garden are important in fostering a restorative experience (Ulrich, 1999). The balance of visual interest in the spatial configuration eases the task of visual comprehension thereby increasing legibility and orientation to place. A simple example of this type of balance is seen in the parterres at Villa Gambreaia. The garden is easy to “read” and therefore easily navigated. Thus, the visitor feels in control of his surroundings. Spatial configuration that promotes rhythm of the design elements also enables meaningful choice. The predictability of the decorated geometry on the walls within the vaulted arches with views into the cloister garth at Salisbury Cathedral allows the visitor to decide if he wants passive interaction (looking into the garth from a “safe” position) or active participation by actually walking out onto the garth. The rhythm of the flow of human activity is
affected through the spatial configuration and is based on the choices made by the users. This is best demonstrated by the plan at Villa Gamberaia. The visitor can stroll from each “room” of the garden into another based on personal choice. This promotes a sense of control of one’s environment and thus aids in restoration.

**Figure 65: Villa Gamberaia: parterres**

The parterres are balanced and thus easy to comprehend visually which increases the legibility of this garden as well as enhances orientation to place.

Copyright permission Villa Gamberaia

**Figure 66: Salisbury Cathedral**

The rhythm of the windows from the vaulted arches around the cloister and their predictability enables the user to make meaningful choices: active or passive participation.

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**Figure 67: Villa Gamberaia Plan**

The rhythm of the flow of human activity is based on the choices the user makes.

Copyright permission Villa Gamberaia

**Three Spatial Configuration Design Principles**

To summarize the interpreted relationship between the key design attribute of spatial configuration with the restorative experiential qualities of sensory stimulation, movement, and control, three proposed design principles have emerged. The first
principle refers to the trait of balance, the second principle acknowledges the rhythm of the designed elements, and the third principle addresses the rhythm in the flow of human activity. These principles are summarized below:

1. Spatial configuration that has balance in visual interest can minimize potential sensory overload or deprivation while fostering greater environmental coherence by easing visual comprehension of the environment, and thereby increasing legibility and orientation to place.

2. Spatial configuration that incorporates rhythm through design elements creates patterns in sensory stimulation, encourages progression, and enables meaningful choice.

3. Spatial configuration that incorporates rhythm of the flow of human activity will pique interest through sensory stimulation which will encourage movement and choice of activity of users.

**Materiality**

Materiality refers to objects or forms used in the landscape to add visual interest and texture. Plants, sculptural forms, mosaics, stones, bricks, and built forms in the landscape can all add visual interest and texture. These materials comprise the foundation of the garden (Crowe, 1994).

**Sensory Stimulation**

Materiality in the garden is the very essence of sensory stimulation. Nature in itself is sensory stimulating and provides a positive distraction from stress and thus promotes restoration (Ulrich, 1999). Materiality in the garden lends a sense of time in the
garden: a sense of the daily passing of time and a sense of permanence. Utilizing materials and a composition of elements to capture the changing daily conditions (reflections, shadows, etc) echo time diurnal and enhance sensory interest. Utilizing materials that respond and reflect the changing seasons will also rouse sensory interest and thereby promote restoration. Immersing one into a sense of “plush-ness” stimulates the senses. The texture of the gravel paths, the abundance of different plant materials, wild life, and variations in color all offer sensory stimulation which is restorative by nature. By providing a variety of harmonious contrasting sources of stimulation to enhance sensory interest (while avoiding overload) will promote the restorative experience of the garden.

Figure 68: Santa Maria Novella Green Cloister

Shadows reflect time diurnal and indicate relative time of day.

Photo by author

Figure 69: Stourhead Garden: Turf Bridge

Azaleas in bloom, deciduous trees, and green turf indicate early summer in England.

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Movement

Materiality by employing mature plantings in the garden can enhance a sense of mystery within safety that can facilitate exploration. To be curious of what is behind this old gnarly tree (as in a partially blocked view) might facilitate the visitor to keep moving and explore his environment. This relationship utilizes the informational factor identified as “mystery” by Kaplan and Kaplan (1989). Materials in this instance can help people to understand and explore their environment. Changing daily conditions also encourages exploration of one’s environment and reinforces a sense of passing time. For example, a visitor may lose time while in a moment of reverie and then notice the shadow from a nearby tree and realize that time has slipped by and it is now time to move along with their exploration. Also the “plush-ness” of the environment may encourage personal engagement or interaction in the environment. The thick, verdant grass of the bowling green at Villa Gamberaia invites the visitor to take off his shoes and explore the lushness of this environment.
Figure 71: Stourhead Garden: path

Mature plantings, curves, and partially blocked views promote movement and exploration within the garden.

Copyright permission Armin Grewe

Figure 72: Salisbury Cathedral

Shadows from the cloister walls and from the Cedar of Lebanon tree indicate the passing of time.

Copyright permission Marion Roberts

Figure 73: Villa Gambareia: bowling green

The plush turf invites one to explore his environment - perhaps barefooted.

Copyright permission Villa Gambareia

Control

The use of natural materials feels familiar and comfortable to those visiting the garden (Kaplan & Kaplan, 1998). This feeling of familiarity and comfort invokes a perceived feeling of control which in turn decreases stress and fosters restoration (Ulrich, 1999). The visitor feels “safe” in this environment. Utilizing mature plantings or aged
materials in the garden increases a sense of security and thus a feeling of safety which fosters a perceived feeling of being in control of one’s environment. Materiality also encourages temporal orientation. Using materials that enhance shadows and reflections will help to denote time in the garden as well as employing sundials and other materials relevant to the era, etc. Provision for a plush environment encourages choice – active or passive participation thus fostering a perceived sense of control which aids restoration from stress.

Figure 74: Stourhead Garden Meadow

Mature growth fosters a sense of permanence of time in this garden. The countryside is also “familiar” and increases a sense of security.

Photo by author

Figure 75: Stourhead Lake

Temporal orientation is enhanced by the shadows and reflections upon the lake.

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Figure 76: Salisbury Cathedral

The “plush-ness” of this cloister invites the visitor to interact but the view from the vaulted arches permits passive participation which fosters perceived control and enhances restoration.

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Three Materiality Design Principles

To summarize the interpreted relationship between the key design attribute of materiality with the restorative experiential qualities of sensory stimulation, movement, and control, three proposed design principles have emerged. The first principle refers to the trait of time and its sense of permanence, the second principle acknowledges the trait of time from a diurnal perspective, and the third principle addresses the immersion into “plush-ness” of the materials. These principles are summarized below:

1. Utilize materials that respond and reflect changes in the season to rouse sensory interest while employing mature plantings and aged materials to encourage a sense of mystery within safety and thereby facilitate exploration and increase a sense of security within the environment.

2. Utilize materials and a composition of elements to capture changing daily conditions to encourage exploration and temporal orientation while reinforcing a sense of passing time.

3. Utilize materials that will provide a variety of harmonious contrasting sources of stimulation to enhance sensory interest and provide “plush-ness” of materials to encourage personal engagement or offer choice for passive participation.

Conclusions

The garden by its very nature is restorative according to various research perspectives, but how such restorative experiences are to be facilitated through design is ambiguous. Conversely, garden design may be discussed in terms of the composition of particular attributes, but often how that composition of attributes forwards restoration is simply asserted or assumed. There simply is no consensus on how design attributes may
foster the restorative process. The summary in Table 7 illustrates an initial exploration and interpretation of the relationship between each key design attribute and their respective traits from the historical garden precedents and the restorative experiential qualities suggested by the theoretical literature. From this interpretation, twelve design principles for healing gardens are proposed and listed in Table 8 below.

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>DESIGN PRINCIPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENCLOSURE</td>
<td>Employ enclosure to constrain conflicting stimulation of surrounding environment thus avoiding negative stimulation yet promoting contrasting and distinctive positive stimulation which will enhance legibility and create a sense of territoriality or ownership by user. Employ enclosure to limit distractions, thereby, enhance sensory stimulation; or to create a landmark or node to enhance legibility; or to direct attention of the user to aid his or her ability to control distractions.</td>
</tr>
<tr>
<td>WATER</td>
<td>Water that is either still or subtle in movement can provide its own movement and/or direct human movement, and thus encourages a tranquil environment thereby fostering and cueing passive interaction and contemplation. A water feature (element) can provide an auditory landmark to help guide orientation/circulation within the environment and can provide white noise to mask negative distractions. Water that is still or subtle in movement and is reflective adds a subtle yet dynamic visual interest; provides its own sense of movement; and encourages a tranquil environment thereby fostering and cueing passive interaction and contemplation. Providing a water feature that captures its life sustaining quality for flora, fauna, and/or humans will animate the environment with wildlife and presents humans the choice for interaction or not.</td>
</tr>
<tr>
<td>SPATIAL CONFIGURATION</td>
<td>Spatial configuration that has balance in visual interest can minimize potential sensory overload or deprivation while fostering greater environmental coherence by easing visual comprehension of the environment, and thereby increasing legibility and orientation to place. Spatial configuration that incorporates rhythm through design elements creates patterns in sensory stimulation, encourages progression, and enables meaningful choice. Spatial configuration that considers the rhythm of flow of human activity will pique interest through sensory stimulation which will encourage movement and choice of activity of users.</td>
</tr>
<tr>
<td>MATERIALITY</td>
<td>Utilize materials that respond and reflect changes in season to rouse sensory interest while employing mature plantings and aged materials to encourage a sense of mystery within safety and thereby facilitate exploration and increase a sense of security within</td>
</tr>
</tbody>
</table>
Utilize materials and composition of elements to capture changing daily conditions to encourage exploration and temporal orientation while reinforcing a sense of passing time.

Utilize materials that will provide a variety of harmonious contrasting sources of stimulation to enhance sensory interest and provide “plush-ness” of materials to encourage personal engagement or offer choice for passive participation.

The next chapter will address what this study contributes to the body of knowledge in Landscape Architecture, further study, the limitations of this study, and conclusions drawn from this thesis.
CHAPTER 5

This thesis began asking the questions: “what is a restorative/healing garden?” and “how can one design for this type of garden?” The garden by its very nature is restorative according to various research perspectives, although how the garden is restorative differs depending on the point of view. If restoration is viewed as a relief from stress, then by alleviating sources of stress by providing designs for gardens that promote movement and exercise, access to privacy and control of one’s environment, social support, and positive natural distractions will lead to a restorative experience. If one needs restoration from mental fatigue, then designing a natural environment that is whole and easily understood yet provokes exploration and visual interest which promotes recovery of directed attention will lead to a restorative experience. Finally, if what one is seeking is emotional healing, then one needs to feel a relief from physical symptoms, a reduction in stress, and an overall improvement in well-being which can be accomplished by spending time outside. The designs that offer socialization, privacy, strolling, vigorous exercise, shade of sun, sitting or exploring, and the very aesthetics of nature will lead to a restorative experience. Each of these perspectives leads to different types of design suggestions because the problem at hand is conceptualized differently.

The healing garden literature as a whole lacks consensus as is exemplified by the pluralistic terminology and wide ranging design guidance found therein. The literature review summarized in Chapter Two identified an overlap and repetition of what was variously termed “design resources”, “factors and patterns”, and “design elements” that were synthesized into three restorative experiential qualities: sensory stimulation, movement, and control. However, these experiential qualities alone only offer ideas or
thoughts for design consideration when designing a restorative/healing garden but how such restorative experiences are to be facilitated through design remains ambiguous. Through the interpretative case study analysis found in Chapter Three, four key landscape design attributes were identified: enclosure, water, spatial configuration, and materiality. It is the interpreted relationships between each key attribute and restorative experiential quality that provides a framework for launching twelve speculative design principles that can be further developed into performance requirements to direct design decisions when designing restorative/healing gardens in health care settings.

Contribution to the Body of Knowledge to Landscape Architecture

This thesis contributes to the body of knowledge in Landscape Architecture by interpreting and synthesizing the existing healing garden literature into three restorative experiential qualities (sensory stimulation, movement, and control) which embodies all of the different restorative perspectives. This thesis also identifies four key attributes (enclosure, water, spatial configuration, and materiality) from case study analysis from relevant time periods that coincide with the western medical model when health care and nature were interrelated. The relationships of the attributes and restorative experiential qualities resulted in twelve speculative design principles summarized in Table 8 (in Chapter Four) to inform design decision making when planning restorative/healing gardens for health care settings.

Further Study

This study could be taken to the next step which is to establish performance requirements from the twelve speculated design principles to inform the design decision making process as suggested by Duerk (1993). There are several processes of inquiry that
could lead to the development of performance requirements. One process is for the
designer to brainstorm ideas for examples of discrete aspects of each of the attributes
that would enhance the restorative experiential qualities in the garden. Another process is
to utilize a panel of experts to draft performance requirements based on Table 8 in the
preceding chapter which can provide the framework to organize thoughts in a meaningful
way. An additional way to achieve performance requirements is to look at existing cases,
i.e. newly designed healing gardens in health care settings, and analyze the data
according to interpretative conceptual clustering to see how and if these gardens achieved
restorative experiential qualities through the attributes in the garden. Such issues and
performance requirements could then be utilized to inform post-occupancy evaluations of
healing gardens. The next step further would be to perform post-occupancy evaluations
on these said gardens to see if the interpretative clustering of data for restorative
experiential qualities through attributes in the garden led to actual restoration. This type
of inquiry is sadly lacking in the healing garden arena.

Limitations

The limitations of this study are that the results are based on personal
interpretation of the various literature research perspectives by this researcher. A different
researcher might not have made the same associations. One criticism of this study could
be that only four historical garden precedents were analyzed from three distinct periods
when nature was gifted with therapeutic/healing properties. Perhaps a broader case study
analysis over many time periods would increase credibility of the four identified key
attributes found in restorative gardens or even a greater sample of precedents from the
periods identified would strengthen the study.
Others could argue that another limitation of this study is that the garden precedents used were limited to England and Italy. Considering western medical models as precedents, perhaps other gardens in European countries as well as the United States might offer additional information regarding restorative/healing design of gardens in health care settings. Although each garden analyzed was personally visited by this researcher, the restorative effects felt by this researcher are subjective. The longevity and use of these gardens today still embody the restorative characteristics that were important at the inception of the gardens.

To improve further on this study, future research should consider more consensual approaches to inquiry, such as utilizing expert panels to synthesize interpretations, or models of co-research. At the very least, peer review should be employed to enhance the trustworthiness of the findings. Additionally, the sample of case studies could be meaningfully extended to other time periods and to other cultures. As research in this area improves, more informative sampling frames may be constructed and enhance the robustness of such inquiry.

Conclusions

There is resurgence in the literature concerning the importance of nature and healing today that indeed shows the interest and need for addressing the psychological aspects of health and healing. Alternate forms of medical care are being embraced by the populace such as acupuncture, Chinese herbs, aromatherapy, and massage to name only a few. There is currently an attempt by the medical communities to support these alternate forms of health care in conjunction with traditional western medicine. There is a “calling out” from the public for more “humane” healthcare that incorporates both the mind and
the body in the healing process. “Healing involves more than curing...healing includes the individual’s spiritual and psychological well being” (Shepley, M., 1998). This holistic approach is what is meant by the term “healing environments” (Shepley, M., 1998). Thus a healing environment “exploits science and medical technology while supporting the physical, mental, and spiritual needs of patients, families, and caregivers to enhance therapeutic outcomes” (Shepley, 1998). One of those needs includes restoration from stress which can be accomplished by integrating nature during the healing process. It is this author’s opinion that health care environments, whether the physical buildings or the gardens, should incorporate the ideals of holism where all parts are related to the whole and that the body, mind, and spirit are involved in the healing process.

A restorative environment is like a tapestry with threads of common experiential qualities that weave throughout the design in the course of key attributes to promote restoration from stress, and thus, a better quality of life. Holism is the view that all parts are related to the whole; thereby one can assume the physical setting, both built and natural, is related to the healing process. Holistic medicine considers the patient’s body, mind, and spirit in the healing process with the patient being an active participant in the recovery of his own health. Accordingly, with the theory of holism in mind, the environment (in this thesis the garden) becomes an integral part of the healing process. Anita Olds, an environmental psychologist states that “to heal means to make whole… an environment which is itself whole and visibly harmonizes all of the people and its parts can act as a unifying thread and can mirror the well-being for which the patient is striving… the environment then becomes a healing agent” (Olds & Daniels, 1987, p. 1). Thus the healing garden with the restorative experiential qualities of sensory stimulation,
movement, and control accomplished through the key attributes of enclosure, water, spatial configuration, and materiality also can be visibly whole and vital to the well fare of the patient for restoration and healing.
Bibliography


