WORDS OF RECOVERY:
FINDING MEANING IN ILLNESS AND INJURY

by

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Abstract

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Past findings in the fields of environmental psychology and health psychology have supported the notions that individuals are best able to adapt to illness and injury if they are exposed to natural, restorative environments, and if they can create personal meaning of their medical condition. Although patient well-being is a concern in both of these fields, this project was the first to study these literatures in conjunction with each other. The goal was to elucidate the relationship between restorative environments and patient coping outcomes.

Sixteen inpatients hospitalized in an urban rehabilitation medical center participated in this study. Participants were randomly assigned to take part in a meaning-making interview in their hospital rooms or gardens located on the hospital grounds. Data were also collected on current pain and anxiety before and after the meaning-making interview and during a follow-up one day later.

Results from the study exhibited a significant difference in patients' perceived restorativeness of the gardens compared with the hospital rooms in only one of five domains of attention restoration theory (*fascination*); propensity for meaning-making was not found to be related to the location where the interviews took place; and patients did not exhibit emotional and physical changes as a result of spending time in the natural environment. There were, however, two notable findings. First, each participant fell somewhere along an attribution-finding spectrum. Some participants had “found” the answers to why they became ill or injured prior to the interview, and the interview served as an opportunity to voice these answers. Others utilized the interview as an opportunity to question attribution—that is, through the interview, they continued their search or even commenced the process of finding attribution for why they became ill or injured. No matter how developed an attribution was, however, it was clear that the participants developed attributions that enabled them to understand their illness experience within the context of their lives. Secondly, most participants who found personal meaning in their illness experiences disclosed meanings indicative of posttraumatic growth (PTG). The PTG domains most frequently referred to were *appreciation of life*, *relating to others,* and *personal strength*.

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Project Overview

The goal of this dissertation is to examine, in a single study, two fields of research that previously have not been investigated together: restorative environments and the ability to make personal meaning of illness or injury. Both fields seek to understand the elements that increase patients' ability to cope with illness or injury. Theories of restorative environments posit that adaptive functioning is a result of directed attention recovery (Attention Restoration Theory, ART: Kaplan & Kaplan, 1989) and stress reduction (Psychoevolutionary Theory: Ulrich, 1983). Meaning-making research in health psychology has found that patients are better able to adapt to their illness or injury if they can find meaning in it (Taylor, 1983; Janoff-Bulman, 1992; Park & Folkman, 1997). Despite the fact that both research areas are concerned with patient well-being, this project represents the first time that these fields were studied in conjunction with each other, in an effort to elucidate the relationship between restorative environments and patient coping outcomes.

This study builds upon an earlier project in which I investigated Attention Restoration Theory (ART) in three healing gardens set within an urban rehabilitation medical center. My findings confirmed that the four elements of ART (being away, fascination, extent, and compatibility) were found in these gardens and that patients recognized the environment's positive impact on their recovery. These conclusions encouraged further examination of how patients are affected by spending time in the gardens.

With the current project, I predicted that patients would perceive the garden environment to be more restorative than the hospital room environment. I predicted that the garden environment would relieve patients' mental fatigue, congruent with ART. I predicted that patients would undergo psychophysiological changes in the gardens that would be congruent with psychoevolutionary theory. Through the method of semi-structured interviews, I decided to investigate if being in the natural, restorative environment would have an effect on patients' ability to find meaning in illness or injury.

CHAPTER ONE

Theoretical and Empirical Literature Review

The effect that nature has on the mental and physical health of individuals is a much researched topic in environmental psychology. Exposure to the natural environment enables people to feel more relaxed and able to cope (Marcus & Barnes, 1995, 1999); attend more efficiently to cognitive tasks (Cimprich & Ronis, 2003); and heal more rapidly and with less pain following a medical procedure (Ulrich, 1984). Furthermore, in the field of health psychology, studies have documented that individuals search for meaning when they become ill or injured and are better able to adapt both psychologically and physically when they are successful in doing so (Taylor, 1983; Janoff-Bulman, 1992; Park & Folkman, 1997).

This dissertation aims to bridge the fields of restorative environments and meaning-making, beginning with a discussion of the two literatures and offering suggestions for how they might be profitably used in synergy. Below I present a review of the theories and empirical research focusing on the restorative environment and its relation to adaptation. I then present a specific review of research conducted in hospital gardens. Next is a review of the theories and empirical research focused on meaning-making and its relation to adaptation. I conclude with an explanation of how my project integrated the environmental and meaning-making literatures.

The Restorative Environment and its Effect on Patient Adaptation

Attentional adaptation. Attention restoration theory (ART), one of the principal theories in psychology focusing on the therapeutic effects of the natural environment, was developed by Stephen and Rachel Kaplan after they discovered that the natural environment experienced during an Outward Bound-style program provided participants with “a sense of well-being, of being renewed, of being restored” (1989, p.146). In the context of their theory, restoration occurs when people recover from *directed attention fatigue*. Directed attention fatigue is the mental fatigue one feels after expending extreme and prolonged effort concentrating on specific material (Kaplan & Kaplan, 1989). Directed attention is a survival mechanism used to decrease confusion brought about by stressful situations, allowing one to focus on crucial stimuli without losing concentration to distractions. For patients who are in the hospital due to illness or injury, this limited resource can be easily depleted, leaving them vulnerable to mental fatigue. This fatigue can lead to a decreased ability to cope. Thus, patients in hospitals have a great need for access to environments that will facilitate the restoration of their attention. Attention restoration theory postulates that mental restoration occurs in environments that contain four elements: 1) a sense of being away, 2) fascination, 3) extent, and 4) compatibility (Kaplan & Kaplan, 1989). These elements are thought to be more often found in natural environments as opposed to built environments, and thus nature “is a vital ingredient in healthy human functioning” (Kaplan, 1992b).

A setting that gives the sense of *being away* is one that is physically or conceptually away from the everyday environment (the hospital environment, in the case of patients). It is one that allows a sense of “escape” from stressors, and makes an individual feel like she or he can “get away from it all” (Kaplan & Kaplan, 1989, 1990).

The *fascination* category is based on the work of William James who conceptualized the difference between voluntary and involuntary attention (1892/1962). Voluntary attention—or as the Kaplans term it, *directed* attention—forces individuals to exert effort in order to concentrate on specific material. Some environments, however, promote individual's use of involuntary (or *effortless*) attention. Effortless attention can be brought about by components in the environment that elicit either soft or hard fascination. Soft fascination is obtained easily and pleasantly (for example, the fascination one has while looking at the ripples in a lake), and is conducive to personal thought and reflection. An environment eliciting hard fascination may be exciting to look at (such as watching a sports game), but it is not conducive to thought and reflection. As an element of attention restoration theory, it is soft fascination that the Kaplans suggest is the most healing.

A setting that is coherent and encourages discovery is one with *extent*. It is an environment that gives "the sense of being in a whole other world" (Kaplan & Kaplan, 1990, p. 242). The extent of an environment depends on its scope—that is, an extensive environment is large enough to be explored, but it is easy to understand how all of its parts fit together.

Lastly, a setting that is *compatible* is one that supports the mental or physical activities that individuals wish to take part in. "If one's purposes fit the demands imposed by the environment, and the environmental patterns that fascinate also provide the information needed for action—compatibility is fostered" (Kaplan & Kaplan, 1989, p. 186).

Environments containing these elements are thought to be healing because, together, they allow individuals the ability to relax and undergo mental restoration (Kaplan & Kaplan, 1989). In these environments, individuals' heads are cleared of the distracting "cognitive leftovers" (brought on by prolonged directed attention to one area) that inhibit concentration. Further, there is a recovery of directed attention—with distractions gone, attention can be focused again. Individuals are able to attend to things that have been on their mind, but have not yet been dealt with. Finally, there is a period of self-reflection that promotes individuals to think about their lives and their priorities in a clear, rational manner.

Empirical Inquiry into Attentional Adaptation

Research examining the physical environment's impact on mental restoration has spurred enough excitement and scientific inquiry to justify two leading journals in the field of environmental psychology to devote entire issues to the topic (*Environment and Behavior*, 2001; *Journal of Environmental Psychology*, 2003). This dissertation is aligned with other studies that have attempted to connect attention restoration theory with actual outcomes. As will be reviewed below, the diversity of the research includes studies comprised of different participant populations ranging in age (undergraduates to older adults) and health status (patient and non-patient). Studies have taken place in various settings, including laboratories with slide simulations of environments and in natural spaces near people's homes. Studies have also examined different outcomes, whether the endpoint is simply to investigate the environment's effect on attention, or if mediational properties of attention restoration are investigated in relation to another adaptational outcome. I will focus on the work that has given specific focus to environmental impact on attention, and offer a critique of pieces that are of concern or in need of further inquiry. I begin with a discussion of studies that were conducted in laboratory environments.

Laboratory studies. In an early attempt to put attention restoration theory to the test, Herzog, Black, Fountaine, and Knotts (1997) provided college student participants with either an attentional-recovery scenario (“You have just spent your day performing dull attention-demanding tasks that required intense concentration…regaining your attention is your goal.”) or a reflection scenario (“You have some very serious personal problems that you need to think about…thinking deeply about these problems is your goal.”). The participants were then exposed to simulated environments—slides categorized into ordinary natural settings, sports/entertainment settings, and everyday urban settings. Participants were instructed to rate on a 5-point scale ranging from “an excellent setting” to “a terrible setting” how appropriate these environments would be to accomplish their given goal.

With respect to both scenarios, the natural settings were considered to have high restorative potential; the urban settings were considered to have low restorative potential; and the restorative potential of the sport and entertainment settings were considered to be in the middle. These results confirmed the hypothesized relationship between nature and restoration. Moreover, they elucidated the difference between environments that support *hard fascination,* allowing for recovery from directed attention—but not reflection (such as sports and entertainment settings)—and environments that support *soft fascination,* allowing for both recovery and reflection (such as natural settings). As explained above, this difference in fascination type is a cornerstone of attention restoration theory.

In addition to codifying different types of fascination, research has focused on the relationship between individuals’ preference for natural settings and attention restoration theory. Environmental preference research suggests that individuals tend to prefer spending time in natural environments as opposed to built settings (Balling & Falk, 1982; Kaplan & Kaplan, 1982, 1989; Schroeder, 1991; Kahn, 1999), and studies have been conducted to examine if there is a link between this repeatedly-found preference and the surmised higher restorative potential of natural environments. In one such study, college students were asked to describe both favorite places and personally unpleasant places and to reflect on their experiences in these settings (Korpela & Hartig, 1996). As expected, the majority of participants' favorite places were composed of natural elements (such as greenery and water), and the elements found in reported unpleasant places often included busy streets and crowds. Furthermore, the four elements of attention restoration theory, measured with the Perceived Restorativeness Scale (PRS; Hartig, Korpela, Evans, & Gärling, 1996) were more often present in the favorite places than unpleasant places. In their analysis, however, the authors did not consider the *proportion* of natural elements in the environments. That is, the PRS scores were highest in the favorite places, whether or not they were natural (some favorite places were residential and urban locations), thus the study focuses on what makes *favorite locations* restorative—regardless of natural elements—rather than what makes natural environments restorative.

In a subsequent study, Korpela, Hartig, Kaiser, and Fuhrer (2001) attempted to reconcile this discrepancy and more fully investigate the relationship between restoration and the natural environment. This time, college student participants were asked to describe either a favorite place or an unpleasant place and discuss the experiences that they had previously had in the setting. The experiences were then coded as restorative and not restorative. To be considered a restorative experience, participant descriptions had to relate to attention restoration theory. For example, “reflecting on one’s self and one’s priorities in life” was considered restorative.

To tease out the impact of nature on restoration, favorite places were divided into two categories (those that were natural and all other types of environments), and it was found that restoration was more often experienced in favorite places that were natural. This finding *does* support the hypothesis that natural settings are more conducive to restoration than built settings. However, further research is still necessary to make judgments regarding the natural environment and its specific relationship to the elements of attention restoration theory. When analyzing the scores for the PRS, the authors did not divide the favorite places into these two categories. Although analysis of PRS scores suggested the elements of attention restoration were found significantly more often in favorite places than unpleasant places, the *amount* of nature found in the favorite places was again not considered.

In 2003, Staats, Kieviet, and Hartig again investigated if the preference for nature was due to the perceived restorative potential of natural settings. In this study, college students were exposed to two environments, simulated with slides. One group of slides was arranged in such an order as to represent a walk through nature; the other was arranged in an order to represent a walk through an urban setting. In a similar manner to Herzog et al. (1997), participants were randomized into two groups, each assigned to an attention scenario—either a fatigued scenario (“This semester you have studied intensely…You have difficulty concentrating and are very irritable.”) or a non-fatigued scenario (“The period between semesters has been very relaxing…You feel very much able to focus on your courses again.”). In response to the given scenarios, participants were asked about their preferences for each of the two types of environments; their attitudes towards walking in the environments; and the likelihood of being able to recover and reflect during a walk in each of the environments.

As the authors hypothesized, participants in both groups exhibited a preference for the natural environment. Moreover, participants who had been asked to imagine mental fatigue demonstrated a more positive attitude toward walking in the natural environment. Although both groups responded more positively regarding the natural setting than the urban setting, the score differentials were greater in those who imagined being mentally fatigued; the mean preference score in this group was twice as high for the natural setting when compared to the urban setting.

At the same time, there was an unanticipated finding. Participants who were asked to imagine being mentally fatigued exhibited higher correlations between expectations of recovery with an urban walk versus a walk in nature. Thus, findings for the benefits of nature appear murkier than would have been assumed. If participants believed the likelihood of recovering from attention fatigue and undergoing personal reflection would be experienced more when taking a walk in an urban environment, why did they still report a preference for nature? This question remains unanswered by the authors. The complex and occasionally counterintuitive nature of these results offers a sense of the difficulty researchers face as they endeavor to disaggregate the constituent elements of attention restoration theory.

In each of the examples described above, participants were either asked to recall past experiences or to imagine themselves in hypothetical situations, leaving unanswered the question of how a participant actually suffering from mental fatigue would respond.

Berto’s 2005 investigation addressed this gap in the literature. In her study, she induced mental fatigue in college student participants via the Sustained Attention to Response Test computer program (SART; Manly, Robertson, Galloway, & Hawkins, 1999). This program “presents temporally predictable stimuli (digits from one to nine) to which participants are required to respond with a key press to all stimuli except the target stimulus” (p. 252). Participants completed the SART program, after which half were shown a series of restorative environment pictures (scenes of nature) and the other half were shown a series of nonrestorative environment pictures (scenes of city streets, industrial zones, and housing). (Categorization of the pictures had been completed in an earlier study where each picture was rated by 40 other participants according to a short version of the PRS.) After the pictures were viewed, participants underwent a second series of the attention task.

A comparison of the SART scores of participants at the two time-points offers evidence that participants who viewed the restorative scenes showed a significant increase in attention; those in the nonrestorative group, however, showed no significant differences in their scores before and after viewing their series of pictures. These findings support the notion that if one is mentally fatigued, exposure to restorative environments can increase attention capabilities.

The findings from the studies described above illustrate promise for the establishment of a relationship between attention restoration and exposure to the natural environment. In all studies that analyzed preference, natural settings were more often preferred than built settings. Moreover, in two of the three studies that examined theoretical restoration in either hypothetical or past situations, natural environments were assumed to be more restorative. Lastly, in the study that induced mental fatigue, exposure to nature increased attention capability.

The promise of these findings however must be accompanied with caution. In one study, spending time in nature was preferred, but *not* assumed to be more restorative, which was unexpected. Moreover, as mentioned above, questions remain regarding both the applicability of the perceived restorativeness scale and the existence of the four elements of attention restoration theory in natural settings.

Many of the study designs leave open causal questions. For example, in the studies where participants imagined themselves in hypothetical or past situations rather than actually undergoing cognitive tasks, there is a decreased ability to generalize the findings to real-life situations. Only Berto’s (2005) study examined real instances of mental fatigue, but even here they were experimentally induced.

And, although researchers attest that photographs provide similar data to actual environments (Herzog, et al., 1997) simulated environments lack the smells and sounds of actual environments, which would, I contend, affect the restorative potential of the settings. Thus, results may in actuality represent participants’ assumptions rather than the mental changes they would actually experience in real environments. Staats et al. (2003) made an effort to remedy the simulation situation with their more realistic “walks” through environments; however, the data was still not collected in actual locations. It should also be noted that the studies drew their participants exclusively from populations of college-age students. The following section reviews research that investigates attention restoration in environments outside of the laboratory, using diverse populations.

Studies in situ. Hartig, Mang, and Evans (1991) investigated attention restoration in individuals who were experienced backpackers. Participants belonged to one of three groups: those who went on a backpacking trip in the wilderness, those who took part in a non-wilderness vacation, and those who took no vacation at all. To test attention capacity, a proof-reading task was administered at pre-test and post-test. Findings demonstrate that spending time in the wilderness had restorative outcomes, in that proof-reading improved from pre-test to post-test *only* for those who participated in a wilderness vacation. Moreover, participant proof-reading scores in the other two groups *decreased*—revealing that the physical environment can actually diminish one's attention capabilities. Although the findings of this study support the notion that the natural environment can increase one's ability to direct attention, it must be noted that the participants were not randomized into their groups and there was no control of exactly where or how vacations were spent.

In a second study, using a randomized experiment, the researchers compared the restorative qualities of a walk in a natural setting, a walk in an urban setting, and the act of simply relaxing in a chair in a laboratory (Hartig et al., 1991). To test the environment's impact on reducing mental fatigue, while in their assigned location, participants were given multiple mentally fatiguing tasks (including the Stroop Test (1935) and a binary classification test) before taking a walk (or relaxing). They then completed the proof-reading task and a measure of perceived restorativeness quality in regard to their current environment. The restorativeness measure was developed with respect to attention restoration theory (Kaplan & Talbot, 1983). All four elements of attention restoration theory were experienced more in those who took a nature walk than those randomized to the two other groups. Moreover, with regard to mental fatigue, those who took a nature walk located more errors in their proof-reading task than the other two groups, indicating higher cognitive functioning.

Tennessen and Cimprich (1995) also examined the effect that nature has on the ability to direct attention, focusing on the views from college dormitory room windows. Measures of the ability to direct attention included the Digit Span Forward and Backward (DSF, DSB; Wechsler, 1955), the Symbol Digit Modalities Test (SDMT; Smith, 1973), and the Necker Cube Pattern Control test (NCPC; Orbach, Ehrlich, & Heath, 1963). The Attentional Function Index (AFI; Cimprich, 1992) was also included to measure participants' self-reports of how effective they thought they were in carrying out everyday activities that require directed attention. Views from the rooms were rated according to the degree of nature that could be seen through the window by a group of six adults who ranged in their understanding of environmental impact on attention. Slides were taken of the view from each window and raters scored the slides (1=all natural, 2=mostly natural, 3=mostly built, 4=all built); the scores of each slide were averaged and then the views were placed into the four categories.

Students with all natural views scored significantly better on the SDMT and the NCPC, and rated their attentional functioning on the AFI higher than did the other groups. When the all and mostly natural-view categories were combined and compared to the built-view categories, participants in the more natural group scored significantly better than the more built group only on the SDMT and the NCPC. The findings regarding effectiveness in carrying out activities were inconsistent: only two of the objective measures showed better effectiveness for nature viewers, and the subjective

AFI scores were no longer significantly different when the all- and mostly- natural groups were combined. Even so, findings might suggest that attention restoration can occur with just a small dose of nature seen through a window.

Kaplan (2001) also studied the benefits of views from windows, this time investigating the views from six apartment complexes. The apartments were chosen because of the range of views, both built and natural, surrounding the buildings. Window-view content was assessed in two ways: 1) respondents rated on a scale of 1 to 5 (*can't see this* to *see it almost always*) 17 window-view characteristics (i.e., trees, a park, quiet street, vacant lot); and 2) respondents were given 40 black and white photographs (taken at each of the complexes) and were asked to compare their view to each on a scale of 1 to 5 (*not at all like my view* to *very much like my view*).

Having a view of gardens from one's window was positively correlated with self-reports of effective functioning and how at peace individuals were, and negatively correlated with how distracted individuals felt. And, although views with built components did not correlate with positive well-being in any of the categories, it also did not negatively affect well-being. Thus, unlike the findings of Hartig et al. (1991), where it was found that *not* being exposed to nature had a detrimental affect on individuals, in this study the built environment did not have negative outcomes. The study design presented here poses a problem, however, in that the researchers were not permitted to speak with participants directly; all information was collected via mail, and the actual views participants saw from their windows could not be analyzed. Thus, window-view information *was* collected, but accuracy of participants' reporting could not be verified.

Kuo (2001) also examined the impact of views from apartment building windows in an investigation of the impact of nature on inner-city residents. This study tested whether small amounts of nature could affect residents' ability to manage major life issues through the mediating factor of restored attention. Structured interviews were conducted, including a measure of attentional capacity—the Digit Span Backwards (DSB; Lezak, 1983)—and a measure of the management of major life issues—the Ineffective Management of Major Life Issues scale (IMMI: created for this study, but based on the Personal Projects methodology; Little, 1983). The IMMI consists of four subscales, which measure the *difficulty* of the life issues, one's *neglect* of the issues, the amount of *time* the issues have been problematic, and the current *severity* of the issues. Participants identified issues in each of three categories—major goals, major problems, and major decisions, and, for the two most important issues in each category, completed the IMMI. To group the participants according to how much nature they were exposed to, Greenness Ratings were assigned to the buildings. Independent raters scored standardized sets of 16 photographs of views from each building on a scale of 0-4 (0=not at all green, 1=a little green, 2=somewhat green, 3=quite green, 4=very green). The scores were then averaged and condensed into two categories—green and barren.

The mediational model was tested by examining the interrelationships among the variables: DSB scores were negatively correlated with scores on the IMMI (and its subscales), meaning that participants who were able to direct attention considered themselves to be more effective in managing major life issues. Those living in barren conditions scored lower on the DSB than those living in green conditions, meaning that the participants who were exposed to more barren views had less ability to direct attention than those who were exposed to nature. Results support a relationship between nature and effectiveness, in that those living in green conditions considered themselves more effective at managing their life issues than those in barren conditions, as evidenced by their lower scores on all four IMMI subscales. When attention (DSB) was controlled, there was no longer a relationship between the environment and effectiveness (IMMI). Thus, attention mediated the relationship between the environment and effectiveness in carrying out activities of daily living.

This study adds a great deal to our understanding of the impact of nature. With mediational testing, the effect that natural surroundings (even in low doses) had on the management of major life issues was fully mediated by participants' ability to direct their attention. This finding is significant not only because it extends our knowledge of the effect of nature by examining the mediating process, but also because this supports the theory of attention restoration. Moreover, the author even suggests that with the information we learned regarding the positive effects of the natural environment, "hospital designers could help people help themselves" (p.27).

Cimprich and Ronis (2003) investigated attention restoration with another group of acutely stressed participants: women who were newly diagnosed with early-stage breast cancer. Participants were randomized into an intervention group and a nonintervention group. Those in the intervention group were asked to take part in an activity involving the natural environment (e.g., visiting a scenic spot and listening to sounds of nature) near their homes, four times per week, 30 minutes each time. Logs were kept of the time spent doing the activities. The nonintervention group was not asked to take part in a natural activity, but was asked to record any “relaxation and free-time activities.”

To measure directed attention, participants completed the Digit Span Forward and Backward (DSF, DSB, Lezak, 1995; Wechsler, 1955), Trailmaking (A and B) (TMA, TMB; Lezak, 1995), and the Necker Cube Pattern Control task (NCPC; Cimprich, 1993). Assessments took place an average of 17 days before surgical treatment and 19 days after treatment (but before any adjuvant therapy was started).

After the nature intervention, group differences emerged in attention. The attention of those in the intervention group increased significantly more than those in the nonintervention group on all measures except for the NCPC. Although specific measures of adaptive coping were not included in this study, the implication that small doses of nature (an exposure time of only two hours per week) affected attention regulation in a particularly vulnerable population is very important.

The research designs of the investigations taking place in real environments improved upon the laboratory research. Results from these investigations tend to be more valid because they were no longer reliant upon participants’ recollections or imaginations. Objective measures of attention were included in each of these studies, so the limitation of testing *assumptions* rather than actual attention was no longer present. Lastly, the combined results from these studies lend themselves more to generalizability as there was diversity in study participants and study locations.

Generally speaking, the empirical evidence suggests a positive relationship between the natural environment and the ability to restore directed attention. However, these findings invite a closer investigation of the details of this relationship. First, longitudinal research is lacking and thus causal directionality remains an issue. We cannot say with certainty that a natural restorative environment can *predict* better directed attention and, if it does, how long the effects of the restorative environment can last. Second, there were mixed results in regard to restoration of attention as measured by attention tasks.

The findings described above and the unanswered questions they created led me to investigate the relationship between the "nearby nature" of a hospital setting and patients' effectiveness in coping with illnesses and injuries (Kaplan, 1992a). My research aimed to add to the literature by collecting data on participants' attention to aspects of their real life. Instead of investigating participants' attention to contrived tasks or subjective reporting, I investigated the attention they gave to the meaning of their illnesses and injuries.

Psychophysiological adaptation. In addition to attention's relationship to the natural environment, this dissertation investigates the physical changes and stress reduction that can be experienced when exposed to the natural environment. In a seminal article in the *New England Journal of Medicine*, McEwen (1998) introduced the idea of "allostatic load": the notion that the body's accommodation to stress can be protective in the short-term, but damaging over time. McEwen defines "allostasis" as "the ability to achieve stability through change" (p.171). The allostatic systems of the body must both turn on in response to a stressor and turn off when the stressor is no longer a threat (1998; McEwen & Seeman, 1999). For example, in the hypothalamic-pituitary-adrenal axis, stress activates the release of corticotropin-releasing factor (CRF) from the hypothalamus, in turn activating the pituitary to release adrenocorticotropic hormone

(ACTH), which lastly activates the adrenal cortex to release cortisol, or stress hormones. When the threat has passed, the level of cortisol returns to baseline, and through negative feedback, reduces the production of ACTH and CRF. Here, then, restoration can be defined in physiological terms as a decrease in stress and a return to baseline physiological functioning. If however, the level of stress hormones is not reduced, overexposure to these hormones (and load on this allostatic system) can lead to physiological damage including cardiovascular and immunological disease (McEwen, 2004)

McEwen (2004) describes four scenarios that can lead to allostatic load: 1) repeated accounts, or "hits" of a stressor over time, 2) the body's lack of accommodation to a stressor, 3) the body not recovering after being exposed to a stressor, and 4) a lack of response from the allostatic systems to a stressor that causes hyperactivity in other areas of the body. Perceptions—as well as one's general state of health—affect how one reacts physiologically to a stressful situation. Of particular salience to the current project, McEwen (1998) suggests that "physicians and other health care providers can help patients reduce allostatic load by helping them learn coping skills, recognize their own limitation, and relax" (p. 177). Perhaps one way to reduce this physiological damage is to introduce patients into a restorative environment.

Psychoevolutionary theory, as proposed by Ulrich (1983)—and most often referenced in studies examining psychophysiological stress and its relationship to the environment—suggests, as does McEwen, that restoration is attained through physiological stress reduction (i.e., lowered heart rate, relaxed muscle tension) as well as an immediate emotional response. Ulrich cites Zajonc's (1980) idea of "preferenda"—

general or vague aspects of an environment that elicit an affective reaction without cognition—to explain that an individual has an automatic emotional response to an environment. This response impacts the further cognitive processes the individual undergoes in relation to the environment (i.e., recognition and identification), which influences physiological arousal. Lastly, the individual's behavior is motivated by this arousal. This is further explained by Ulrich, Simons, Losito, Fiorito, Miles, and Zelson (1991):

> An adaptive constellation of restorative responses would involve, for instance, attention/interest accompanied by liking, reduced levels of negatively toned feelings such as fear, and reductions in physiological arousal from high levels to more moderate ranges…Restorative influences of unthreatening natural scenes following a stressor should be evident in a shift towards a more positively-toned emotional state, and in decreased levels of physiological arousal. (p. 208)

From an evolutionary perspective, it benefits individuals to respond quickly to the environment in order to react appropriately and efficiently to ones surroundings.

Over the years, Ulrich's work has expanded to investigate the impact the natural environment has on a number of physiological outcomes, including pain intensity and rehabilitation time necessary after a medical procedure. Many researchers have followed in his footsteps and explored numerous outcome factors with varied populations. Exemplary studies are detailed below.

Empirical Inquiry into Psychophysiological Adaptation

The following studies focus upon the psychophysiological effects of nature on individuals. As with attention restoration research, there is a range in participant demographics with respect to health status and age, and a range in the environments under investigation with respect to both setting (including environmental simulations and actual settings) and the amount of time participants are exposed to these environments.

In a laboratory study, Ulrich, Simons, Losito, Fiorito, Miles and Zelson (1991) explored the impact of viewing a stress-inducing movie and the ability of a surrogate natural environment to mitigate stress effects. The stressor was a ten-minute video depicting accidents occurring in a woodworking shop. After watching the movie, the college student participants were exposed to ten minutes of another video—a recovery video—taped specifically for this project, showing one of three types of everyday environmental settings (nature, traffic, or a pedestrian mall).

To explore bodily reactions to stress, data from three physiological measures were collected throughout the viewing of both movies. Electromyography (EMG) measured muscle tension, skin conductance responding (SCR) measured the activity of sweat glands, and pulse transit time (PTT) measured the amount of time between a heartbeat and pulse pressure. An electrocardiogram (EKG), measured heart period (the intervals between heart beats) and collected data about how attentive the participants were to their viewing environments; as attention increases, heart rate decreases. Additionally, at three time-points during their participation (before the stressor movie, after the stressor movie, and after the recovery movie) participants completed the Zuckerman Inventory of Personal Reactions (ZIPERS; Zuckerman, 1977) to collect subjective data about state affect. The ZIPERS measures state affect along five dimensions: fear, positive affects, anger/aggression, attentiveness/interest, and sadness.

Greater stress reduction during recovery was seen in the participants who viewed the nature movies than those who viewed the movies of the traffic and the pedestrian mall. Blood pressure, muscle tension, and skin conductance increased during the stressor and decreased during recovery for all groups, but the decrease in recovery was significantly stronger among those who viewed the nature movies than the other two groups. Heart period decreased during the stressor video for all three groups, but only for the nature viewers did it continue to decrease during the recovery period. This indicates that the stressor video held participants' attention, but only those who viewed the nature recovery video continued to have their attention held. This result demonstrates that watching something unpleasant can induce involuntary attention just like nature—an eventuality that the Kaplans do not discuss. Psychological recuperation was also significantly stronger in those who viewed the nature movies: fear and anger/aggression were significantly lower, and positive affect was significantly higher in the nature group than the other two groups. The sadness and attentiveness/interest scales showed no significant difference between groups. However, the authors point out that the results of the ZIPERS, which measures state emotion, may have been different if the participants were asked to complete the questionnaire while viewing the recovery tapes rather than *after* the tapes. This would have been a more stringent test of psychoevolutionary theory, which states that reaction to environmental surroundings happens immediately upon exposure. In sum, recovery from the stressor was faster and more complete for the viewers of the nature movies than the other groups. Although conducted in a laboratory, this study demonstrates that access to a natural environment can have considerable effects on stress reduction.

In two nearly identical laboratory studies, Tse, Ng, Chung, and Wong (2002 a, b) examined the influence, again, of simulated natural environments, this time on pain perception in healthy college participants. In both studies, pain was induced via an inflated tourniquet applied to the dominant arms of the participants and participants were randomized into two groups. One group viewed natural scenes (i.e., mountains and waterfalls) during the administration of pain and one viewed a blank screen. The difference between the two studies lies in the fact that the viewing was displayed in a video format in one study (Tse et al., 2002a) and in the other via Eye-Trek goggles (Tse et al., 2002b). Twenty seconds after the tourniquet was applied, and every 20 seconds for the following 10 minutes (or until the pain became unbearable), participants reported their pain on a 0 to 5 scale (*no pain* to *intolerable/stop*). Results from both of these studies demonstrated that visual distraction with nature scenes significantly increased pain threshold (i.e., the amount of time it took for pain to be detected by participants) and pain tolerance (i.e., the amount of time it took before pain became intolerable).

In a groundbreaking study published in *Science*, Ulrich (1984) examined the effects that views from inpatient hospital room windows had on individuals recovering from gall bladder surgery. Except for what could be seen from the windows—deciduous trees or a brick wall—all hospital rooms to which patients were assigned were nearly identical. Data from the charts of patients were collected over a nine-year period, during the months when there were leaves on the trees. This enabled the nature view to be compared to the wall view. Patients were assigned to rooms as they became available. Data from patients who viewed the brick wall were paired with data from patients who viewed the trees to insure that, at baseline, there were no differences between the groups with respect to sex, age, smoking habit, weight, past hospitalization, year of surgery, the floor of their inpatient room, or the color of the paint on the walls in their room.

Findings from this study showed the strong effect that even a simple view of nature can have on the recovery of surgery patients. Those with a view of trees spent approximately one less day in the hospital, and had fewer negative nurses’ evaluations in their charts. During the second through fifth days in the hospital, those with a view of nature needed less potent pain medication (i.e., acetaminophen versus narcotics) as compared to the brick wall viewers. The author notes that the significant difference in pain medication use during days two through five was important because immediately post-surgery (day 1) it was expected that all patients would be in too much pain or would be too medicated to look out the window; and at the time closest to discharge (days 6 and 7) it was expected that all patients would be on the same low dose of pain medication (or no medication at all).

This study, the only one of its kind, is most often cited by others who are investigating nature’s effects on physiological well-being. It expanded the literature considerably by bringing research out of the laboratory setting and into an actual environment where individuals are in acute need of stress reduction. The findings are particularly significant because they show that even a small “dose” of nature can have a large impact on the rehabilitation process.

Diette, Lechtzin, Haponik, Devrotes and Rubin (2003) also sought to test whether an environmental distraction could have an effect on patients. In this study, patients scheduled to undergo flexible bronchoscopy (FB), typically a painful procedure, were divided into an intervention group (those who experienced nature distractions before, during, and after undergoing FB) and a control group (those who were treated with the standard care). Assignment was determined by the day of the procedure, meaning that on a given day, all patients would be assigned to either the intervention group or the control group. The distractions consisted of a photographic quality mural of a mountain stream in a meadow, mounted on the ceiling during the procedure and at the bedside before and after the procedure. Additionally, patients were provided with a tape of nature sounds (i.e., birds, water). They had the option of listening to these sounds through headphones and were instructed to make any adjustments to the tape (including turning it on and off) at their own discretion. The control group received neither the mural nor the option of listening to the natural sounds.

Outcome data were collected two days after the procedure. Measures included self-reporting of pain and anxiety experienced during the procedure, self-reporting of the ability to breathe during the procedure, willingness to return to the institution for another FB if needed in the future, and an evaluation of the bronchoscopy area. Participants in the intervention group reported less pain during the procedure than the control group did. There were no significant differences between the groups, however, on anxiety, ability to breath, care satisfaction, or reactions to the physical environment. As no data was collected to analyze the intervention group’s use of the distractions (e.g., how long they looked at the murals; if they chose to listen or not to listen to the natural sounds) it is impossible to tie the findings to a particular aspect of the intervention. Nevertheless, one can conclude that the distractions had some beneficial effect on the participants in the intervention group, no matter the extent to which they were used.

In addition to murals and sounds of nature, other types of distraction therapies depicting natural environments have been investigated. For example, Miller, Hickman, and Lemasters (1992) examined if distraction therapy would reduce the pain and anxiety experienced during procedures undergone by adult burn patients. Data was collected from burn patients during ten dressing changes for each patient. Participants were randomized into a treatment group and a control (standard care) group. Those in the treatment group watched a video of nature scenes (including the ocean, desert, forest, flowers, waterfalls and wildlife) at their bedside during the dressing changes. The videos were accompanied by music.

At enrollment, participants completed a measure of trait anxiety (STAI-form Y-2; Spielberger, 1983). Then, fifteen minutes prior to each dressing change, but after receiving pain medication, patients were asked to complete the McGill Pain Questionnaire, which consists of the Pain Rating Index (PRI) and Present Pain Intensity (PPI) (Melzak, 1975), as well as the measure of state anxiety. They completed these measures again within two minutes after each procedure.

When comparing participants in the treatment and control conditions, the treatment group experienced a significant decrease in pain intensity and state anxiety. These results show promise for patients who have to undergo repetitive, painful procedures, and need methods to decrease pain and anxiety. Furthermore, reducing patient pain may also make it easier for medical personnel to perform such procedures.

Lee, Chan, Wong, Fung, Li, Chan, Mui, Ng, and Chung (2004) also examined whether a distraction utilized during a medical procedure would affect pain perception. In this study, participants who were scheduled to undergo a colonoscopy were randomized into three groups: a visual distraction and sedative use group, a visual and audio distraction and sedative use group, and a group that used sedatives alone. The visual distraction was implemented via an Eye-Trek goggle system displaying homemade movies, consisting mostly of scenic views. Classical music served as the audio distraction. Patient-controlled sedation (PCS) was utilized in all three conditions.

Because the use of sedatives has the potential for risk and is quite costly, the goal of the study was to find an alternative to traditional sedation; hence the main outcome measure was dosage of the patient-controlled sedation. Additional measures included the number of hypotensive episodes, oxygen desaturation, recovery time, pain, satisfaction of the colonoscopy experience, and patients' willingness to have a future colonoscopy with the same procedures.

The group receiving a combination of visual distraction, audio distraction and PCS used significantly less sedation than those in the other two groups. Participants in this same group also reported significantly less pain and higher satisfaction with the colonoscopy experience than those in the other two groups. Participants in both the visual distraction and PCS group and the audiovisual distraction and PCS group were more willing to return for a future colonoscopy using the same procedure of distraction and sedation. As in Miller, et al. (1992), these results show promise for patients who have to undergo an uncomfortable medical procedure. Moreover, if patients are satisfied and willing to return for a similar procedure, it may encourage them to be more proactive in their health care maintenance.

In sum, the positive effects of the natural environment on physical outcomes have been repeatedly demonstrated in a number of studies, both laboratory experiments when stress is induced and, of particular importance to this dissertation, in real-world settings with patient populations. Positive physical well-being outcomes range from general stress-related outcomes (i.e., heart rate, skin conductance) to specific medical procedure related outcomes (i.e., rehabilitation time after surgery, ability to breathe, pain medication dosage). Affect, a main aspect of psychoevolutionary theory, is examined less often than physical outcomes, although when it was examined in relation to state anxiety, the positive relationship with nature continued.

The majority of studies examining the effect of the environment on psychophysiological outcomes have utilized simulated environments. What is missing in the literature is work examining how a real-world setting affects physical outcomes, particularly in a patient population. Ulrich's (1984) study is the sole example of work of this sort, and thus it is imperative to investigate if his results can be replicated. Although in a hospital setting the impact of simulated environments is important, as it is impossible to bring nature into sterile operating rooms, it is also important to learn with more confidence if recovery can be affected by an actual natural environment.

The Restorative Effects of Hospital Gardens

This dissertation is concerned with the effect that nature has on the well-being of individuals in the acute stress situation of being inpatients in a hospital. The amount of research that has focused on hospital gardens is modest, with most projects taking the form of post-occupancy evaluations (POE), evaluations of environments by actual users. Even so, theories have developed as to what makes gardens healing (Stigsdotter & Grahn, 2002). Ulrich hypothesized about what aspects of hospital gardens make them healing for patients, and documented them in his theory of supportive gardens (1999).

Supportive here refers to “gardens with environmental characteristics that facilitate or support stress coping on the part of patients, visitors, and healthcare staff. By having restorative and buffering effects on stress, supportive gardens can foster gains in numerous other patient outcomes” (p.35). Ulrich suggests that successful healing gardens promote four phenomena: 1) a sense of control and access to privacy; 2) social support; 3) physical movement and exercise; and 4) access to nature and other positive distractions. It is this fourth phenomenon that is the focus of my current research.

Although done without direct connection to theory, POEs of hospital gardens have made apparent the positive impacts that these gardens have on the well-being of patients, staff, and visitors. In a compilation of data from four sites, Marcus and Barnes (1995) analyzed the physical layouts of gardens, observed the behaviors of visitors while in the gardens, and interviewed visitors. In response to an open-ended question, “Do you feel any different after you’ve spent time in the garden?” the majority of respondents reported that they felt more relaxed and calmer; were able to think more clearly; find answers; and felt more capable after spending time in the garden. While their questioning did not focus on any specific theory, the findings regarding individuals’ ability to think more clearly and find answers appears to buttress the hypothesis that the gardens alleviated directed attention fatigue.

In another POE, Whitehouse, Varni, Seid, Cooper-Marcus, Ensberg, Jacobs and Mehlenbeck (2001) evaluated individuals visiting a children’s hospital garden. Again, in relation to attention restoration theory, participants reported that they went to the garden “to relax and rest,” and “to get away from [the hospital’s] stressful environment.” Participants reported mood changes due to their visits to the gardens, disclosing that they felt “more relaxed, less stressed, [and] content.” A major limitation of this study, however, is that even though pediatric patients participated, only one of them had actually visited the garden.

This same limitation applies to another POE of three gardens located on the grounds of a pediatric cancer center (Sherman, Varni, Ulrich, & Malcarne, 2005). However, this POE did add to the literature because it included a questionnaire in the data collection regarding “present functioning” of participants in the garden versus those in the hospital. Participants’ rated their distress in regard to anxiety, sadness, anger, worry, fatigue, and pain on a visual analogue scale (0-100, 100 being the most distressed). Participants in the garden reported better functioning in all domains when compared with those in the hospital.

Preliminary Research

Although it is important to study the restorative effects of nature in all people who spend significant time within a hospital setting, perhaps the population most in need of restoration is hospital patients. During the summer of 2005 I conducted a study that specifically examined the restorative effects that patients experienced while they visited three healing gardens set within an urban rehabilitation medical center (Pranikoff, 2006). Using Kaplan and Kaplan’s (1989) attention restoration theory (ART) as the theoretical scaffolding, I examined whether the four elements of ART (being away, fascination, extent, compatibility) would arise organically in participant interviews, which focused on their experiences in the gardens.

Over the course of four weeks, I conducted eight open-ended interviews with adult patients to determine if they would mention the elements of attention restoration theory without being directly prompted to do so. I posted signs at the entrances of the gardens announcing to visitors that they may be asked to take part in an interview, but that their participation would be voluntary. Seven of the eight interviews took place in the gardens, one in a patient’s room.

The findings from this study supported the application of attention restoration theory to the hospital gardens. Even though the gardens were located within the property of the hospital, the interviews made clear that patients felt a strong sense of being away from the medical setting. Moreover, not only did some patients comment on feeling away from the institute, but they also felt removed from the larger urban context in which the hospital is part. Participants commented on the ease of fascination, as well as the idea that one’s thoughts could easily be shifted from one’s pains to the natural surroundings. One woman reported that she was less conscious of her pain when she was in the garden “because of the foliage.”

Patients appreciated the feeling of being in an entirely different world and being able to discover the extent of what the gardens had to offer. The therapeutic effects of this “world” secured the patients belief that the gardens were a necessity in their rehabilitation, supporting the element of compatibility. Furthermore, the interviews allowed the patients to introduce me to another healing aspect of the gardens—and one not included in attention restoration theory—the environment’s support of social relationships. Patients felt that the garden environment supported preexisting social relationships while giving them a space to foster new relationships. The gardens are “the only place to socialize away from the bedside,” said one woman. Another woman commented:

> You met other people sitting at the table [during horticulture therapy classes] and you were able to talk to them…you get to know a name and a face, and you're not talking about your foot hurts or your back or what kind of surgery you had. You're just relaxing.

Not only were there new people to connect with, but conversation topics became more friendly and enjoyable. This woman mentioned that the gardens made her more sociable, allowing her to speak with strangers, including myself.

Although my previous findings affirmed the appropriateness of applying attention restoration theory to this particular space, what was missing was any type of physiological data to investigate psychoevolutionary theory in this context. Ottoson and Grahn (2005) utilized both attention restoration theory and psychoevolutionary theory in a study that compared the restorativeness of inside and outside settings within a home for elderly people. Resident participants took part in two identical data collection interviews where they underwent a battery of attention tasks (Necker Cube Pattern Control, Digit Spans forward and backward, and the Symbol Digit Modalities Test) in order to test attention restoration and physical measures (heart rate and blood pressure) in order to test psychoevolutionary theory. The interviews differed only in the location where they took place. Half of the participants underwent the first battery of tests after spending time outdoors and the second battery of tests approximately one week later after spending time indoors; the other participants underwent the first battery of tests after spending time indoors and the second battery of tests approximately one week later, after spending time outdoors.

Results from the attention tasks show that functioning was significantly better when participants took part in the activities after spending an hour outside—a result that appears to support attention restoration theory. However, none of the results from the physical measures showed any significant differences between what was collected after spending time indoors and spending time outdoors, leaving inconclusive the relationship between nature and this population.

This dissertation uses methods similar to those used by Ottoson and Grahn (1995). Even though Ottoson and Grahn did not find any physiological differences between environments, evidence from other studies supports the inclusion of a physiological measure in this dissertation to test psychoevolutionary theory.

A Focus on Nature

It can be argued that natural environments, or environments that simulate nature, are not the only settings in which individuals can experience restoration, or even the optimal setting for such an experience. For example, Korpela (1992) and Korpela and Hartig (1996) found that the elements of attention restoration were most present in participants' favorite places, and although individuals' favorite places tended to be natural settings, not all were. Kaplan, Bardwell, and Slakter (1993) investigated the restorative properties of museums and found that the four restorative elements described by attention restoration theory were present and that restorative effects (i.e., feeling calm and reflective) were felt by participants, especially by those who were regular visitors.

The evidence discussed in the studies above and the results of my preliminary research, however, demonstrate that there is a replicable association between the natural environment and individuals' ability to adapt to both directed attention fatigue and stress.

Because inpatients in a hospital are likely to be under acute fatigue and stress, it is important to find ways to alleviate these. In an effort to cope, patients often create personal meaning of their illness or injury. What is currently missing in the research is a connection between the benefits of restorative environments and the effects that reducing directed attention fatigue and stress can have on patient adaptation to illness and injury. I suggest that finding meaning in adversity may be one mechanism underlying this connection (Park & Folkman, 1997). Thus, the next section reviews the coping literature focused on finding meaning in one's illness or injury. This is followed by an integration of environmental and meaning-making theories, forming the base of my current study.

Meaning-making and its Effect on Patient Adaptation

Theories of meaning-making. There are several theories within the health psychology literature that explain how individuals create personal meaning from adverse situations (for a review, see Skaggs & Barron, 2006). The theories focus both on what makes a situation traumatic and on the psychological mechanisms trauma survivors engage to cope with these situations (Bury, 1982; Taylor, 1983; Thompson and Janigian, 1988; Janoff-Bulman, 1989, 1992, 1996; Park & Folkman, 1997). As will be illustrated below, there is a great deal of overlap of ideas among the theories. Many hold in common a foundational notion that traumatic events force a disruption in how individuals envision their lives and the way the world works, and then examine what individuals do to reconcile the unexpected disruption in their life with how they anticipated their lives would proceed.

In their *life schemes framework*, Thompson and Janigian (1988) posit that:

> The search for meaning occurs when an individual’s life scheme no longer provides a sense of order in life or a sense of purpose or both. An event may have challenged the components of the life scheme either because it cast doubt on the accuracy of one’s views or because it made it impossible to reach important goals. When this happens, people experience a sense of meaninglessness; they have lost their feelings of order and/or purpose in life. The search for meaning is an attempt to restore the sense that one’s life is orderly and purposeful. (p. 268)

A negative event (i.e., illness or injury) has the capacity to disrupt one’s life scheme because it has the power to bring to light one’s vulnerability; it can disrupt one’s ability to achieve goals; and it evidences one’s mortality.

Bury (1982) classifies a life scheme disturbance of this sort as a “biographical disruption”—a disruption that has the capacity to unsettle one’s everyday course of life and ultimately challenge the story that an individual has created about herself and what she expects in the future. Using rheumatoid arthritis as an example, Bury argues that illness is distressing in three ways: it upsets taken-for-granted assumptions and behaviors; it disrupts explanatory systems and alters self-concept; and the process of mobilizing resources is upsetting to individuals. Furthermore, individuals tend to assume that they are invulnerable to illness and the possibility of death, and when they become ill, their basic belief system is dismantled.

This dismantling—or shattering—of central beliefs regarding how the world works is further described by Janoff-Bulman (1992). She theorizes that people have core, overarching ideas about the world, taking the form of three *fundamental assumptions*: the world is benevolent, the world is meaningful, and the self is worthy:

> In general, people believe that the world is a good place. The “world,” in this context, is an abstract conception that refers to both people and events. When we assume other people are benevolent, we believe that they are basically good, kind, helpful, and caring. In assuming that events are benevolent, we believe in the preponderance of positive outcomes and good fortune over negative outcomes and misfortune. (p. 6)

In other words, individuals believe that the world is fair; that they themselves are good people; that others are good; and that therefore, nothing bad will happen to them. It is when something “shatters” these assumptions (e.g., when one becomes ill or injured) that individuals realize their vulnerability and are challenged to balance the need to recalibrate their assumptions about the world—“developing a new worldview that allows for the real possibility of misfortune”—with continuing to believe in the fairness of life (p. 313).

Informed by her work with breast cancer survivors, Taylor (1983) discusses the psychological processes survivors undergo in order to strike this new and necessary balance. In her cognitive theory of adaptation, she argues that the search for meaning in the illness experience is one of three mechanisms that lead to successful coping. In addition to searching for meaning, individuals also aim to gain mastery over illness and their lives in general, and endeavor to increase their self-esteem, often by comparing themselves to a real or hypothetical worse-off other.

Taylor’s theory regarding meaning suggests that if people can reappraise their illness—for example, by reprioritizing personal responsibilities and relationships or framing the illness as having a positive impact—that they are be better able to adapt. In her cognitive adaptation theory she explains that:

> Meaning is an effort to understand the event: why it happened and what impact it has had. The search for meaning attempts to answer the question, What is the significance of the event? Meaning is exemplified by, but no exclusively determined by the results of an attributional search that answers the question, What caused the event to happen? Meaning is also reflected in the answer to the question, What does my life mean now? (1983, p. 1161)

In their stress and coping paradigm, Lazarus and Folkman (1984) also posit that reappraising an illness in a way that renders it less threatening, helps assimilate its meaning into one's already created belief structure—leading to adaptive coping. The cognitive appraisal process occurs in steps, beginning with a primary appraisal (determining if the situation is irrelevant, benign or positive, or stressful); a secondary appraisal (evaluating the coping resources one has); and lastly the possibility of a reappraisal. One coping strategy is finding meaning in the stressor. If meaning can be made, then the stressor can be cast in a less-threatening light, allowing for a reappraisal of the situation and ultimately one's adaptation to the stressor.

Park and Folkman (1997) expanded upon this cognitive appraisal process and the importance of *reappraisal* by defining two types of meaning: situational and global. Situational meaning is given to the specific situation or person-environment transaction (e.g., a newly diagnosed illness, a recent injury), while global meaning is more general and refers to an individual's beliefs, expectations, and assumptions about the self and the world. Successful meaning-making is achieved when there is congruence between global and situational meaning. In other words, when the situational experience fits into global understanding, and there is coherence between the traumatic event and the individual's expectation of life and how the world works, the individual can better psychologically adapt. The means by which this is achieved is to reappraise the trauma in a way that is non-threatening, assimilating the illness into one's global beliefs. It is also possible to change one's fundamental assumptions to accommodate the trauma, though it is more likely that assimilation of the event into one's global meaning will occur—as individuals tend to seek stability, and hence the continuation of their global beliefs.

Park and Folkman's (1997) idea of meaning-making will serve as the theoretical foundation for understanding psychological adaptation in this study. In fact, most meaning-making research can be examined through this lens, even if the research did not explicitly use Park and Folkman's framework. Thus, in this literature review, Park and Folkman's theory will be used as an umbrella under which other theories of adaptation fit.

Empirical Inquiry into Meaning-Making and Adaptation

One of the first meaning-making studies, conducted by Bulman and Wortman (1977), examined meaning-making in relation to adaptation in a group of patients coping with spinal cord injuries. Meaning was defined in terms of the patients' attributions of blame and causality for their injury. Coping ability, or adjustment, was rated by social workers and nurses. Patients who were deemed "successful copers" were understood to have a positive attitude toward physical therapy, motivation to improve their physical abilities, and those who aimed to be physically independent.

Patients who blamed themselves for their injury were better able to cope with the injury, even if they were not to blame (e.g., they were a passenger in a car accident), and even if they felt that they could not have avoided the accident. Bulman and Wortman explained that these findings may be due to the victims' need to feel in control; if they believed that they were to blame, then they were in control and future injury could be avoided.

This idea is consistent with Park and Folkman's (1997) theory of meaning-making. Self-blame may have allowed patients to retain the idea that they were in control of their lives—a global belief—thus, incorporating the injury into the way they understood life to work. Also aligned with Park and Folkman's theory were Bulman and Wortman's findings that showed that some spinal cord injury patients reappraised their victimizing events "by stressing positive consequences of their victimization," which allowed them "to reevaluate their disability positively" (p. 359). For example, some participants realized how lucky they were just to be alive, and others saw the accident as a message to reprioritize their lives.

Another study investigated meaning-making and acceptance of illness in the lives of HIV-positive individuals (Plattner & Meiring, 2006). Semi-structured interviews were conducted to learn how participants perceived their HIV infection. Participants' acceptance of being HIV-positive was founded on two main beliefs: 1) that they were to blame for contracting HIV, and 2) that they contracted HIV as a test or punishment from God. Similar to the spinal cord injury patients (Bulman & Wortman, 1977), acceptance and self-blame appeared to be a way to take control over a stressful situation, thus allowing one to integrate a positive HIV status into ones' life. Believing that God was the cause of the HIV also had benefits. One participant, for example, explained that God had given her HIV so that she would pray—she believed that God needed her, and this gave her illness and life purpose.

A number of studies have used more structured interviews to determine the types of meaning individuals ascribe to their medical conditions, specifically utilizing Lipowski's (1970) notion of meanings as predetermined choices. Lipowski determined that patients in Western culture most often disclose one of eight meanings for their illness or injury. Predominantly, they think of their illness or injury as: challenge, enemy, punishment, weakness, relief, strategy, irreparable loss or damage, or value. Studies have confirmed these categories, and also suggest that possession of a more positive meaning of one's illness is related to increased well-being.

For example, in a study investigating the meaning a group of women gave to breast cancer, Luker, Beaver, Lemster, and Owens (1996) utilized Lipowski's meanings as a method to initiate discussion. At two time-points (just after diagnosis and 21 months later) women with breast cancer were asked to discuss the meanings they gave to their illness. Lipowski's eight meanings (with explanations) were presented to the women on eight different cards. After choosing the card, which most appropriately described how they interpreted their cancer, participants were asked to explain their reasoning for choosing the meaning category.

All of the meanings were used to describe cancer at least once, except relief. The most commonly chosen meaning was challenge, followed by value and enemy. One reason women offered for understanding their illness as a challenge was that they interpreted breast cancer as a hurdle, something to "get over." Furthermore, some participants explained that the cancer "gets your priorities in order" and "makes you think how trivial your worries are" (p. 1197). Reading these results through the lens of Park and Folkman (1997), it can be understood that ascribing the meaning of challenge to their breast cancer enabled these women to incorporate illness into their lives; they were able to learn from it. The cancer, then, had a purpose: giving the women the opportunity to change their lives for the better.

Barkwell (1991) took an additional step with this type of investigation, exploring the relationship between illness meaning and well-being. Her study explored the meaning that terminal metastatic cancer patients ascribed to their pain, again using Lipowski's eight meaning types. Participants were presented with the preconceived meanings and asked to place them in rank order in regard to their pain. Additionally, measures of pain (McGill Pain Questionnaire, MPQ; Melzak & Torgerson, 1971), depression (Centre for Epidemiological Studies Depression Scale, CES-D; Markush & Favero, 1973) and coping (Coping Strategies Questionnaire, CSQ; Rosenthal & Keefe, 1983) were included.

The most frequently ascribed meaning again was challenge—this time, followed by enemy and punishment. When examining these three meaning types with regard to the outcome measures, individuals who understood their pain as a challenge had significantly less pain, higher coping scores, and lower depression than those who described their pain as an enemy or as a punishment. By analyzing the explanations individuals disclosed for understanding pain as a challenge, two recurring themes were found: taking control of the pain and gaining mastery over the pain. In Park and Folkman's theory, mastering one's pain would allow women who believed that they were in control of their lives to more easily incorporate their illness situation into their global understanding. Their illness would represent another aspect of their lives that was in their control.

Farber, Mirsalimi, Williams, and McDaniel (2003) investigated meaning and well-being with individuals who were coping with HIV/AIDS, using the Meaning of Illness Questionnaire (MIQ; Weir, Browne, Roberts, Tunks, & Gafni, 1994). Meaning was measured along five dimensions: impact, type of stress (e.g., harm, loss), degree of stress, challenge, and nonanticipated vulnerability. Well-being was measured with the General Well-Being Schedule (GWB; Fazio, 1977). Participants who ascribed a more positive meaning to their HIV/AIDS status reported significantly higher levels of well-being and lower levels of depression compared with those participants who ascribed a more negative meaning to their medical condition.

Using Taylor's (1983) cognitive adaptation theory, Thompson (1991) examined causal attributions, meaning-making, and adaptation among stroke victims and their caregivers. Interview data were collected on four meaning-making themes. *Causal attributions* were assessed by asking the participants whether or not they searched for and found a cause for the stroke. *Selective incidence attributions*, or understanding why the situation happened specifically to the participants, was assessed by questioning if participants asked "Why me?" and if they did, what their answer was. *Responsibility attributions* were assessed by asking participants if they or others were to blame for the stroke. And, participants were directly asked if they had *found meaning* in the stroke experience, and if so, how they found this meaning. Outcome measures included the Geriatric Depression Scale (GDS; Brink, Yesavage, Lum, Heersema, Adey, & Rose, 1982) and a scale measuring the meaningfulness in life, which included questions regarding sense of order, fairness, and purpose (Thompson & Janigian, 1988).

In cross-sectional analyses, both patients and their caregivers showed greater adjustment, with regard to depression and meaningfulness in life, if they found meaning in the stroke experience. Patients who considered their lifestyle as the cause of the stroke and caregivers who considered a medical or physical condition as the cause of the stroke were also better adjusted. Patients who were not concerned with selective incidence (that is, they did not ask themselves, “Why me?”) were more adjusted, but the association was not statistically significant for caregivers.   By interpreting these findings through the lens of Park and Folkman (1997), it can be understood that identifying a cause for the stroke and creating a meaning from suffering allowed patients and caregivers to assimilate the situation into their lives without enduring the negative consequences of incongruence between situational and global meaning.

Vickberg, Duhamel, Smith, Manne, Winkel, Papadoulos and Redd (2001) investigated the relationship between global meaning and psychological adjustment among bone marrow transplant survivors. Global meaning (measured with the Personal Meaning Index of the Life Attitude Profile-Revised scale, Lap-R; Reker, 1992) was associated with lower global psychological distress (measured with the Global Severity Index of the Brief Symptom Inventory, BSI-GSI; Derogatis & Spencer, 1982) and lower post-traumatic distress (measured with The Post-Traumatic Stress Disorder Checklist-Civilian, PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993). Furthermore, global meaning was positively associated with better mental health as measured with the Medical Outcomes Study Health Survey (MOS-SF-36; Stewart, Hays, & Ware, 1988). As is hypothesized by Park and Folkman (1997), these results suggest that maintaining global meaning may be key in adjusting to illness and stressful medical procedures.

Russell, White, and Parker White (2006) investigated the relationship between causal attributions, finding meaning in illness and perception of quality of life in individuals diagnosed with multiple sclerosis. Participants were asked about their beliefs of the cause of their disease and asked to rate to what extent each of 17 items played a role in causing their illness (e.g., germ or virus, emotional state, personality, divine punishment). Questions were asked about their experience with symptoms pre-diagnosis (e.g., How would you describe what you were thinking about yourself at that time?) and meaning-making after diagnosis (e.g., What is your belief about why MS came into your life when it did?). Global quality of life was measured with the Multiple Sclerosis Quality of Life instrument (MSQOL-54; Vickery, 1995).

Participants who rated themselves as being very involved in creating personal meaning of their illness had significantly higher scores on the quality of life and life satisfaction measures. Moreover, those who did not find personal meaning in their illness—those who were not interested in finding personal meaning, thought that it was not possible, or had not been able to find meaning—scored significantly lower on perceived well-being and quality of life measures. The relationship between finding meaning in the situational context of illness and global quality of life again reflects Park and Folkman’s (1997) hypothesis that congruence between situation and global meanings leads to better adaptation.

Another study investigated meaning creation in newly diagnosed lung, breast, and colorectal cancer patients (O’Connor, Wicker, & Germino, 1990). In this study, meaning was defined as:

> Questions about the personal significance of a life circumstance, such as cancer, in order to give the experience purpose and to place it in the context of a total life pattern; this integration was considered to involve the reworking and redefining of past meaning while simultaneously looking for meaning in the current life situation. (p. 168)

Semi-structured interviews allowed participants to discuss chosen experiences and emotions and answer specific questions, including inquiry into physical symptoms, feelings, religion and faith, and the future and meaning of life. The interviews were content-coded, and of particular salience to my current research were two categories: "Seeking an understanding of the personal significance of the cancer diagnosis," which included issues of attribution-finding and "Change in outlook toward self, life, others". These themes reflect the effort that participants took to make sense of their cancer within the context of their lives, and their goal of restructuring their attitudes—reappraising their cancer experience as a learning experience and assimilating the illness situation into their lives.

In an intervention study, Lee, Cohen, Edgar, Laizner, and Gagnon (2006) investigated the efficacy of a standardized meaning-making psychological intervention among newly diagnosed breast and colorectal cancer patients. Participants were randomized into two groups. The treatment group took part in the meaning-making intervention in addition to their standard care, and the control group took part solely in the standard care. The meaning-making intervention consisted of up to four individualized sessions using a narrative style to guide patients toward incorporating their cancer into their life story.

Outcome data were collected on self-esteem, using the Rosenberg Self-Esteem Scale (RESE; Rosenberg, 1989); optimism, using the Life Orientation Test (LOT-R; Scheier & Carver, 1987); and self-efficacy, using the Generalized Self-Efficacy Scale (GSES: Schwarzer, 1992). There were significant differences between groups on all of the measures, such that those who participated in the meaning-making intervention reported greater self-esteem, optimism, and self-efficacy than those in the standard care group.

The literature discussed above not only illustrates that individuals coping with illness and injury create personal meaning from their medical situations, but also that those who create personal meaning actually fare better on a number of well-being dimensions. Moreover, patients who make meaning that may not at first be interpreted as "positive" (e.g., they blame themselves or understand their medical condition as a punishment from God) also fare better if this meaning can be successfully integrated into their lives. These outcomes are seen in participants ranging in medical condition (accident victims as well as individuals coping with various types of cancer, multiple sclerosis, stroke, and HIV/AIDS) and time since diagnosis (from those who are newly diagnosed to those in end-of-life care). Examining the above studies through the lens of Park and Folkman (1997) underlines the importance of fit between the situational meaning of an illness or injury and the global meaning of one's life.

The studies described above range considerably in experimental design, with researchers employing quantitative and qualitative methods, open-ended and more structured interviews, and even a meaning-making intervention. Where the literature is weak, however, is in its lack of longitudinal investigations. All but one of the studies described above were cross-sectional. Thus, it cannot be determined if meaning-making causes increased well-being, and/or if better well-being influences the meaning that an individual ascribes to her or his medical condition. The impact of meaning on well-being has been found to be stronger than psychological support (Barkwell, 1991) and social support (Farber, Mirsalimi, Williams, & McDaniel, 2003). Because of this, it is imperative for future work to test the causal relationship between meaning-making and adaptation in order to best assist those coping with stressful medical conditions. Although my study was also not designed to collect data over an extensive period of time, I developed this dissertation in response to the above critique. I was influenced by the repeated findings in the environmental and health psychology literature and I was motivated to gain clarity in areas my literature review caused me to question.

The Current Study:
An Integration of Environmental and Meaning-Making Theories

Hospital patients must cope with acute stress due to their medical conditions, in addition to coping with other stressors that are evident in the physical and social environment of the institution (for reviews, see Devlin & Arneill, 2003; Ulrich, Zimring, Zhu, DuBose, Seo, Choi, Quan, & Joseph, 2008).[1] These individuals are in particular need of restoration and strategies to enhance adaptation to their situations. The goal of my study was to examine if a restorative environment within a hospital—a healing garden—could enhance meaning-making and, thus, assist adaptation to illness in a group of inpatients. Specifically, I examined a dimension of the physical environment—nature—and a dimension of the cognitive realm—meaning-making—to see if these two areas can work synergistically, enabling psychological and physical adaptation to illness and injury.

Can a restorative environment influence a patient’s ability to understand the meaning of illness or injury in her or his life? Perhaps a restorative environment has the potential to aid in the reappraisal of illness or injury so that medical conditions can be interpreted as a challenge or an opportunity to learn a lesson—and can then be integrated into a patients’ larger world views. If so, does restored attention and renewed ability to focus on one’s life and the meaning of illness or injury serve as the mediating mechanism? In order to answer these questions my research had three specific aims: 1) to determine if the healing gardens enable patients to perceive attention restoration; 2) to determine if the healing gardens provide a more conducive space than the hospital rooms for patients to find personal meaning through interviews; and 3) to determine if patients experience emotional and physical changes when they spend time in the gardens.

There is evidence from this review demonstrating that both restorative environments and finding meaning in illness and injury are related to greater well-being on their own. If there is indeed a relationship between the two, it is important to understand their individual and potential joint effects as well as the mechanisms by which they operate. This knowledge can direct the creation of future interventions aimed to enhance the recovery and well-being of ill and injured individuals. It is my hope that these concepts, previously understood as discrete, can work *together* and thereby increase patient ability to adapt.

CHAPTER TWO

Method

Sixteen inpatients hospitalized in an urban medical rehabilitation center took part in this study. Patients were randomly assigned to take part in a meaning-making interview in either their hospital room or gardens located on the hospital grounds. Data regarding how individuals perceived the restorativeness of their interview location was collected. Data was also collected on current pain and anxiety before and after the meaning-making interview and at follow-up one day later.

Setting

The Rusk Institute of Rehabilitation Medicine, located on the east side of midtown Manhattan, is part of the New York University Langone Medical Center. The institute houses both adult and pediatric inpatient and outpatient rehabilitation services including a pain management program, an arthritis program and programs for cardiac, stroke and musculoskeletal rehabilitation. Because this study compared two different environments within Rusk, I will describe each in detail below.

The hospital rooms. All sixteen participants for this study were recruited from a single floor that serves adult orthopedic inpatients. The majority of patients were staying in rooms originally structured to hold four beds, but were converted to hold two beds in 2002 (Figure 1). Each room has a private bathroom, sink, and closet space, moveable chairs and tables, and patient-specific equipment including wheelchairs and walkers. The inpatient area is “L” shaped with a nursing station located in the middle of one hallway (Figures 2 & 3). Two banks of elevators with seating areas are also located near the inpatient rooms, and each area has windows with views to the outside environment

(Figures 4-7). As will be explained more fully below, all sixteen interviews began in the hospital rooms.

On the first day of participation, three participants had no roommates, eleven participants had one roommate, and two participants had two roommates. On the second day of participation, the rooms remained the same with the following exceptions: one male participant who had originally been in a triple moved to a room of his own; two women remained in their rooms, but a roommate was discharged from each (one room had previously been a double; one had previously been a triple).

Patients had varying amounts of personal articles in their hospital rooms, from just a magazine or a bag of clothes to more gift-like items including vases of flowers, stuffed animals, and “get well” cards. Eight participants had “welcome” plants from the gardens (plants that are brought to patients soon after admission) displayed on a window sill or table.

Views out the windows from patient beds included the East River and Queens, and New York City buildings and streets. Five patients had a brick wall directly outside their windows, but the city streets were visible in the distance. Views out the doors from patient beds included an empty hallway, another patient room, the door of a patient bathroom, and medical stations. One participant could not see out the door from her bed.

The gardens. Three gardens, the Enid A. Haupt Glass Garden, the Enid A. Haupt Perennial Garden and the Children’s PlayGarden, are located side-by-side near the entrance of Rusk (Figure 7). (A fourth garden which was not used during this study, the Gimbel garden, is located further in the building, by the outpatient physical therapy unit.)

The gardens are affiliated with the American Association of Botanical Gardens and Arboreta.

The 1,700 square-foot Glass Garden was the first garden to be built on the premises, opening in 1959, and the first greenhouse fully accessible to people confined to wheelchairs (Gerlach-Spriggs, Kaufman, & Warner, 1998) (Figures 8 & 9). The main entrance to the greenhouse consists of a circular pond. Large koi and turtles live in the water. A rubber tree and leafy vines hang overhead. Along the edge are two seating areas, a cage of collared doves, and a display of Wardian cases. On the far side of the pond is an entrance to the rectangular portion of the greenhouse, which is divided into three main aisles with seating areas located in three corners. This area houses plants from around the world including orchids, bonsai, and cacti. It is also home to many animals including a cat, turtles and frogs, a Goffin's cockatoo, an African grey parrot, a cockatiel and numerous other species of birds. Wild sparrows continuously fly in and out of the greenhouse's open windows; and the cat's dusty footprints can be seen on the rooftop. In the back of the greenhouse is an office used by the garden staff, volunteers, and horticulture therapists; connected to its south side is a workroom where horticulture therapy classes are conducted (Figure 10).

Through the door on the opposite side of the workroom is the outdoor Perennial Garden, which is comprised of wide brick paths and raised flowerbeds (Figures 11 & 12). The original garden, built in 1991, was initially 4,500 square-feet; however, approximately five years ago this "backyard" to the Glass Garden had to relinquish more than half of its space to allow for Amtrak construction. The garden space will be returned upon completion of the project. Primarily, green-leafy plants grow here with colorful flowers interspersed. Birdhouses, birdbaths, and a gazing ball also serve as attractions. There is movable seating and benches available in this garden and umbrellas that can be opened by visitors.

The newest garden, built in 1998, is the Children's PlayGarden (Figures 13 & 14). Located to the north of the Glass Garden, this 5,500 square-foot outdoor garden has a stream of water controlled by a dinosaur knob easy for children to maneuver, bridges, and features to play with, including a sandbox, playhouse "scaffolding" to climb on, swings, and a wheelchair-accessible glider. Two main paths lead down its length and a green slope dominates the middle portion. The plants are mainly annuals and are divided into plots, including a vegetable garden and a garden of grasses. A rabbit lives here during the summer months and is brought into the Glass Garden when the weather turns cold. There are areas for visitors to sit including benches, child-sized chairs and tables, and a hammock.

Sample and Recruitment

Eligibility. To be eligible for the study, patients were required to be 18 years of age or older, English-speaking, and mentally competent, determined by a Mini-Mental State Examination score within normal limits (MMSE; Folstein, Folstein, & McHugh, 1975).   For the first eight interviews, I conducted the MMSE as part of the eligibility interviews. However, because the Psychology Department administers the MMSE and they did not want patients to undergo the examination twice, this procedure was amended so that patients had to have already been screened by the Psychology Department and have obtained a score within normal limits on the MMSE before I could receive their names as potential participants.

The senior horticulture therapist conducted reviews of the registry of newly admitted patients twice a week, using the inclusion criteria described above. I visited eligible patients in their rooms during the time of their admission, at which point, if they agreed to participate and were eligible, I obtained signed consent and continued with the interview or made an appointment to meet them at another time.

Sample. Group and individual demographics are presented in Tables 1 through 3. The 16 participants (10 women and six men) ranged in age from 24 to 76 years, with a mean age of 63 years (SD = 12.97). All participants but one Asian woman were White. The majority of participants had a background, which included higher education—six had a college degree, and five obtained degrees past college. Two participants had only received a high school degree or equivalent and three participants had some college or vocational schooling. The majority of participants (11) were not currently married (three had never been married, six were divorced, and two were widowed) and five were married. Almost half of the participants (seven) were currently employed; of those not employed seven were retired, and two were on medical leave or disability.

All participants had been transferred to Rusk from an acute care facility, in all but three cases the facility was NYU's Tisch Hospital. The number of days hospitalized (combining the previous facility and Rusk) ranged from nine to 56 days (M = 16.13 days, SD = 12.38). The number of days as an inpatient at Rusk ranged from two to 14 days (M = 7.5 days, SD = 3.43). Seven (56.2%) participants had been inpatients at Rusk before.

Information about why the patients were currently hospitalized and their treatment was obtained by self-report. Patients who participated in the study were on the orthopedic floor for a number of reasons. All but one had undergone a recent surgery (seven hip replacements, three knee replacements, three bone settings, and two exploratory surgeries).

Prior to their participation in this study, two patients had never been to the gardens before and 14 had been to the gardens for horticulture therapy. Of those 14, half had also visited the gardens on their own. I asked participants about the places where they go to think about and reflect on their lives or problems when they are not in the hospital—seven mentioned spending time in nature (e.g., a park, yard); 10 mentioned their home; and 10 mentioned going inside a building (e.g., synagogue, museum).

Procedures

This study used a two-group pre-post between-group design. Data were collected using multiple methods: closed-ended and semi-structured questionnaires as well as mapping and inventory of patient hospital rooms. [2]

Patients were randomized into two groups. Randomization was determined by a computer program prior to my introduction to the patients. I was aware of the randomization prior to meeting patients; therefore, I was not blind to the assigned conditions. In the Hospital Room Group or *HR* condition, the entire interview (Parts A and B, described below) was conducted in the hospital room. In the Garden Group or *G* condition, Part A was conducted in the hospital room and Part B was conducted in one of the gardens. If a patient was randomly assigned to the G condition, but was unable to move (for example, if she was receiving intravenous antibiotics at the time of participation), she was placed in the HR condition, and the next participant was assigned to the G condition. Participants (including those in the G condition) completed the brief follow-up interview in a variety of places, including their hospital rooms (N=11), the gardens (N=3), and a group activity room (N=1). One participant did not have a follow-up interview. [3]

Interviews. Upon entering a patient's room I introduced myself, explained what participation in the study entailed, and asked if the patient was interested in taking part. If she or he was interested, I conducted a brief eligibility interview, which included inquiry into the patient's ability and willingness to participate in an oral interview and also the patient's ability and willingness to leave the room and conduct part of the interview in one of the gardens. If the patient was eligible and was not feeling fatigued (and had no other obligations that evening) I continued with procedures to obtain signed consent, and if time allowed, conducted the first interview. If the patient was not available at that time, but was interested, I scheduled a time to return to the room to continue with both the consent and the first interview. Likewise, if she or he only had time to sign the consent form, I scheduled a time to return for the first interview.

The first part of the interview (Part A) took place in the hospital room for patients in both conditions. The interview began with the collection of background information, including demographic information and information related to the patient's health and experiences in the gardens at Rusk. These questions oriented the patient to the researcher-participant relationship and eased us into the interviewing process. The participant then answered brief measures of state anxiety and physical pain intensity. The measures were administered verbally, after which I drew a map and completed an inventory of the hospital room.

The location of Part B of the interview depended on the condition the patient was randomized to. If the patient was randomized to the HR condition, I continued the interview in the hospital room. If the patient was randomized to the G condition, after completing Part A, I went to the nurses' station and asked one of the hospital staff members (nurse, aide, or patient unit clerk) if it was necessary for the patient to have an official escort to the gardens. If it was necessary, I would return to the patient room and we would wait for an escort. If it was not necessary, the patient and I would go down to the garden by ourselves. Seven interviews took place in the glass garden and one took place in the perennial garden.[4]

In both conditions, the second part of the interview began with a measure of perceived restorativeness with respect to the current environment followed by semi-structured questions regarding the story of the participant's illness or injury and the personal meaning of her or his illness or injury. This portion of the interview was recorded with a digital recorder. I concluded the formal interview with a re-administration of the anxiety and pain measures, after which I scheduled a time during the next day to visit the participant and conduct the follow-up interview. All patients in the G condition were accompanied back to their hospital rooms.

After each interview, I recorded notes about the interaction to further contextualize the participants. Notes included any factors that may have affected the interview process, for example, interruptions by medical staff. The follow-up interview, which took place the next day, began with a re-administration of the anxiety and pain measures. I then asked, in a recorded interview, for the participant to talk about her or his experience during the initial interview and how it felt to talk about illness or injury. At the end, I presented each participant with a copy of the consent form and an envelope that included a thank you note and three photographs that I had taken of the gardens.

Measures

Anxiety and pain. The six item short form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI-6; Marteau & Bekker, 1992) assessed participants' current level of anxiety. Items were rated on a 1-4 scale (1=not at all to 4=very much) about how one was feeling at the moment in regard to being calm, tense, upset, relaxed, content, and worried. The three negative items (tense, upset, and worried) were reverse-coded so that higher scores on the scale indicated lower levels of anxiety. A total score for the STAI-6 was obtained by calculating the mean of the six items, thus scale scores ranged from 1 to 4.

The Wong-Baker FACES Pain Scale (Wong & Baker, 1988) provided a quick assessment of current pain intensity, and is used regularly at the Rusk Institute. Items were rated on a 0-5 scale (0=no hurt to 5=hurts worst) indicating how much physical pain one was in at the moment. Each number is accompanied by an illustration of a face that has an expression reflecting the various degrees of pain.

The STAI-6 and Wong-Baker FACES Pain Scale were administered three times: at the beginning of the interview, at the end of the interview, and during the follow-up the next day. Scores at the beginning of the interview provided a baseline of the anxiety and pain levels of participants before the experimental manipulation in order to examine group equivalence at baseline. This allowed me to ascertain that there were no differences among patients assigned to the two conditions before the manipulation; the later administrations allowed for an examination of change over time in each condition.

Perceived restorativeness of interview location. The Perceived Restorativeness Scale was utilized in this study (PRS; Hartig, Kaiser, & Bowler, 1997). The PRS is a 26-item self-report measure used to assess the four elements of attention restoration theory (being away, fascination, coherence (extent), and compatibility).[5] A fifth element of legibility (theoretically a factor of extent) is also included, but factor analyses have not confirmed this as a separate factor (Hartig et al., 1997).[6]

The PRS was modified for the current study to reflect that the participants were being interviewed in either a garden or a hospital room and that these locations were being compared to the larger rehabilitation medical center. For example, one of the original statements regarding the element of being away, “Being here is an escape experience,” was modified to, “Being in this garden is an escape experience from the rest of the hospital” for those in the G condition and “Being in this hospital room is an escape experience from the rest of the hospital” for those in the HR condition.

Items were rated on a scale of 0 to 6 (0=not at all to 6=completely) and negative items were reverse-coded. Scores for each of the five subscales were created by calculating the mean score of the items representing each element; thus, each subscale score ranged from 0 to 6, with higher scores indicating greater perceived restoration.

In Hartig’s work, the subscales were derived through a series of principal factor analyses with orthogonal rotation, forcing the elements to be as independent as possible. However, the legibility items factored on the same factor as the compatibility items. Despite this, Hartig et al. advises researchers to keep the subscale separate unless they perform their own factor analyses (1997, p.14). As this was not possible with the small sample size in the present study, and in keeping with the theoretical basis of the scale, I chose to use all five subscales. Internal consistency reliability of the five subscales was high (alpha coefficients ranged from .82 to .97); and intercorrelations showed great variance in magnitude (Table 4). Fascination was correlated with being away (r=.77, p= .001) and compatibility (r=.78, p = .001). Being away was correlated with compatibility (r=.69, p= .003) and legibility (r =.41, p = .115), and legibility and compatibility were correlated (r =.39, p = .131). The element of extent (coherence) was not significantly correlated with any of the other elements.

Meaning-making. Meaning-making was derived from the semi-structured interview. Questions were designed to solicit an understanding of why a participant thought she or he became ill or injured, what being ill or injured meant to the participant, and to encourage participants to reflect on their illness experience and the experience of being a patient in the hospital. Before administering the interview, I asked each participant to speak without interruption for three minutes about the story of her or his illness or injury, how it had affected her or his life and what personal meaning of illness or injury she or he had. This reduced my influence as a researcher on the responses. I then asked the series of semi-structured questions in a non-varying order. These questions are listed in Table 5. The length of interviews ranged from 7 minutes, 15 seconds to 20 minutes, 44 seconds (M=12 minutes, 30 seconds).

A semi-structured interview format was chosen to provide patients the opportunity to use their own voices during their participation. During my work on a study examining life after treatment for colorectal cancer patients (Lepore & Revenson, 2005), I came to understand that often times it is difficult and uncomfortable for participants to answer self-report, quantitative questions about life changes due to illness.

The closed-ended scales were regularly accompanied by detailed explanations as to why a participant gave a specific answer: “If you asked me last week, I would have said that I was very tired because I had another round of chemo, but today I feel pretty good.” As a researcher my understanding of a participant’s experience is enhanced with the details she or he shares with me and I wanted to build this type of detailed communication into the current study design.

Follow-up interview. The follow-up, semi-structured interview enabled me to gain information about how participants felt about the previous day’s experience and to learn if there were any lingering effects of the interview. The follow-up began with the participants sharing their experiences during the previous day’s interview and was followed by open-ended questions: How did you feel when you spoke about your illness experience?; Did you experience any changes in how you think about your illness/injury?; If so, what were the changes and why do you think they occurred?; Is there anything else you’d like to share with me about your illness/injury experience, what being ill/injured means to you, or what it has been like being a patient here at Rusk?

Thematic Analysis of Interview Data

Content analysis was used to analyze the interviews. Comparisons of personal attribution of illness or injury to the attributions made by physicians and family members were drawn to understand the relationship between explanatory models that were presented to and created by the patients. Attributions were coded according to whether they were preconceived (conceived prior to the interview experience) or if they were still in development (the patient was grappling with causality throughout the interview).

Questions regarding life changes were evaluated through grounded theory. Life changes were then coded according to long-term changes (e.g., participant forced to retire early), short-term changes (e.g., participant needed to change summer plans), and changes in daily quality of life (e.g., participant could no longer walk down subway steps). Furthermore, causes for these changes were explored and coded (e.g., pain, immobility).

Future expectations were coded according to whether the participant felt hopeful (e.g., patient previously expected to be moved to a nursing facility, but after surgery planned to move back home) or worried (e.g., patient was concerned about burdening family members at home).

Two types of meanings emerged from the data, which I call lesson-learned and age/heredity. Subthemes in the lesson-learned category were similar to the five areas of posttraumatic growth as suggested by Tedeschi and Calhoun (1996, 2004, 2006; Tedeschi, Park, & Calhoun, 1998): appreciation of life; relating to others; personal strength; new possibilities; and spiritual change. Thus, the interviews were further coded for these five posttraumatic growth themes. The age/heredity category was coded when participants mentioned that becoming ill or injured meant that they were getting old or that it meant that they had a genetic predisposition for the medical condition.

CHAPTER THREE

Participant Descriptions

Below are descriptions of each patient who participated in this study. To preserve the privacy of the patients I have created pseudonyms and included broad biographical outlines shorn of identifying detail. Descriptions have been incorporated to provide an understanding of how the medical conditions of participants fit into the context of their lives, as well as to assist the reader in following each patient's story and quotations throughout the rest of the dissertation. The order in which the descriptions are presented is the order in which I met the individuals. In parentheses next to each name I have inserted either "garden" or "hospital room" for an easy reference indicating the group to which each patient was assigned.

Karen (hospital room)

Karen is a 56-year-old Asian woman with a history of brain cancer. Her friend brought her to the Emergency Room during an intense bout of vertigo. The onset of her current illness was sudden and manifested with dizziness, bodily "tingles", chest pain and nausea. Karen describes herself as a "very healthy and active person", saying that she skis, plays volleyball, and does volunteer work. She has a "very stressful" job in the financial sector, which demands that she work 48 to 50 hours a week, as well as after she comes home. She became ill on the morning she was to leave on an important business trip. Prior to admission, Karen lived a very fast-paced life. This pace culminated with her vertigo experience and the sense that "everything went by so fast."

The hospital experience has been a drastic shift with its "very slow pace." Life unfolds at a different speed. She explained, "I'm always waiting to go to therapy, always waiting for someone to work on [me]…waiting for the psychologist, waiting for equipment to be set up." She commented that she was "trying to learn patience" and was attempting to be calmer.

Karen was frustrated when she spoke about her illness experience because she had hoped to have already been discharged at the time of our interview. She had thought that if she pushed herself in therapy she would get home quicker, but that did not happen. During our follow-up meeting she asked permission to use a walker to go down to the garden, but her physician insisted she use her wheelchair. Her psychologist pointed out that in one session Karen said *ten times* that she was "running" to do things. It was suggested that she meditate (which she has experience with) and focus on relaxation.

Karen was very friendly and easy to talk to and seems to have a great deal of social support. Although she is divorced, her mother-in-law came for dinner the evening she consented to be part of the study. I conducted the interview the following day. Friends visit her and they take her to the gardens. Her son also comes to the hospital. She had many gifts on display in her room, including flowers and stuffed animals. When I met her in her room for the follow-up meeting she introduced me to her roommate who told me that Karen's phone had been ringing all day—and it rang while we were together.

When our time together was complete and I had presented Karen with her thank you note and photographs, an aide accompanied her back to her room. I went to the hospital gift shop on her request to purchase some laundry detergent—because she was going to be in the hospital longer than she had originally expected, she was eager for some clean clothes. When I returned to her room she showed me that she had framed one of the photographs in a picture frame she had made in recreational therapy. It was displayed on her window sill.

Donald (hospital room)

Donald is a 69-year-old White, married man with a history of osteoarthritis. He had been admitted to the hospital in preparation for bilateral hip replacement surgery. During a break that the surgeon took to tell Donald's wife of the first successful replacement, the anesthesiologist noticed that Donald's blood pressure had dropped to a level that deemed continuing with the procedure unsafe. After several days of close monitoring in the Intensive Care Unit, Donald underwent an angioplasty, and a stent was placed in a blocked artery. He was then transferred to a single-occupancy room at Rusk because no other space was available. When he completes his physical therapy at Rusk, he will have a second stent placed and will then return home.

Donald was stressed with the financial burden that being ill had caused him and his wife. Prior to admission he had not wanted to leave work, so he waited until he literally could no longer walk before electing to have the surgery. He said that his biggest obstacle had been climbing the 52 stairs in the subway station to get to his office. He explained, "I pushed it before I had the surgery and I'm pushing it to try to get out and back to work." He laughed nervously when he disclosed that he now had no income because he had used all of his sick and vacation days. Donald believed that his illness experience and financial struggle were not "unique," and continued by saying, "over and over again across the country, people are destroyed by illness."

Even though he felt the negative impact of his medical situation, Donald felt "hopeful and grateful" because he had been given a second chance at life. He understood that often times, people's heart conditions remain silent and undiagnosed and he was thankful that his was detected and being treated. He also shared a feeling of luck when I asked him about his experience as a patient at Rusk. He said that he had nothing to compare it to—he had only been in the hospital one other time in his life, about thirty years ago, following an automobile accident, and he barely remembered it. He understood that others have much more experience being ill and being an inpatient than he did.

Although he was very easy to converse with—even joking during the interview that he was making up for his time in the sixties when he did not take LSD because the medication he had been on right after surgery had caused him to hallucinate—Donald told me that he did not really like participating in the project, but was doing so to help me. During the follow-up interview, which took place in the Glass Garden, his frustration became apparent when he asked me why I kept repeating the same questions. I explained that I was interested in his answers at specific moments in time. When we were finished, it took about 15 minutes for an aide to come down to the garden to escort us back to his room. He became impatient with the wait, but we passed the time by talking about his family and the architectural changes he had seen in New York City over the past years.

Suzanne (garden)

Suzanne is a 69-year-old, divorced, White woman who is currently recovering from hip replacement surgery. She has a great deal of experience with hospitals and has been an inpatient at Rusk four previous times due to an undiagnosed autoimmune muscle disease that she has been coping with for the past ten years. It was the steroid treatment she was given for this autoimmune disorder that initiated the bone deterioration in her hip and other joints. Furthermore, her unexplained disease continues to cause complications by making it difficult for her joint prostheses to work properly. For example, a shoulder replacement she received prior to this admission does not stay in place because her muscles are too weak to hold it in the correct position. After sharing her extensive list of ailments, which included emphysema and cardiac arrhythmia, she laughed and said, “You name it, I have it!” Suzanne told me the long story of her illness, her chronic pain, and the fact that she fell off her scooter the night before her hip replacement and broke her pelvis. Surprisingly, however, she ended her explanation by saying, “so far everything is looking good.”

Suzanne was very sociable and welcomed the opportunity to participate in the study. Her friendliness was apparent in the relationship she had with one of her roommates. This roommate was surprised when we left the room on our way to the garden because she thought Suzanne was going home. The two women depended on each other for support and had obviously disclosed to each other personal feelings about their current situations. As I passed the roommate, pushing Suzanne in her wheelchair, she whispered to me that Suzanne was afraid to go home. Suzanne later commented at how concerned her friend was when she thought we were leaving the hospital.

It was very obvious that Suzanne loved being in the gardens. She said that other than the doctors, the gardens are the “main reason” why she comes to Rusk for her medical rehabilitation. When she is at Rusk and she is mobile she visits the gardens on her own in addition to attending daily horticulture therapy classes. As we walked through the aisles of the Glass Garden she touched and commented on the plants and birds. We stopped by the cockatiel and she said that usually the bird allows her to pet his head. At the end of the interview she visited the cockatiel again and also spent a few minutes with the African gray parrot.

Suzanne shared several narrative explanations when answering the quantitative questions. When responding to the PRS statement, “This garden is a place to get away from it all,” she said that the gardens make you feel “totally out of the hospital environment.” She also said that her hour of horticulture therapy every day is an hour that is filled with “relief” and “escape.” Her appreciation for the gardens was so strong that her goal is to volunteer there when she has fully recovered. When responding to the question of pain intensity, at baseline she felt less pain than at Time 2 because she was not moving. Moreover, at Time 2 she said that she was due for her pain medication, which supplemented her continuously worn Fentanyl patch.

When I met Suzanne the next day for the follow-up meeting, she was in the hallway outside of her room, chatting with the roommate I had met the previous day. They were outside of the room because their third roommate had been frustrating them. In addition to constantly complaining since her arrival at Rusk, this woman had played static on her radio all night long, making it impossible for the two friends to sleep. Furthermore, she had made it so difficult for the medical staff to treat her that she has caused the nurses to refrain from entering the room. When we went through the STAI-6 for the final time Suzanne explained that her answers were indicative of how she was feeling about the situation with this third roommate. For example, she said that she was “somewhat” worried because she had to spend another night with the roommate and may again get very little sleep, but that other than that, she was great. Suzanne continued to say that because the room was such a stressful place she felt thankful for her time in horticulture therapy. On that day she had actually been the only attendee to her class, so she and her horticulture therapist planted a bonsai. He had joked with her saying that she deserved to do something special because she was a "regular."

Our conversation ended when Suzanne's friend asked us to ring for a nurse because the edema in her leg was causing a great deal of pain. Suzanne asked me to ring the nurses' station from both from her bed and her friend's bed. Again, it was evident that these two women were important supports for each other and Suzanne quickly shifted her focus from our discussion to concern for her friend.

Dolly (hospital room)

Dolly is a 68-year-old, White, married woman with a long history of osteoarthritis. When I met her, she was in the midst of her second stay at Rusk, recovering from hip replacement surgery. Four years ago she had also been an inpatient there after undergoing bilateral knee replacement surgery and she was very happy to have been able to return for her current rehabilitation. When Dolly was a teenager, she had been a member of her high school's majorette drill team. She attributed her joint deterioration to her past physical activity, specifically the action of pulling her knees "up very, very high." She mentioned several times that although she has been diagnosed with "old age" arthritis, she has had it most of her life. This made her story unique from others with the same disease.

Dolly seemed to enjoy having company and was very willing to share her illness experience with me. Before we started the proper interview, we spoke a little bit about the weather and how grey it was outside. She was very attuned to her environment and commented that she could tell how overcast it was because the gold towers that were visible from her window were less shiny and bright than usual.

Throughout her life, osteoarthritis has forced great limitations on Dolly's activities. For example, when her children were young, the pain made it difficult for her to keep up with them. She also used to enjoy spending time outside gardening, but the "kneeling and bending and stretching" of this hobby made her stop and involve herself in more sedentary activities. Dolly now spends her leisure time taking piano lessons. During the interview she contemplated that being able to take walks "around places like [the] botanical gardens" would be a treat for her now.

It was apparent to Dolly that she was progressing through her rehabilitation well. Her pain had diminished immensely during her recuperation and she scored "0" on the Wong-Baker Scale at all three time points. She shared that she was no longer on pain medication.

I called Dolly prior to visiting her for the follow-up because she had told me the day before that her daughter had been planning a visit. When I got to the hospital, her daughter had just left. Dolly spent most of the time reiterating that she felt very lucky to be back at Rusk again after the "positive experience" she had with her knees four years ago. Prior to her admission, she had worried that she may not have been able to return because as of 2006, she explained, Medicare modified its rules so that if you are under 80-years-old and only have a single hip replacement, you no longer qualify for care in the facility. Dolly had been able to return to Rusk because by chance, there happened to be a bed available.

Doug (garden)

Doug is a 68-year-old, White, divorced man with a history of Parkinson's disease. Approximately five years ago he noticed that he was having pain in his left knee. It was discovered that he had a meniscus tear and he underwent outpatient surgery to repair it. Although the procedure was successful from the surgeon's perspective, about two years later, Doug's pain returned. He revisited his surgeon, who after taking an x-ray of the knee, said that there was nothing wrong and that Doug would "get over" the pain. Doug was not comfortable with this interaction and asked his family physician to refer him to another surgeon in order to obtain a second opinion. The second surgeon took an MRI and reported that he saw the meniscus tear. Approximately six months later, Doug had a second surgery. He felt confident in the care of his new surgeon and appreciated the new doctor-patient relationship, however, six months after the second surgery, Doug started to feel the pain again. Even with anti-inflammatory medication, the pain did not ease, so it was decided Doug would need a total knee replacement. His family physician then recommended that Doug see his own surgeon. This third surgeon took yet another x-ray and pointed out to Doug that he no longer had a meniscus in his left knee, and that his bones were rubbing against each other. Due to the deterioration of the meniscus and Doug's Parkinson's disease, it was decided that he should indeed undergo the knee replacement, and recuperate at Rusk.

When I first met him, Doug told me that he would be available to take part in the interview two days later, during the time when he had been scheduled for horticulture therapy because he had requested to cancel his visit to the gardens. As he did not care for the gardens, and knew that there was a 50% chance that he would visit them with me, I was surprised that he was so willing to participate in the study. It turned out, ironically, that he was randomized to the garden group and I actually took him to the gardens at the same time that he had specifically asked not to go.

During the interview we sat in the main, rectangular portion of the Glass Garden because the horticulture therapy class (which Doug had previously been a member of) was taking place in the workroom, a common space for garden interviews. It was also raining outside, so sitting in the other gardens was not an option. Because Doug had a problem hearing, the location was not ideal, but after his prompting, I was mindful of speaking loudly and enunciating my words clearly. While we completed the PRS, Doug said that he was “not a garden person” and that “horticulture therapy was not for him.” In the midst of answering zero after zero on the PRS he told me that he suspected that his answers would be quite different from those of my other garden participants.

Doug had a reserved personality. This was particularly evident when he spoke about his future. He said that he expected his quality of life to improve from his most recent surgery, but that he knew that he would never be as healthy as a thirty-year-old. In the same sort of noncommittal way he said that his treatment at Rusk was “up and down,” explaining that sometimes he had a good nurse and at other times he did not, and that his treatment was “not consistent,” but that it was “the nature of the beast.”

Due to his tempered nature, it shocked me that during the follow-up, Doug said that he was 100% happier than he had been the last time we met because over the course of the day he had moved to a new room. He however, had not said anything about being uncomfortable in the space he had previously been assigned. I was also pleasantly surprised that Doug shared a very positive description of his experience during the earlier interview, saying that his participation had been "enlightening" and "worthwhile."

Maria (garden)

Maria is a 24-year-old, White woman with a history of multiple sclerosis. She was my youngest participant. When I first met her, she was very welcoming and immediately easy to talk to. During the eligibility interview, she spoke a little bit about her undergraduate studies and her plans for the future. We then scheduled a time for me to return the following day because her family was on their way to the hospital to visit her.

Maria was in Rusk recovering from surgery she had just had following an accident where her knee was broken. She explained to me that on her way to work one morning she had noticed a man briskly leaving a construction site and continue to proceed very quickly down the street. Because of her M.S. Maria tends to be very cognizant of her surroundings, so when she saw the man coming towards her, she stopped moving in an attempt to stay out of his way. The man, being less attentive, bumped into her and caused her to fall. Immediately after she hit the ground, Maria knew that she was seriously hurt. She called her brother and he took her to the Emergency Room. The doctor took an x-ray of Maria's leg and after an examination yielding nothing unusual, she was discharged. Shortly after she returned home, however, the doctor called Maria to say that after further study of the x-ray, a break was indeed found. Maria went back to the hospital, was admitted, and planned to have surgery the following morning. It was not until two evenings later, though, that she had her operation.

Prior to the accident, Maria led a very busy life. Not only did she work full time, but she was in graduate school. Maria had been on what she called a “fast-track of life,” and was “burning the candle at both ends.” Being in the hospital forced her to drastically slow down. She had cancelled the class she had planned to take over the summer and because she could not work, applied for unemployment. She realized that she had to reprioritize her life and had no choice but to focus fully on her recuperation.

Maria and I were given permission to travel to the gardens unaccompanied and we spoke a lot on our trip. When we were waiting for the elevator to take us downstairs, we continued our discussion from the previous day and Maria shared with me that she had wanted to go to medical school. Because of her M.S., however, a career in medicine would not be possible, so she has decided to study hospital administration. Our conversation was interrupted in the lobby when her brother called her on her cell phone. Although she spoke a great deal during our informal meeting, Maria did not incorporate much personal narrative into the proper interview.

Maria felt that she had made the right decision coming to Rusk—she had elected to be transferred there under the guidance of her surgeon and neurologist. She believed that she was getting prepared well to go home and valued what the therapists were teaching her because she was to be non-weight bearing on her knee for another month. She also appreciated the many activities that were offered at Rusk, including horticulture therapy, jewelry making and therapeutic photography.

During her follow-up appointment, Maria spent most of the time speaking about the importance of disclosure and how helpful it was to be able to talk about her situation “as opposed to keeping everything inside.” She added, “you just start to realize how much you’ve been through when you start, you know, expressing it and saying it out loud and you hear yourself say it.”

Richard (garden)

Richard is a 59-year-old, White, married man, who was transferred to Rusk after having exploratory surgery to investigate a lack of fluid movement in his spine. When he first arrived at the hospital, the deficient spinal fluid was causing paralysis.

Prior to coming to Rusk, Richard had a very poor outlook for his future. He described himself as a “medical nightmare,” explaining that he has had neck, shoulder and back surgery. He had previously imagined that his health would never return and that he would have to spend the rest of his life in a nursing home. He now had a different way of thinking.

Richard was very grateful for one of the therapists he had been seeing at Rusk. He told me that it was actually she who had given him hope and encouraged him to believe in himself. He now had more control over his negative thoughts and trusted that he was going to improve. His positive attitude was clearly evident when he told the aide who accompanied us to the gardens that everyday was a good day because “it means you’re alive.” Richard and the aide had become friends and she said that he was the only patient who could make her smile.

Richard was also very thankful for the support he received at home from his wife. When I asked him where he goes to reflect on his problems, he mentioned, in addition to some outdoor spaces, that he talks to his wife. He added that “most guys won’t admit to [confiding in their wives],” but that his wife was “good that way.” He also received social support from his sister and when I met him to conduct the interview (having consented him the previous day) his sister was in his room visiting him.

After I made the initial request for Richard to speak without interruption for three minutes and we began the tape-recorded portion of the interview, it was necessary for me to prompt him twice so that he would continue with his story. He finished his thoughts with clear closure, saying after a few sentences, “that’s all I have to say,” and “that’s it”—he would not have continued speaking if I had not urged him to.

During the PRS, Richard said that he had gardened for over 40 years, beginning as a child on his parents’ property. He explained that he now preferred to be elsewhere than a garden setting saying, “it is nice, but not for me no more.” Although he preferred not to be in the garden, he was very cooperative and friendly. When the proper interview was complete and we were waiting for the aide to accompany us back upstairs, he told me that he had no plants at home and that once his wife over-watered a cactus and he still teases her about it.

When questioned during the follow-up, Richard said that “it felt good” to talk about his illness experience. He also said that being a patient at Rusk had been wonderful. When the tape-recorder was off he continued by saying that everyone (nurses, technicians, physicians) were very caring and helpful, illustrating this with the example that no one leaves him in his room alone until they see that he is fully settled.

Rachel (hospital room)

Rachel is a 59-year-old, White, Orthodox Jewish woman who was recovering from hip replacement surgery. When I first introduced myself to her, her husband was visiting and when he saw me, he stood up and offered me his chair. Rachel was immediately comfortable with me, seemingly because she recognized that I was Jewish. Moreover, she and her husband said that I reminded them of their sister-in-law whose name was Julie, and this also seemed to put them at ease.

After the eligibility interview was completed, we scheduled to continue with the study the following morning at 9:00am. Shortly after I arrived, however, we needed to break because Rachel had been scheduled for a psychology consultation and the appointment could not be changed. I returned later that day, but when I reached her room she was sleeping. I waited for her to wake up, which she did when her husband arrived for his evening visit. Although I offered to reschedule, she said that she wanted to do the interview at that time because it was always going to be busy. Shortly after we began, another relative came and stayed throughout the interview.

During the interview, Rachel was very optimistic about her recovery because her mother had had the identical surgery and it proved to be very successful. Rachel had expected to need a hip replacement at some point because of her “genetic track”, so it was not a surprise to her when surgery became necessary. Prior to her operation, Rachel tried to let the pain “interfere as little as possible” and was hopeful that after her rehabilitation she would be better than she had been before, continuing to follow in her mother’s footsteps.

Rachel received a lot of support from her family and from her community. That evening, her husband had come for his visit after running to Macy’s at her request, and buying her the New York Times and an ice-cream bar. The phone rang several times while I was there—Rachel spoke with a friend while I drew the map of her room; her husband answered the phone at all other times. During the interview she spoke a lot about the support she received from *Bikur Cholim*, the Jewish organization that cares for the sick. She was overwhelmed by the amount of concern she had received from the community and was very thankful for it.

Speaking with Rachel was very easy because she had a lot that she wanted to share. During the PRS she added several comments. For example, when responding to the statement “Coming here helps me to get relief from unwanted demands on my attention,” she said that there were no “unwanted demands,” that during rehabilitation she expected *and wanted* to work hard. She seemed to be very observant of her environment and when I read the statement, “This hospital room has fascinating qualities,” she said the bright green paint was fascinating and added that the curtains had a Matisse-like design on them.

Rachel was scheduled to go to horticulture therapy the day of the follow-up visit, so it was decided that I would meet her in the garden. When I got there I met her and her husband (who had joined the horticulture therapy class) in the Glass Garden and then we moved outside upon Rachel’s request, to the PlayGarden. During the follow-up she said that her day had been painful and that her hip was bothering her. She had spoken earlier with a nurse about her pain, but was told that nothing could be wrong, because the only possible problem that could arise would be a hip dislocation and if that were to happen, Rachel would scream. When I asked how “worried” she was during the final administration of the STAI-6, she said that “intellectually” she would score 2 out of 4, but she was “feeling” a 3 (she ultimately chose 2). She said the pain was probably due to the fact that she had been sitting for a long time, and although it was “superficial,” it was still worrisome.

Rachel told me that she had also spoken with a nurse about a display of photographs that are hanging on the wall down the hall from her room. These pictures were taken by patients in the recreational therapy photography program. The nurse said the art was new on the floor and “that they had never had anything like that in the hospital before.” I then gave Rachel her thank-you gift, which she appreciated. She said that she really liked the photographs and that her husband was a nature photographer and would like them too. She told me that she planned to make a collage with them and display them in her room.

Belinda (garden)

Belinda is a 74-year-old, White, married woman who was recovering from a second knee replacement surgery. When I met her she was eager to participate, consenting right away and agreeing to start the interview immediately. Although during the eligibility questionnaire she answered that she would be willing to go to the gardens, when the time came for us to travel downstairs Belinda was reluctant to move because she had been icing her knee. She appeared agitated, but assured me that she was not angry and together we proceeded to the elevator.

As soon as we entered the Perennial Garden, Belinda was taken aback by how quiet it was. She chose a spot to talk, which was down the path from the door, and I pulled up a plastic chair beside her. When the tape-recorded portion of the interview began, I needed to prompt her twice to continue with her story; the first time because she had stopped talking, and the second time because she asked me to repeat the question.

Belinda did not consider herself “ill” and understood her knee replacement simply as a “bump in the road.” Although the symptom she described of her medical condition was that the bones in her knee were rubbing against each other, she never mentioned that she had osteoarthritis. During the PRS when I read the statement, “Being here helps me to relax my focus on my illness” she said that she had a “problem” and now it was solved—in other words, she had no “illness” to focus on. Belinda’s motto was “if it’s broke, fix it.” She attributed this attitude to her background in science and nursing.

Many of Belinda’s answers were curt and some were contradictory. For example, during the first three minutes of the interview she said that the pain in her knee had affected her life by forcing her to limit her daily activities. However, when I asked later in the interview how her life had changed since her knee problem began, she merely stated, “it hasn’t changed.” Belinda did share some narrative when scoring her pain in the garden. She said that she actually felt less pain than she had felt when we were in her room and her score decreased from a 2 to a 1, which was reflective of this change.

When we returned to her room, Belinda informed her roommate that we had just been in the garden, which inspired the two to discuss with each other how much they enjoyed the natural setting. Belinda continued with this positive review during the follow-up visit when she said that she would encourage all patients to take advantage of the gardens and horticulture therapy. Moreover, Belinda told me that she believes in “always learning” and that she appreciated the “plant program” because it offered her the chance to gain new knowledge.

Howard (hospital room)

Howard is a 75-year-old, White, widowed man. When I first entered his room he was impatiently waiting for an aide to help him transfer from his wheelchair to his bed. With his permission, I returned to his room ten minutes later when he was settled.

Howard seemed sad and was quite ornery, so much so that I was surprised that he accepted the invitation to participate in the study. By my observation, he was the most distressed of my participants.

Howard was in the hospital rehabilitating from his second surgery following an accident that occurred two and a half years ago. He had fallen and fractured his femur and since the original surgery had seen little progress in his recovery. Howard seemed very disheartened by this lack of improvement.

Howard also seemed saddened by the lack of support he received from his family and friends. Both his son and his daughter argued with him prior to his most recent surgery because they did not think he should go through with it. Howard, however, understood that he had no other choice. Moreover, the pain he had been in prior to surgery had kept him from keeping social appointments, which also impacted negatively on the amount of social support he received. When our time together was complete I asked Howard if he wanted me to keep the chair I was sitting in by the bed, in case anyone was to come. Despondently, he said that no one else would be visiting him that day.

Although at the beginning of the tape-recorded portion of the interview he spoke for three minutes without interruptions or additional prompting, Howard's words were very controlled and slow, and the word length of his narrative was the shortest of all of my participants. His answers during the rest of the interview were divulged more quickly, but also remained brief. Howard became irritated when I asked him to discuss the meaning of his medical condition. He said that he considered himself "pragmatic" and that delving into the "deepness" of meaning-making was a waste of his energy.

Compared with the rest of my participants, Howard had the most negative view of his experience with rehabilitation. The process had been long and painful and he said, “There’s no shortcut, there’s no free lunch.” He continued by comparing his experience to being tortured. Unfortunately, Howard was not available to participate in a follow-up interview.

Diane (hospital room)

Diane is a 68-year-old, White, divorced woman who was recovering from hip replacement surgery. Additionally, while at Rusk, she was being treated for carpal tunnel syndrome. Diane was the most outwardly emotional of my participants and disclosed a great deal during the interview. Through most of our time together, Diane kept her eyes closed, which magnified the amount of emotion evident in her words.

Diane’s health problems began three years ago, with a severe case of shingles. Following this sickness, she developed pain in her leg due to post-herpetic neuropathy. She also suffered from back pain, which stemmed from herniated disks and sciatica. The pain in Diane’s leg eventually spread to her groin, thigh, and knee. It was assumed by her doctor that this pain was residual from the shingles. Diane described herself as a “holistic” person and explained that she experimented with multiple modalities to deal with the pain, including acupuncture and capsaicin cream. When these were not successful, she went back to the doctor who put her on a prescription medication. Shortly thereafter, however, Diane developed a case of diverticulitis and she discontinued her use of the medication. Because the pain stemmed from her groin, her physician suggested that she see a gynecologist. Feeling disappointed after her gynecologist did not discover anything abnormal, Diane sought the opinion of yet a third doctor. This new physician took an x-ray of Diane’s hip because, she explained, hip pain can spread to the groin and thigh area. This is when arthritic deterioration in the hip joint was found. Diane was completely shocked.

Immediately post-surgery, Diane had suffered from an enormous amount of pain. Although when I met her she was beginning to see her progression back to health, she had not expected her recovery to take so long and for it to hurt so much. She had been comparing herself to hypothetical others who recover from hip surgery quickly and this made it difficult for her to grasp why her experience had been so challenging. Additionally, Diane had been under the impression that she was a very healthy person and had not expected a diagnosis of osteoarthritis. She had attempted to physically prepare herself prior to surgery, but did not see that this previous effort was helping with her rehabilitation.

Diane mentioned her experiences in the gardens several times during the interview. When I asked her the questions, which referenced her background at Rusk, she said that visiting the gardens was an experience likened to being in “an oasis in the middle of a desert.” She continued that when she first visited the gardens it was her “saving grace.” In fact, she said, she cried when she was taken there because if felt like “the only sanity in the whole thing up to that point.”

During the PRS, Diane shared some additional comments, which made it evident that she was very cognizant of her surroundings. For example, when responding to the statement, “This hospital room is a place to get away from it all,” she said that she felt that the gardens were a place to “get away from it all.” When responding to the statement, “There is nothing worth looking at here,” she mentioned the beautiful view of the Empire State Building, which she could see out her window. In fact, before I left her room at the conclusion of the interview, Diane made sure that I looked out at her view so that I could fully understand the beauty she was speaking of.

Diane cried when she spoke about her future and about the meaning of her illness. Although I asked her if she wanted to end the interview, she said "no" and we continued through the minor breaks of tears. What appeared to be the most difficult for Diane was that her rehabilitation was more intense, longer, and much more painful than she had expected. In order for no one else to have to endure a similar experience, Diane told me that she wanted to write a book, her "own version of having a hip replacement…so that people would be better prepared."

At follow-up, Diane felt a little more optimistic. She said that she was more "encouraged that things will get better." She also said that the therapists had been very attentive and met her emotional needs. She appreciated being able to disclose her feelings—we actually needed to delay our meeting by one hour because she had requested an appointment to speak with a psychologist. I later found out that she had told the horticulture therapist that she had enjoyed sharing her feelings with me.

Helen (hospital room)

Helen is a 76-year-old, White, widowed woman. I met her while she was recovering from bilateral knee replacement surgery. She was sitting behind her table in the middle of her room, facing the door, and immediately welcomed me in. Helen was extremely talkative and disclosed a great deal of her biography to me.

Helen's illness story began in the 1970s when she started to suffer from chronic pain. She had an allergic reaction to some antibiotics, which caused hypereosinophilia.

Her pain mysteriously continued for a number of years until she requested that her doctor perform a test for Lyme disease. The test was positive and she was properly treated. Additionally, Helen was diabetic and had cardiac problems, which caused chest pain, and eventually led to the implantation of a pacemaker.

In addition to these chronic illnesses, 24 years ago, while at work, Helen fell and injured her knee. She had surgery, but joint deterioration that followed had become very painful. Other parts of her body also started to hurt her because she was compensating for her knee (e.g., she developed carpel tunnel in both of her wrists from constantly resting her body-weight on her hands). Furthermore, her uninjured knee also began to deteriorate. Helen's diminishing quality of life was the impetus for her surgery.

Helen had come from out-of-state to have her knee replacements at NYU because her daughter worked there. She received a lot of support from her daughter and after being discharged, Helen planned to live with her daughter until fully recovered. During the PRS, Helen mentioned that she felt a certain "oneness" with the setting because of her daughter's presence. Even though her daughter had told her not to worry, Helen was concerned about burdening her. Helen was also concerned about burdening the hospital staff while she was still at Rusk.

Although Helen lives in the same retirement community as her sister they had recently been arguing and Helen felt no support from her. In fact, Helen said that she felt like her sister's "punching bag." Helen told me about her busy days in her home community and how her daily activities usually start with water aerobics at 7:30am. Prior to surgery, however, her pain would get so intense that she would stop her activities by mid-afternoon. Her joint deterioration had substantially limited her independence.

When she was at home, Helen had refused to take Vicadin—she did not like to take pain medication. She even complained that the pain medication she was on at the time I met her made her feel “loopy.” Although she scored a 3 out of 5 on the first two administrations of the Wong-Baker Pain Scale, at both times she compared her current pain to how she felt previously and said that it was pain she could live with.

There were a couple of interruptions during our interview. Helen’s surgeon came by on rounds and they had a friendly rapport. She asked him many questions about the status of her blood sugar, being more technical than the average patient because she was a nurse. Later during the interview I left her room for 15 minutes so she could eat her dinner privately. Food was very important to her—she spoke about her love of cooking—and she requested to eat her meal without disturbance.

During the interview, Helen compared her recovery to the recovery of her roommate. Although she was clearly friendly with her roommate and joked with her during the interview, Helen also found it difficult to be in the same room with her. Both Helen and her roommate had bilateral knee replacements, and Helen found it distressing that her roommate was progressing at a much faster rate. Helen shared with me her regret of having both knee surgeries done at once, stating that she had made the decision to do so at a time when she was not in her “right mind.”

When I met Helen for the follow-up, she seemed much less discouraged. Her roommate had been discharged, so drawing a comparison to another patient’s successful recovery was no longer a reflective action. She had also seen a significant improvement during her physical therapy and felt more convinced that her rehabilitation was on a trajectory of progression.

Brenda (garden)

Brenda is a 57-year-old, single, White woman who was brought to the hospital after falling while in a physical therapy session. The fall caused her to break her hip and I met her while she was recovering from a surgery in which pins were placed in the joint to hold it in the proper position.

When I first went to see Brenda, she was sitting on her bed speaking with a visitor, so I waited in the hallway until he left. She later explained that the man had been her boss and that he had been pressuring her to return to work. He had been calling her throughout her rehabilitation and his visit had interrupted her time in recreational therapy. Brenda told me that her therapist had insisted, in front of Brenda's boss, that Brenda finish the necklace she was making, in order to give her some time away from her employer. When I arrived I had worried that Brenda would be too tired to continue talking, but she was excited to participate and I conducted the interview on that day.

Brenda's strong sense of organization was missed at work, and although she was relieved to have some time away from her office, she did not like the feeling of being unproductive while in the hospital. She told me that she had finally been escorted to the medical school library so that she could check her email and pay her bills—using a laptop was not an option because Brenda had a history of a brain injury, which required her to use a full-size computer. During her interview, Brenda mentioned that her medical condition had caused her to have to reorganize her whole life and because of her dependence on others, everything needed to be perfectly planned.

Brenda had a very bubbly personality. While we were in her room, she showed me all of the "toys" she was given during her stay at Rusk, which included devices to help her lift her leg, put on her socks, and reach items farther than arms-length away. Her good spirits continued in the Glass Garden when she rolled her wheelchair over to Zazu (the African grey parrot) and started chatting with him.

Brenda was impatient with the rate of her healing and after only ten days of being hospitalized was “ready to kill people.” She was hoping that her physician would reconsider the 12 weeks time she was told that she must stay off of her leg. Brenda was also impatient with how long it was taking her to gain the skills required to use a crutch and a walker, and she joked that if she were to go shopping or to a play, that she would probably knock someone over.

When not in the hospital, Brenda involves herself with the cultural activities of New York City. In fact, when I asked her where she usually goes to reflect on her life or problems, she said that she liked to go to the ballet. She said that she thinks in ballet terms and when she was told by a physical therapist to “bounce” on her toes she interpreted it to mean that she should do a relevé. Brenda’s love for the arts seemed to be translated into her taking part in many of the recreational therapy activities that are offered at Rusk. On display in her room was a box that she had decorated and when I met her for the follow-up meeting, she was putting on a necklace that she had just finished making.

Rick (garden)

Rick is a 71-year-old, White, divorced man. He was rushed to the hospital following an episode when his legs collapsed while climbing some stairs. A few days after his admission, his legs briefly “came back,” but after walking several steps, he lost complete use of his lower body. When I met him, he was recovering from a biopsy that had been conducted, where his surgeon removed some tissue from a lesion that had been found on his spine. The cause of the lesion and his diagnosis remained unknown, however Rick felt very lucky because cancer had been ruled-out. Of all my participants, Rick had spent the most time in the hospital with a total of 56 days, 12 of which had been spent at Rusk.

When his illness first manifested, Rick had no “second thoughts” about being taken to NYU because he had been treated there before—being a patient at NYU was a priority for him. Rick was very organized and needed to be in control, and by the time his car service had reached the Emergency Room, he had already contacted his physician. When he arrived, the ER attendants knew to expect him.

Rick was extremely loquacious. When I first entered his room to introduce myself and the study, I interrupted a conversation he was having with his roommate. Although he asked me to return the following day for him to sign the consent and take part in the interview, he spoke with me for fifteen minutes about his family, my studies, and the City University of New York admissions policy. At the time I was to meet him the next day, Rick was sitting in his wheelchair, with his back to the door, speaking on his cell phone. I waited in the hall for about 20 minutes before he ended his conversation. His nurse saw me and joked that Rick would probably be on the phone for a *very* long time.

Rick told me that he needed to finish some paperwork before we got started. Unlike the previous day, he seemed a bit impatient, saying sarcastically “Are you going to stand through this whole interview?” before I asked his roommate if I could borrow a chair. After I sat down, he pondered how he would get a letter into the mail. I told him I would be happy to send it, he would just need to remember to give it to me.

Rick and I were given permission to travel to the gardens by ourselves. As we left his room, Rick started to manipulate his wheelchair on his own, but when we reached the elevator, he received a call on his cell phone from his daughter, and he told me to "take it the rest of the way." As we wandered through the Glass Garden looking for a place to continue with the interview, Rick's impatience was again noticeable and I rushed to find us a space.

Rick told me that he "discovered" the gardens during his first stay as an inpatient at Rusk. Since then, he had visited the gardens as a non-patient. During the PRS, Rick told me that he did not think the hospital had given the gardens enough space. He also said that he considered horticulture therapy to be "one of the few highlights of the day."

When the interview was completed, I returned with Rick to his room and scheduled a time to meet him the next day. As I walked down the hall I heard my name called. When I turned around I saw Rick waving the envelope that he had wanted me to send. Together we laughed at how forgetful we were.

When I met with him the next day, Rick was much calmer. Because he had appeared to be so frustrated during our previous meeting, I was surprised at his positive remarks during the follow-up. Rick said that I was a "calming" and "laid back type of person," which made the interview experience "very easy, very comfortable."

Betty (hospital room)

Betty is a 67-year-old, White woman who was recovering from knee replacement surgery. After I introduced myself and the study to her, she agreed to participate, but asked that I return in four days, when her schedule would be more flexible. When I arrived at our agreed-upon time she seemed to have forgotten about the study, but still consented to participation. Although Betty had been randomized to go to the garden, at the time of the interview she was receiving antibiotics intravenously for a bacterial infection and her knee was under ice, so we needed to remain in her room.

Approximately two months before her admission to Rusk, Betty had developed an infection in a prosthetic kneecap, which had been placed about six years previously. During the surgery, a portion of the knee was removed, cleaned and replaced. She was then put on IV antibiotics. She was told that a part of the knee had come loose and that it had become an ideal host for the bacteria. Shortly after her surgery, Betty started vomiting and "knew something was terribly wrong." It was then discovered that the PICC line, through which she was receiving her medication, had become infected with another strain of bacteria. She mentioned how ironic it was that something that was supposed to heal her actually made her more ill. During the most recent surgery, Betty's entire prosthetic knee was replaced with a concrete joint. She hoped that the current round of antibiotics would eradicate the rest of the bacterial infection and she expected to have the concrete joint replaced with a new prosthetic knee in the near future.

Although her current acute illness centered on her knee, Betty said that her illness experience began about 12 years ago when she began having cardiac problems. Betty survived two heart attacks, the second of which almost caused her death. She attributed the heart attacks to her high stress job as a legal secretary.

Betty told me that she had previously been unhappily married, but she now had a caring boyfriend who was very supportive. She also had many friends. One had brought her a giant replica of a flower that stood at the foot of her bed. Another had baked her homemade cookies, which she ate as we spoke. And still another had actually come to visit her during our interview and waited in a seating alcove until we were done.

During the PRS, Betty compared her room to the gardens. For example, she said that “going to plant therapy” gave her a “break from [her] day-to-day routine,” but that her room did not. She then laughed and rolled her eyes at the statement, “This hospital room has fascinating qualities” and rated the statement “This setting is fascinating” a zero because she said that not even the television was working. Betty voiced that the room was “clean” and did “its job,” but grew frustrated through the questioning, stating that I was trying to give the room “human traits or traits of a hotel.” She then said, “the fact that they have this wonderful garden…that’s something special.”

Betty told me that even when she was not a patient at Rusk she would visit the gardens there. She enjoyed bringing her lunch and sitting in the PlayGarden and walking around to see the animals. Betty’s first time as an inpatient at Rusk was six years ago and she still had a plant from a horticulture therapy class she took at that time. When she was a patient in a nursing home, she took the plant with her. Her boyfriend was now caring for it.

When I met Betty for the follow-up, she was with an aide on her way downstairs to listen to a lecture that was being given by a representative from the Museum of Modern Art. Again, she had forgotten that we were to meet, but was willing to participate. The three of us went downstairs together and then Betty and I spoke in the entry of the room where the lecture was being held.

As we made our way downstairs, Betty had told me that she had been thinking a lot about the previous day's interview and that she did not like that so many of the questions had focused on her room. She said that her room was not "her own" because she was sharing it. Unlike her room in the nursing home where she was previously a patient, she could not "turn off conversations," and she could not retreat into a private space. I explained to her that we would have come to the garden had she not been connected to an IV. If the questions had related to the garden, she said she would have felt completely different.

During the first administration of the STAI-6 the day before, Betty had told me that she was feeling anxious because she was in the midst of arguing with Medicare. She had made a request to be reimbursed for the future purchase of a new walker that had a seat attached to it. She wanted to make sure that if she were to be discharged and needed to continue her IV treatments at her community clinic, she would be able sit during her walks to her appointments. Because she had been given a walker after her surgery six years ago, she was told that the rules stated that she was not entitled to receiving a reimbursement for another one. Immediately after our follow-up interview, I waited while she left a message for her Medicare representative. I then wheeled her to into the MOMA lecture that had begun a few minutes earlier.

Bob (garden)

Bob is a 48-year-old, White, single man with a history of osteoarthritis. He was at Rusk recovering from hip replacement surgery. Bob quickly agreed to participate in the study the first day that I met him, though asked that I return the following day when he hoped to be less tired. Soon after I entered his room to start the interview, one of the recreational therapists asked if he wanted to take part in her program. I was surprised that he had agreed to participate in my study, but refused the offer of recreational therapy because, he said, he was too exhausted.

Beginning about five or six years ago, Bob started to have pain in his hip. An x-ray revealed that at that time he had severe arthritis and his physician told him that it would need to be treated. However, because Bob was still able to function in his daily life and was only in pain during certain activities, he declined treatment. Gradually the pain grew more and more severe. At first Bob could not walk up and down steps or bend down to tie his shoes. He then started using a cane to help him maneuver throughout the day. The pain eventually became so intense that he could not even find a comfortable position lying in bed. With a great decrease in the quality of his life and increased dependence on others, Bob became depressed.

About one year ago, Bob revisited his orthopedist, worried that his condition was not just arthritis, but possibly cancer because the pain was so debilitating. After another set of x-rays, which presented only the arthritis, Bob was given pain medication and a plan for surgery was put into action. Although he has been in pain during his recovery, it is a different type of discomfort, and he knows that “as every day goes by” it will diminish.

Bob seemed lonely and had a quiet temperament. His room was very plain, with no personal or gift items on display. Never married, he lived at home with his sister and her boyfriend. He felt very grateful that he had their support, especially when he became completely dependent on the help of others.

When it came to time to leave his room I asked a nurse to help Bob move from his bed to his wheelchair. Bob’s appearance was a little disheveled. The nurse encouraged him to put some socks on, but he refused. We were then given permission to travel downstairs unaccompanied. Although Bob had heard of the “greenhouse” he had never visited any of the gardens before. He was excited to learn that there were animals living there as well as plants. As soon as we entered the Glass Garden he said that the environment was “nice and relaxing.” He chose to continue with the interview by the pond near the entrance.

Bob’s immediate, positive response to the gardens was reflected in his positive responses to the PRS. He spoke easily throughout the interview, but did not add any additional narrative to any of the quantitative questions. He seemed tired, and immediately after we finished we went back upstairs to his room.

The next day, Bob’s follow-up meeting was very short. He was quite tired after having received some tests. When I met him, he was lying on his bed and when I left, he closed his eyes.

With the above descriptions, I aimed to present my participants’ illness experiences within the contexts of their lives. Although there was some overlap in diagnosis, it is clear that every individual had a unique story and personal way to discuss medical conditions. What follows now are the results from my data collection, where I move from individual stories to presenting more of a group picture of my participants’ experiences.

CHAPTER FOUR

Results

The findings are organized in a way that reflects the original aims of this study. I have integrated the qualitative and quantitative analyses within each section in order to most fully investigate my inquiries and represent the information gathered from my participants. It must be noted that with the small sample size, intervention condition differences can only be significant with a large effect size.

Perceived Restorativeness of Interview Locations

The first aim—to determine if the gardens were perceived as being more restorative than the hospital rooms—was in experimental language a “manipulation check”. Group differences in perceived restorativeness of the interview locations are presented in Table 6. The only significant group difference on the Perceived Restorativeness Scale was for the fascination subscale. Those who took part in the meaning-making interview in the gardens rated their setting higher in fascination than those who were interviewed in their hospital rooms.

After finding out that the fascination scores were significantly different between the two groups, I investigated if there was any relationship between the fascination one experienced in the meaning-making interview location and the ability to make personal meaning of illness. In other words, I questioned whether either environment increased one’s ability to make personal meaning of illness or injury as long as it elicited fascination. The relationship between meaning and fascination, however, did not prove to be significant ($t(14)=.55$, $p=.59$, $d=1.63$).

I conducted correlations to see if the length of the meaning-making interview was correlated with the Perceived Restorativeness Scale. Length of the meaning-making interview was correlated with the legibility subscale (r=.46, p=.07). However, the length of the meaning-making interview was not correlated with any other PRS subscale (being away(r=-.12, p=.67); fascination (r=-.26, p=.33); extent(r=.10, p=.72); compatibility (r=-.03, p=.93)), nor the total PRS score (r=.-.04 p=.87).

Emotional and Physical Changes

The second aim was to determine if patients experienced emotional and physical changes when they spent time in the gardens.

Anxiety. Anxiety levels were assessed with the total score of the STAI-6 at three time-points: before the meaning-making interview (baseline), after the meaning-making interview (Time 2), and at follow-up (Time 3). At baseline, all participants completed the STAI-6 in their hospital room. At Time 2, patients in the Garden Group completed the STAI-6 in the garden immediately after the meaning-making interview and patients in the Hospital Room Group completed the STAI-6 in the hospital room immediately after the meaning-making interview. A repeated measures analysis of variance was conducted to determine if the location of the meaning-making interview affected participant anxiety over time. There was no time x location effect (F(2, 12) = 1.47, p=.27, partial η^2=.20), that is, there was no differential change in anxiety between the Hospital Room Group and the Garden Group. The change in anxiety over time for both groups is presented in Figure 15. Although the figure suggests that there was a change in anxiety for the Garden Group, this change was not significant.

I conducted correlations between the PRS and STAI-6 scores at each of the three time-points to investigate whether those who found their interview location to be more restorative suffered from less anxiety. Participants' anxiety was not related to perceptions of the restorativeness of the interview locations (Table 7). To better understand the relationship between perceived restoration and anxiety I again examined the correlations between anxiety and the PRS subscales, but none were significant (Table 7).

I also conducted correlations between the length of the meaning-making interview and anxiety at the three time-points. Length of the meaning-making interview was not correlated with anxiety at any time-point (baseline (r=-.08, p=.78); time 2 (r=-.15, p=.58); time 3 (r=-.07, p=.80)).

There was, however, a correlation between time and anxiety. STAI-6 scores were correlated at baseline and Time 2 (r = .83, p = .00), but this relationship was not significant at Time 3 (Table 7).

Pain. Pain levels were determined by the Wong-Baker Pain Scale at three time points: before the meaning-making interview (baseline), after the meaning-making interview (Time 2), and at follow-up (Time 3). At baseline all participants completed the Wong-Baker Pain Scale in their hospital room. At Time 2, patients in the Garden Group completed the Wong-Baker Pain Scale in the garden immediately after the meaning-making interview and patients in the Hospital Room Group completed the Wong-Baker Pain Scale in the hospital room immediately after the meaning-making interview. A repeated measures analysis of variance was conducted to determine if the location of the meaning-making interview affected participant pain over time. There was no time x location effect (*F*(2, 12)=.37, *p*=.70, partial η^2=.06), that is, there was no differential change in pain between the Hospital Room Group and the Garden Group. The change in pain over time for both groups is presented in Figure 16.

As with the anxiety measure, I conducted correlations between the PRS and Wong-Baker scores to investigate whether those who found their interview location to be more restorative suffered from less pain. Participants' pain was not related to perceptions of the restorativeness of the interview locations (Table 8). Nor were PRS scores and pain significantly correlated at any time-point, perhaps because pain scores were extremely stable across time (Table 8). Lastly, length of the meaning-making interview was not correlated with pain at any time-point (baseline (*r*=.13, *p*=.63); time 2 (*r*=.25, *p*=.36); time 3 (*r*=-.03, *p*=.92)).

Location Conduciveness to Meaning-Making

The third aim was to determine if the healing gardens provided a more conducive space than the hospital rooms to find personal meaning. Two group differences were found in regard to the length of the meaning-making interviews (reported here in seconds): the Hospital Room Group (M=938.62, SD=256.36) had longer interviews than the Garden Group (M=564.38, SD= 93.09) (*t*(8.81)=3.88, *p*=.004, *d*=1.94) and women (M=846.20, SD=297.78) had longer interviews then men (593.67, SD=93.52) (*t*(11.64)=-2.49), *p*=.029, *d*=1.14).

Results from the analysis of the meaning-making interviews reflect the multiple aspects of meaning-making that have appeared in the literature, including the attributional search (Taylor, 1983; Thompson 1991); type of meaning (Taylor, 1983; Tedeschi & Calhoun, 2004, 2006); and the ability to incorporate illness and injury into one's life story and envision a future (Lee, Cohen, Edgar, Laizner, & Gagnon, 2006). I will discuss each of these themes in turn.

Cause of Illness or Injury

The first set of meaning-making results is associated with participants' attributions for their illness or injury. Data were gathered from the direct questions patients were asked about why they, their physicians, and their families thought they became ill or injured, as well as from other portions of the interview where patients reported any attributions for their illness or injury. The original purpose of these questions was to investigate patients' explanatory models for illness or injury and to learn how these models were similar to or diverged from the information they received from their physicians and their families. Through analysis, however, it became clear that each participant fell somewhere along an attribution-finding spectrum. Some participants had "found" their answers as to why they became ill or injured prior to the interview and the interview served as an opportunity to voice these answers. Other participants used the interview as an opportunity to question attribution—they had not yet found a clear answer, and through the interview, they continued their search or perhaps even commenced the process of finding attribution for why they became ill or injured. Of the 16 participants, four in the Garden Group and six in the Hospital Room Group entered the interview experience with preconceived attributions for their medical situations; and four in the Garden Group and two in the Hospital Room Group entered the interview experience still questioning why they had become ill or injured (Table 9). Hence, this section is divided into two subsections: the first presents the results from participants who determined an attribution prior to the interview experience, and the second presents the results from participants who were still creating their attributions at the time of their interview. Taken together, these results illustrate that patients did strive to understand what caused their illness or injury and that they made attempts to comprehend how their medical conditions fit into the context of their lives.

Preconceived attributions. Some participants had considered the attribution of their illness or injury prior to the interview and had already conceived a personal understanding for why they were in their particular medical situations. Prior to the interview, these participants had been through the attribution-finding process and when questioned, they were prepared to share their answers with certainty. Content analysis revealed a number of types of attributions, with some patients reporting more than one type of attribution: an accident (N=1 HR), age (N=2 G, 1 HR), past physical activity (N=2 G, 2 HR), genetics (N=3 HR), just part of life (N=1 HR), and a specific stressor (N=1 G) (Table 11). There were no group differences between the two locations of the meaning-making interview and the types of preconceived attributions made (Table 10).

Excerpts from interviews. Howard, a man who had just undergone hip surgery (his second surgery following a broken femur that he had endured in 2006) had a clear understanding for why he broke his bone: he fell. His doctors repeated this brief answer. Howard entered into the interview with this conviction of attribution and did not question it. He described himself as being a “pragmatic person” and his answer to why he broke his bone reflected this aspect of his personality. Howard is the only participant who was convinced that an accident caused his medical condition.

Another participant, Belinda, who had just received her second knee replacement, said that the deterioration in her knee was “part of the aging process.” She continued by saying, “it’s nothing that I did. I was born in 1933—that’s why!” Belinda’s doctor had provided more of a description of what was happening in her knee, rather than a reason for its cause. She recalled her doctor saying that she needed the surgery “because the ligaments [were] separated. The bones…were completely disintegrated and the bones were rubbing against each other.” Although Belinda briefly questioned a more personal reason for the cause of her joint deterioration, evident in her expressing that she did not do anything to cause her medical problem, at the time of the interview, she had already decided that getting older was the single reason for its cause, the only reason that made sense.

Doug recalled no explanations from his physicians or his family for why he developed osteoarthritis. He, however, said that the reason for his arthritis was that he was “growing old” (he was 68). Additionally, he attributed his illness to suffering “past injuries…being a ball player [in] high…contact sports…like ice hockey, football, and things like that…[and] skiing, too.” Before the interview and without additional explanations Doug created an understanding for why he developed arthritis that corresponded with his personal history.

Donald, who was also diagnosed with osteoarthritis, was told by his doctor that that his arthritis was “wear-and-tear and age related—and [caused by] heredity, too.” Donald added to this triple attribution:

> Well, I think I became ill because wear-and-tear arthritis is a common thing and…I did a lot of hard work all my life….I did a lot of labor work—you know, construction work…carpentry and house painting and constantly climbing, you know, ladders…so I think it’s a pure case of age, wear-and-tear, and heredity. My

> mother was loaded with arthritis—she had her hip done, she had her knee done, she had stenosis…

During a time preceding the interview, Donald had analyzed his life through the lens of his doctor’s words. He had personalized his physician’s explanation and he too, had created a meaningful understanding of why he developed arthritis.

Dolly, who was a former majorette, had been diagnosed with “old age type” arthritis—osteoarthritis—when she was in her twenties. Although her diagnosis was clear, she said that her physicians had never given her an explanation for why her joints were deteriorating. Like Donald, Dolly also reflected on her past. She recalled the time in her life when she first started to feel the arthritis pain and was able to attribute her medical issues to “over doing it in high school.” She explained:

> Probably [the cause of osteoarthritis] was excessive activity. It’s just like some of those football players that probably should never have played football. And whereas others can really take the beating, some can’t, and starting that young, you just don’t realize that you’re one of those that it’s going to affect the rest of your life.

Without answers from her doctors, Dolly had contemplated a cause of her illness, which made sense within her life history. Moreover, her mother agreed that the activity on the drill team had caused the arthritis, supporting Dolly’s attribution. Dolly said that up until a few years prior to her mother’s death, her mother was still saying, “Oh, if I had known this was going to happen to you, I never would have allowed you to [be on the team].”

Bob was the last participant to voice past physical activity as the cause for his medical condition. He shared that his doctor had told him that, “there doesn’t have to be an answer" for why he developed the osteoarthritis, which led to the necessity of his hip replacement surgery. Bob *did* however, feel a personal need to find an answer. When asked why he thought he had developed osteoarthritis, he said, "You know, I was always an active person, I played a lot of sports. I always lifted weights…I lifted heavy weights…that might have had something to do with it. It could have aggravated it, speeded it up." Even though his physician had not offered an explanation for the cause of the arthritis development—going so far as to say it was not even necessary to find a cause—Bob had clearly made an effort to understand how his arthritis fit logically into the story of his life.

Two female participants, Rachel and Diane, attributed the onset of their arthritis solely to their genetic background. Prior to their participation in this study, both had considered the information (or lack thereof) that their physicians had shared with them and they made meaningful connections between their illness and the rest of their lives.

Rachel, who was recovering from hip replacement surgery due to arthritic deterioration, told me during the course of the interview that her mother had also been diagnosed with arthritis. When I met her, Rachel was the same age that her mother had been when her mother underwent the identical surgery. Thus, Rachel said that the cause of her arthritis was likely genetics:

> They know very little about arthritis, actually. Both doctors have told me that…They don't really know what causes it. There's a lot of different thoughts. There's a lot of these illnesses that are diseases or conditions that they don't know if they are autoimmune…are they viral? They don't know. But genetics is

> definitely a very big piece why some people who have a parent get it and others don't get it.

At the time of the interview, Rachel had already determined at least a partial explanation of what caused her arthritis that was consistent with her family history. Furthermore, recalling their mother's experience, her siblings agreed with the genetic factor.

In addition to considering genetics however, Rachel, like some of the other participants, had also questioned her physical activity as a possible contributor to her medical problems. She had even recalled that it was at the gym where her hip had begun to bother her. However, one of Rachel's doctor's had told her that "it's not like exercising too much or not exercising enough" would have been a cause of the arthritis, so she seemed to no longer deem this a possibility.

Another woman, Diane, who had undergone hip replacement surgery, said that her doctor "didn't really say" what had caused the development of her arthritis. However, like Rachel, prior to the interview she had also reflected on her family history:

> …Well, thinking it over it would be genetic. Although my mother lived to be 97 and she broke her hip and had to have a plate put in, but she didn't have any replacements. I guess she could have stood a hip replacement and she did have arthritis…her hands were all gnarled and everything at the end.

Even though Diane had not received any medical confirmation that she had a genetic predisposition for arthritis, her brother agreed with this attribution. They had discussed their mother's health and he had told her that he thought that their mother should have also had her hip replaced.

At diagnosis, Diane was shocked to learn that she had developed osteoarthritis. She said, “I thought I was healthy, vibrant [and an] active person.” She went on to say that she would have expected to be at least twenty years older before she found herself with this medical condition. The alarm of this diagnosis had previously inspired Diane to search for a reason for why she had become ill. Examining her situation with the knowledge of her genetic background allowed her to gain some understanding.

Suzanne was another participant who had created a personal understanding for why she had become ill. Since 1999, she had been suffering from an undiagnosed autoimmune muscle disease. Enormous scientific effort had been made to identify the disease and ascertain its cause. Samples, including muscle biopsies and bone marrow, were sent to several medical research centers (including The Mayo Clinic, Johns Hopkins, and The Center for Rare Diseases), but there had been no success in finding the answers. As part of her medical care, Suzanne had received intravenous steroidal treatments, which led to the deterioration of her joints and the necessity of her recent hip replacement surgery. Even without decisive answers from the medical world, when asked about why she thought she had become ill, Suzanne was prepared with an answer:

> Well [the reason why] I really think I became ill is I was in a horrendous marriage and…I wasn’t able to take care of myself physically. So, I mean…any time I got sick I wasn’t able to take care of myself. And I had a lot of depression and then I think my health just deteriorated…basically, from that.

Prior to the interview, Suzanne had created an understanding for why she became ill and her insight made sense within the context of her life. The lack of hard science in her explanation reflected the lack of answers she received from the medical community. Her mother did support Suzanne’s theory, however, and would say Suzanne’s ex-husband “made her sick! Look at what he did!” Suzanne is the only participant who held a specific life stressor as the preconceived attribution for her medical condition.

The last participant who offered a preconceived attribution for what caused her illness was Helen. She suggested that “life” brought on her medical issue. I questioned her about why she thought she had needed her bi-lateral knee replacement surgery and her explanation was that she was overweight, diabetic, had suffered from Lyme disease and had needed a pacemaker. She said that “each thing added to the level just before” she was admitted to the hospital. When asked about her physicians’ explanations she said that they reiterated her thoughts. However, when asked about her family, she answered that no one *blamed* her for getting sick. “There’s no blame anywhere,” she said, “It just was a…snowball effect of life.” Prior to the interview she seemed to have considered a notion of blame, in other words, the idea that for some reason she deserved the illness. However, by repeating that her illness was just a part of life, she inferred that she no longer considered this to be a possible part of the cause. Helen is the only participant who held “life” as the preconceived attribution for her medical condition.

Attributions in development. Of the 16 participants, four in the Garden Group and two in the Hospital Room Group were still in the process of developing attributions for their medical conditions when I met them. The interview itself offered an environment which fostered the ability to make considerations about what they thought had caused their illness or injury—questioning previous ideas or attempting to fill in missing information. One way this was evidenced was when, early in the interviews, participants provided one answer regarding the cause of their medical condition, but later on shared another possible cause. It was also evidenced when a participant stated no attribution for illness or injury.

Excerpts from interviews. At first, when questioned about why he thought he had become paralyzed from the neck down, Richard, who was a self-described “medical nightmare,” repeated the one-word answer he was given by his doctor: genetics. Moreover, he repeated this answer when he was asked about his family’s view. Richard supported this genetic attribution by explaining that all thirteen children on his father’s side of the family had not lived past the age of 61, further saying that his “odds weren’t too good.” Reflecting on the history of his family, it was no surprise to him that at his age, which was 59, he had to cope with illness. Even with this ostensibly clear understanding however, at another point during the interview, Richard said that stress had caused his illness. He asserted that he should have removed stressors from his life earlier than he did, by retiring and moving to a smaller home, saying that, “I don’t honestly think I’d be as sick as I’ve been if I hadn’t waited so long in life [to make these changes]...” It was during the interview process that this second theory of attribution emerged.

Betty, who had a history of cardiac disease and who had most recently been dealing with a recurring bacterial infection in a prosthetic knee, also created a second attribution for her illness during the course of the interview. First she told me that her doctors had suggested to her that she modify her behaviors in order to “have a healthier lifestyle”. She agreed that her lifestyle had “probably” caused her ailments, adding that she loved to eat and drink and had previously been “overweight by 30 pounds.” She also said that she “was too busy doing too many things.” Later in the interview, however, she seemed to be certain that her cardiac disease, the first of her major illnesses, had been caused by the stress of her job as a legal secretary. She clarified:

> I had to stop working, but that was a blessing ‘cause that was gonna kill me, the job was gonna kill me. And I’m sure if I had some other kind of job, I may not have gotten ill at all. But when you work at a stress job, where you’re not in charge and you’re not in charge of your day, your life…kind of gets out of hand a lot and…it’s just on a faster level than you can run. And the fax machines and the Federal Express, the overnight mail and [this fast paced situation] did not make things better because you couldn’t keep up.

Again, it appeared that this participant had entered the interview with one notion of causation of illness, which was supported by her physicians. However, the interview prompted her to consider a second possibility.

Maria shifted theories of blame during the course of her interview, when she discussed the event that caused a tibial plateau fracture in her knee. Both she and her doctors agreed that a fall on concrete had caused the break, but she was in the process of figuring out *why* the event itself happened. Maria, who had a history of multiple sclerosis, told me that she had broken her knee after a man bumped into her on the street. She said that her balance was “a factor all the time”—that she was not very stable. She went on to say, “so as much as…I blame I fell because this man walked into me…I blame myself a little too because I should have been more aware of my surroundings.”

Later in the interview, however, Maria reconsidered her thoughts:

> Well because, well, like I said, I mentioned earlier I have…M.S., a history of M.S., and my walking has always been a factor and my balance is off, my gait,

> you know, I'm not steady all the time. However, I was, you know, I was walking slow and I was paying attention to my surroundings—I saw this gentleman walking off the construction site and he was walking rather fast and he wasn't really looking. It looked like I was gonna walk into him, so I stopped, but then he walked right into me—he wasn't looking and he was walking, and I mean he was walking pretty hard—he made me fall down and break my, you know, break my knee…that's what did it.

During the course of the interview Maria re-evaluated the blame that she had attributed to her own actions. She *had* been paying attention to her surroundings. She *had* been cognizant of her decreased balance and had even changed her actions in an attempt to prevent the accident. Visualizing the situation again, she realized that she indeed was not to blame.

Another woman, Brenda, also considered the attribution of blame or guilt during the course of her interview. This patient had broken her hip when she fell during a physical therapy session and although her doctors had found no reason (such as congenital weakness or a pre-existing disease) other than the fall to have caused the break—and she agreed with her physicians—it was apparent that Brenda was trying to find a more personal reason as to why this happened to her. During the interview, when she was asked why her family thought she had become injured, Brenda expressed that she was actually relieved that she had not received anyone's explanation. She said, "no one's offered any opinion, thank God. No one's trying to make me feel guilty." She continued, "[Maybe it was] something I did in my past life, I suppose, but I don't know." Brenda transitioned from only considering the fall as the cause of injury, to looking further into why this specific event happened to her. Although she had not yet determined a concrete answer, the interview appeared to influence her attempt to figure it out.

During her interview, Karen struggled with formulating an explanation for why she developed vertigo. She clearly wrestled with her physicians' explanation:

> Well, I had a brain tumor and [the physicians] basically said that with the viral infection, it's harder on people who had brain injury. So, usually, I would have recovered quicker. But I didn't, I don't know, they said it was a virus, which I didn't have a cold, I didn't have, I was fine – you know…Friday night I went to a show, went to dinner Saturday…my normal thing, and then Saturday night…I felt the dizziness and I lied down for a little while. The next thing I woke up an hour later and the whole room was spinning.

The physicians' attribution of a virus causing Karen's vertigo did not make sense to her. Her understanding of a virus was that it manifested as a "cold" and because she had not had any cold-like symptoms, it did not seem reasonable that a virus was the cause of her medical condition. Although Karen had not yet shaped a personal attribution, the interview made her skepticism apparent and allowed her to voice her reconsideration of the attribution. This continued questioning was made further apparent when Karen said that her family had lectured her because they thought she needed to slow down her life. She added that, "they think I'm fast, that I need more sleep…I need to eat more healthier foods."

Lastly, there was one participant, Rick, who said that he had no personal beliefs as to why he became ill. He had been hospitalized after losing control of his legs. The doctors had found a spinal lesion and had eliminated multiple sclerosis and cancer as possible causes, but details of diagnosis remained undetermined. When asked about why he thought he developed the spinal lesion, his answer reflected his frustration with the unknown—following a long pause he said that he had “no idea.” He disclosed, however, that some of his family members have said that “it’s because I drive myself too much. I’m always on the go.” The long pause he took before answering the personal question and the recollection of the view his family holds, signify an attempt to find causation, without yet discovering a firm answer.

Meaning of Illness or Injury

The following results reflect participants’ personal meanings for becoming ill or injured and how participants’ envisioned their future. Data were gathered from the direct questions participants were asked regarding if they had searched for meaning in their illness or injury, what the meaning is, and how they came to understand the meaning, in addition to questions regarding life changes and future expectations. Data were also gathered from other portions of the interviews where participants discussed the meaning of their illness or injury, how their lives had changed since becoming ill or injured, and what they expected in the future.

This section is divided into three subsections: the first presents the results from participants whose personal meaning for illness or injury fits with the posttraumatic growth model; the second presents the results from participants whose personal meaning for illness or injury were related to their age or their belief in genetic predisposition for their medical condition; and the third presents results from participants who said that they did not find any personal meaning for their illness or injury.

During the interviews, five participants in the Garden Group and five participants in the Hospital Room Group disclosed a personal meaning for their medical conditions. The meanings that participants had fell into one of two categories. Some participants shared that they had become ill or injured for a particular reason, that their medical situation had taught them something or had made them more aware of something. When first reviewing the interviews, this type of meaning was labeled "lesson-learned," but through further analysis, it became apparent that the lessons that participants were learning from their illnesses or injuries clearly corresponded with the posttraumatic growth model developed by Tedeschi and Calhoun (1996, 2004, 2006). This type of meaning then became labeled "posttraumatic growth" with five subthemes reflecting the five areas of posttraumatic growth: appreciation of life, relating to others, personal strength, new possibilities, and spiritual change. The other type of meaning derived by participants was that their medical condition meant that they were getting old, or that because of their genetics, they were destined to become ill. This type of meaning was labeled as age/heredity. Some participants voiced more than one personal meaning for their medical condition—all meanings that participants shared are included. Table 11 displays the types of meanings disclosed by all participants. There were no group differences (regardless of location) found in the length of the meaning-making interviews between those who disclosed meaning (M=790.80 SD=291.65) and those who did not find meaning (M=686.00 SD=234.19) (*t*(14)=-.75, *p*=.47, *d*=.39).

The meanings that participants disclosed in regard to their illnesses and injuries are described below and are further contextualized with the information that participants shared in respect to how they envisioned their future.

Posttraumatic Growth Model

The areas of growth as defined by the posttraumatic growth model were used as guides during the analysis of the meaning-making interviews. Excerpts from interviews are organized below according to the growth theme under which they belong. Five participants in the Garden Group and four participants in the Hospital Room Group experienced posttraumatic growth. There were no differences in the posttraumatic growth themes between the garden and hospital room locations, nor in the number of themes coded. There was also no relationship between the number of domains expressed by participants and the location of the meaning-making interview ($t(14)=.49$, $p=.63$, $d=-0.25$). Group differences in types of meaning made are presented in Table 12. Total number of posttraumatic growth themes disclosed by participants was positively correlated with length of the meaning-making interview ($r=.47$, $p=.07$).

Appreciation of life. Participants who experienced posttraumatic growth often disclosed that the personal meaning of their medical condition focused on a new appreciation of life. Three participants in the Garden Group and three participants in the Hospital Room Group experienced this positive change. For example, they now appreciated simple things that they had previously taken for granted. Some also reanalyzed their lives and reprioritized what they thought was important and what they planned to focus on after recovery.

Excerpts from interviews. Bob learned to appreciate the smallest things in life after enduring severe arthritis pain in his hip. Five years post-diagnosis—and before his hospitalization—he would come home from work and immediately go to his bed, finding that even lying down did not relieve his pain. In a great effort to move as little as possible, Bob restricted his drinking so that he would not have the urge to use the bathroom, which was just a short walk of twenty feet away. He said that he had previously taken "all the little things—bending down to pick something off the floor or tying [his] shoes" for granted. With his "renewed health" he asserted to no longer do this. He said, "I plan to take care of myself better…maybe exercise a little more than I have been in the last couple of years and…maybe just try to enjoy myself a little more and appreciate, you know, my new health." Bob's doctor told him that he would need to have his other hip replaced, and Bob intended to do this before finding himself in the same highly dependent situation he was in previously. The dramatic change from pre- to post-surgery made Bob hopeful for the future and aware that he had the ability to control his health in a more substantial way.

Diane, the woman who had been quite incapacitated by the pain she endured after her hip replacement surgery, described herself as a "beetle lying on its back" when she explained how helpless and dependent she was post-surgery. She had expected her hip replacement to feel like a broken bone and that after a few days of "hobbling around" she would be fully recovered. She said that people had told her stories, saying, "Oh, my uncle had a double hip replacement and before that he couldn't even walk and now he's out playing doubles tennis!" This upward comparison to a hypothetical person, one who had a fast and successful recovery, made the experience of being risen from her bed with a Hoyer lift an intense scare. Although prior to surgery she had been in a lot of pain, it was at the beginning of her recovery where she really lost her sense of independence. With the unexpected situation immediately post-surgery, Diane realized how much she appreciated "doing the smallest things." She added, "To just dress yourself or walk down the stairs is a major achievement." Diane felt more unsure about her future than Bob, which reflected the uncertainty she was feeling during her recovery—her slow and painful rehabilitation made her concerned about how she was going to care for herself at home. She did, however, plan to take better care of herself in the future and looked forward to being able to "do more stuff."

Another participant who also spoke about her experiences immediately post-surgery was Rachel. Shortly after having her hip replaced, Rachel dealt with severe constipation. It was through her story of dealing with this, and finally getting relief, that she told me of the importance of appreciating how one's body functions. She said:

> Even on a daily basis we try to be appreciative of our body function, but when you have a crisis and all the more you realize it. I was really crying of relief [when the constipation was resolved]…most people really take that for granted—that your body works. And even when you say the [Jewish] blessing [thanking God for the proper functioning of your body] you can on a certain level take it for granted, but when it doesn't work…there's sort of intellectual awareness that God has given us a system that's so amazing.

With the newly gained intellectual awareness of the wonders of her body, Rachel planned to no longer take it's functioning for granted. This new appreciation in conjunction with comparing herself to her mother who "was in many ways maybe more active" after she had undergone the same surgery, and reflecting that she was generally healthy and still young, made her feel "hopeful and positive" when she considered her future.

Karen, the patient who was recovering from vertigo, had been contemplating personal meaning since her survival from brain cancer. She said that this previous experience had taught her many things including the importance of looking "at life in a different way—to appreciate life, to do things." Karen also articulated that she wanted to change her daily priorities—another way to express an appreciation for life. She said that she now wanted to "focus more on [herself] than on others and on [her] job." She wanted to travel more, and in particular she wanted to spend more time skiing out west, gardening, and going to museums.

In addition to learning from her illness, Karen had been influenced by self-help books and an autobiography, in which a woman wrote about the changes she had made in her life following a divorce. Karen told me of a time when she was speaking with some healthcare workers in the acute-care hospital where she had been prior to Rusk. She was asked what her goal in the hospital was. She originally answered that her goal was to "feel better and to go back to work." However, after contemplating this statement she revisited her answer and said, "No. My goal is to feel better so I can go on vacation!" She had positive expectations for her future and looked forward to enjoying life. Like Bob who had felt like a prisoner in his own bed, Karen planned to take better care of herself by eating healthier and exercising more.

Maria, the woman with the broken knee, had been hospitalized right before she was to start summer graduate school classes. She considered aloud the meaning of the broken joint, its resultant need for immobility, and the abrupt halt it caused in her life plan:

> I tend to think maybe it happened because…I was on such a fast track with my life. I was doing so much and I wasn't resting. I wasn't putting things, you know, I wasn't prioritizing things and everyone always says I'm burning the

> candle at both ends and it’s almost like this happened to teach me a lesson…force me to slow down…

At 24 years old, Maria was the youngest participant in this study. Her age seemed to prompt her to consider her future and necessitate the need to reanalyze her life and what she was doing. She understood that she needed to “step back from everything,” and although she expected her life to return to normal, to eventually get back to “square-one,” she did understand that she needed to “slow down a little bit”—that she was “no super woman.”

Lastly, Richard, who was in the hospital for paralysis, said that being ill made him realize how important it was to see his grandchildren grow up. He shared that he had a brand new grandson that meant the world to him and that this was making him “stronger.” Spending time with his grandchildren had become a new priority for Richard.

Relating to others. Just as frequently as they disclosed an appreciation for life, participants disclosed learning new things regarding their relationships with others. Again, three participants in the Garden Group and three participants in the Hospital Room Group underwent this type of growth. Participants spoke with empathy about other people, both in and outside of the hospital, and considered their own situations in relation to these others. They also voiced how appreciative they were of the people who were caring for them.

Excerpts from interviews. When telling the story of her broken hip, Brenda said that her injury had taught her to be more understanding of elderly people’s irritability. She explained:

> If you had to deal with getting in and out of the tub with these bizarre appliances or being confined to a wheelchair, or walker, or crutches, that really consume a huge amount of energy to use, you can understand why people are not necessarily of the cheeriest outlook.

She continued by saying that her injury made her “more aware of obstacles that other people endure that [she] might either take for granted or just not even appreciate.” When Brenda compared herself to other patients she had seen in therapy, she felt very lucky that her injury was only temporary and that she would not have to deal with the obstacles on a long-term basis. She was “hoping for the best” in recovery and would only consider a change in future expectations if she did not heal as expected.

Karen, who also drew comparisons between herself and others, was informed by both her previous cancer experience and her current medical issue. The experience of recovering from the cancer made her more aware of and sensitive to the struggles she saw other patients dealing with:

> I look at the rehab and I see people with one leg, one arm, their neck all broken, their body all broken, and I see the pain in their faces. Although I have pain, I feel for them more and sometimes I feel that the therapists should be working more with them— sometimes I have two therapists working with me and I’m saying, “I only need one, maybe you should go with the other person, who has only one, two, maybe that person needs three or four.” I feel their pain. I see in their face, I see in their arms, trying to get up, where for me to get up, it’s much quicker and just easier.

Diane, who had felt like “a beetle on its back” immediately following her hip replacement surgery, also reflected on the other patients she saw during her rehabilitation. She shared that in the hospital she saw “all those people in therapy…how brave they are…how much worse off they are.” More specifically, she compared her medical problems to patients who were recovering from strokes and realized how lucky she was. She had just begun to see her progress and realized that even though her surgery was incredibly painful, there were others in the hospital suffering from more threatening situations. Additionally, even though she was feeling inpatient with the pain and longer-than-anticipated recovery time, Diane spoke of how she appreciated that the therapists “remain so patient during such a slow process.” This gratitude toward the hospital staff—their patience and care—was another repeated theme throughout the interviews and another way that changes in the understanding of personal relations were experienced by some participants.

Karen shared her thankfulness for the staff and specifically their ability to make patients comfortable in times of potential embarrassment. For example, she said that if as a patient you have “an accident…it’s like they don’t embarrass you, they’ll just help you, change you…they don’t make you feel bad.” She added how helpful it was that every day nurses and aides introduced themselves, alleviating the pressure to remember names. Furthermore, at the end of the day, employees always said “good night.” Karen further appreciated that the hospital staff spoke to her like a “human being”—that they did “not talk down” to her.

This regular, considerate and humane behavior was particularly valued by patients, and seemed to come as a pleasant surprise to them. Like Karen, Rick, who had undergone surgery to determine the cause of his spinal lesion, said:

> Everyone in this hospital always seems to have a “Hello, how are you?” and “Thank you” and a “good-bye” for you…I have unfortunately been…exposed to some other…hospitals in other areas…that’s why NYU is for me a number one priority choice…Doctors are excellent, everyone is courteous…they help you cope with illness.

Betty also spoke about her care at Rusk in contrast to what she had experienced in other institutions. She was in the hospital recovering from a bacterial infection in her prosthetic knee. Betty told me that she would rather be in treatment *nowhere else* because Rusk has “competent staff who know what they’re doing and who actually care and wanna see the progress day-to-day, even small, little steps.”

Richard was another participant who voiced his appreciation for the respect that he received from the hospital employees during a time of great dependence. He said that Rusk was “one of the best caring places” he had ever been in and further elaborated:

> From the push boy that pushes you in the cart to the top doctors. I’ve never seen a person that would never, ever help you. They’re there when you need them and they’re there for a purpose…Sometimes as a man you get embarrassed about things and you have to call a nurse for certain things you don’t want to…but they make you comfortable and that is very hard to do…the service in the hospital is phenomenal…I wish I could tell you the names…every one of the workers has

> been super…the respect of nurses, orderlies, nurses' aides [are] never, ever rude…impolite. They have been top-notch.

Furthermore, the most exemplary illustration of the positive affect that caring staff had on a patient's experience in the hospital also came from Richard. Prior to his time at Rusk, Richard thought that he would be spending the rest of his life in a nursing home. He attributed his changed outlook, or in his terms, his "great awakening," to his physical therapist:

> She's really put my mind in order…to tell you the truth, I got a better outlook on a lot of things and I feel very positive with myself…and things are getting better. My health is getting better. Everything looks on a positive mode and my positive thought is to get better and I'm gonna get better…I opened up and she opened up to me and told me a lot of things. I mean she's…absolutely wonderful. And she's got me thinking the right way. And she proved the type of person I am, all the qualities that I did in life.

This therapist enabled her patient to believe in himself and gave him the ability to see a positive outcome from a painful experience.

Personal strength. Finding new personal strength was also often disclosed by participants. Through their illness experiences, two participants in the Garden Group and three participants in the Hospital Room Group realized that they were strong individuals. They came to terms with their own fragility and recognized the enormity of what they had survived.

Two of the women I spoke with realized their personal strength prior to their current admission to Rusk through experiences that they had with previous medical conditions. Karen, who had in the past recovered from brain cancer, knew that "so many people" with a similar diagnosis do not survive. She recognized her strength in her return to health and in her ability to "re-learn" everything. She explained:

> It was just amazing that I had to learn how to walk, I couldn't walk for so long, how to even dress myself, and how to even bathe myself. It was a total shock—I always thought people just do it.

Betty also realized her strength during a past near-death experience. She had survived a series of three heart attacks. The second heart attack, which was massive, "blew off [a] valve" and the doctors thought that she would not recover. Betty had lived longer than her physicians predicted she would and she said that she had also "surpassed what [she] reasonably expected." This earlier experience gave her "faith in the future and in [herself] and in [her] ability to heal."

Richard, the "medical nightmare," had a clear insight for all he had been through, and understood his strength through his perseverance. While at Rusk, he realized that he was strong and that he was progressing through what he had previously thought to be impossible:

> I got a lot of illnesses. I have heart disease, diabetes…I've got neuropathy of the feet, I have paralyzation of my whole lower extremity. I just had neck surgery. I had shoulder surgery, back surgery…But I'm getting through it and I'm gonna work this out…I'll be good. I'll be a much better person.

With the encouragement of his physical therapist, which was described above, Richard learned to believe in himself and in his ability to overcome his illnesses. He went on to explain that because of his heart disease, his physicians had been concerned about his most recent operations. He reflected:

> I made it through it, not only once, but I made it through twice. And you know something? If God wanted me, he would have taken me. I made it through two operations and coming out stronger after each one.

Rachel understood her medical experiences, namely the arthritis in her hip and the joint replacement she had recently undergone, as being tests from God. She explained, "in the Jewish tradition there's a sense that things come from God and the meaning of it is that when you have a test, something that's challenging, it's to bring out the best in you and an opportunity for growth." Rachel recognized the strength in her recovery and overcoming the challenges presented to her by God and appreciated the opportunity she had been given to become a stronger person.

Like Rachel, Bob contemplated all he had been through with the osteoarthritis pain in his hip. He believed that he had already endured the worst, previously feeling depressed as a "prisoner in his own bed," and he was determined never to go through a similar experience. He saw how well he was progressing after his surgery and, as stated earlier, he had already made the decision to undergo a hip replacement in his other leg before the deterioration reached the point where he would lose all ability to function again.

New possibilities. Three participants, one in the Garden Group and two in the Hospital Room Group, believed that new opportunities in their lives had come about due to their medical conditions. Having gone through surgery, and in the throes of recovery and rehabilitation, some patients articulated that their paths in life had changed, for the better.

Excerpts from interviews. Richard was not only looking forward to a more positive future since being hospitalized, but during the interview, he also positively reframed his past. When asked about the story of his illness, Richard began, “My health made me retire, which I didn’t really want to do. But it forced me to retire, sell my business…things I didn’t want to do, but did do.” However, when asked about how his life had changed since he became ill he said:

> Honestly? For the better…I changed a lot of things in my life…the stress of business, of running a business for 40 years…raising kids, putting them through college…all that stress is like all gone. And, since I got sick, I had to sell my home and I bought myself into a condo, which is absolutely suiting me to the “T.”

With his positive outlook and without being “crazy” in his head (as he described it), Richard was able to reappraise his past and became thankful for the good that had come from his situation.

Another participant, Betty, also had to retire from her job because of illness. She attributed her surviving three heart attacks to the fact that she was no longer working as a legal secretary—a change in life direction that was a blessing. She left the legal world and “decided to go into acting, which was something [she] always wanted to do, since [she] was younger.” She had “been able to get on stage and do Shakespeare” and had also done readings sitting down, which suited her well due to the issues she was currently having with her knee. Again, a forced change in retirement allowed Betty to pursue a new path, which she enjoyed even more than her previous career.

And, although she had not made any major change yet, Karen said that she was indeed contemplating leaving her career, which was in the stressful financial world. Interestingly, while she was in the hospital, Bear Stearns announced its collapse. Karen said that although she did like her present job, she was "also trying to think of a second career…" She continued to say that her job was "quite stressful" and "very demanding", so she was "thinking of doing more of a fun job." It was during her recuperation, when she was away from her office, that the idea of changing jobs became a potentiality.

Spiritual change. Only one participant (in the Hospital Room Group) considered that her religious faith had strengthened as a result of her medical condition. Rachel, the participant who had overcome the intense constipation post-hip replacement surgery, was an Orthodox Jew. Her understanding of illness and its meaning clearly stemmed from her religious faith. As explained earlier, she interpreted her medical condition as being a test from God.

It was also during her illness experience that Rachel understood the strength of the Jewish Community and its Bikur Cholim (visiting the sick) organization. Being cared for made her very proud of her community and her religion. She explained:

> The hospitalization experience has really…brought me in contact with an amazing number of people who—in the Jewish community—who do a tremendous amount of…loving kindness and go out of their way for the comfort and to encourage people who are sick and their families…And it's just an incredible outpouring of

> love and concern that makes me proud of our people and, and really the best feeling of being so cared for…that we do for one another is really quite amazing.

Although Rachel had a strong religious faith prior to her hip replacement surgery, her illness experience seemed to increase her religiosity and allowed her the opportunity to understand in a more personal way what she had always believed, namely the wonders of God making the human body and the strength of her religious community.

Age/Heredity

When asked for the meaning of illness or injury and the meaning of why they became ill or injured, one participant in the Garden Group and two participants in the Hospital Room Group stated that their condition meant that they were getting old, or it meant that they had a genetic predisposition for their condition. This frequency did not indicate a significant relationship between the location of the meaning-making interview and disclosing the age/heredity type of meaning (χ^2 (1,16)=.41, p=1.0, Φ=-.16).

Excerpts from interviews. Donald, who had osteoporosis, had planned to undergo bilateral hip replacement surgery, but after the first hip was replaced, his blood pressure dropped so dramatically that the surgeon had to cease continuing with the operation. He was brought to the intensive care unit and when he was stabilized he underwent an angioplasty and the implementation of a stent. To Donald, the meaning of illness was "the reality of time, the reality of heredity, the…reality of wear-and-tear." He went on to say, "It happens to everybody. Very few people get out without something." Although he was particularly concerned about his financial situation and the possibility of losing his job (due to the fact that he was going to be in recovery for 12 weeks), Donald said that he felt "very hopeful and grateful." He went on to explain that he felt "fortunate" because cardiac disease is a type of “silent killer.” Here his practical understanding of illness was coupled with the notion that he received a second chance at life. He did believe that illness “happens to everybody,” but he knew that not everyone is as lucky as he in the sense that he was now being treated for a previously hidden, life-threatening disease.

For Dolly, the woman who had been a majorette in her youth, illness meant that she had “a genetic predisposition to…joint weakness” and by repairing the joints (most recently, her hip) and ridding herself of the weakness, she anticipated a positive and more active future. Dolly compared herself to hypothetical others, and said that because osteoarthritis was “not a life threatening illness [and] there are plenty of other things that are far, far worse,” she expected her life to improve.

Lastly, Doug, the man with osteoarthritis who had been a contact sports player, said that the meaning of illness was “getting old, realizing you’re getting old.” Doug had just undergone a total knee replacement following two surgeries, which attempted to repair a meniscus tear. Due to the previous pain in his knee, he said that his quality of life changed because he had to slow down—he “stopped playing tennis [and] stopped doing a lot of walking.” The expectations he had for his future were tempered, possibly due to a combination of the two previously unsuccessful surgeries, the Parkinson’s disease he coped with in addition to his arthritis and his being 68 years old. He explained:

> Well, my expectation from my operation is that I’m gonna get back a certain quality of life, you know, like walking and going up and down steps without any pain. That’s the bottom line…I don’t expect to be running for busses and trains

> and high hurdles and things like that. I know, at my age my expectations are not that of a thirty-year-old.

Not Finding Meaning in the Illness Experience

Although many participants disclosed a personal meaning of illness or injury, three participants in the Garden Group and three participants in the Hospital Room Group disclosed that they had no meaning for their medical condition. This frequency did not indicate a significant relationship between the location of the meaning-making interview and disclosing no personal meaning for an illness or injury ($\chi^2(1,16)=.41$, $p=1.0$, $\Phi=.00$).

Excerpts from interviews. Belinda, who had just undergone her second knee replacement, did not have a personal meaning of illness because, she said, she did not consider herself ill—she considered herself "temporally disabled." When asked about the meaning for the deterioration in her knees, she said, "It's just a bump in the road." She continued later on to say, "I never gave it much thought…it just happened." When asked how her life had changed since her knee started to cause her pain, Belinda bluntly said, "It hasn't changed" even though earlier in the interview she said that her life *had* been affected because the problem with her knee had "limited [her] ability to do what [she] wanted to do—even simple household tasks." In a similar way, when asked if her expectations for her future had changed at all she said, "No, no, no." But again, at another point during the interview she said that she was aware of the "limitations" she would have with the knee replacement:

> I have to be careful with my sense of balance, which is pretty good, but as I was telling my physical therapist today, I will not go into the ocean anymore—much

> as I love going into the ocean—'cause I don't trust the wave action…I'll stick to swimming pools now.

The opposing comments that Belinda voiced in a single interview reflected the fact that she was in a hospital, but did not consider herself sick. Moreover, although the description of her symptoms pointed to her diagnosis being osteoarthritis, Belinda never mentioned that she had arthritis.

Some participants expressed aggravation when I asked them for the meaning of their illness experience. For example, the "pragmatic" Howard, who had just gone through a second surgery to repair a hip problem that had been caused by a fall years earlier, said:

> Uh, I don't dig into this deepness…these issues…I mean, either I'm going to recover physically and gain back a lot of what I lost or I'm not…Most of my life I've been a pragmatic person. You know, I don't like to delve on this deeper meaning of stuff. I think it's…an unproductive draining of your resources.

Unlike most of the other participants, Howard had nothing positive to say about his experience at Rusk. When describing his time in the hospital, he said, "it's pain" and that his daily experiences varied in "degree of torture." Howard had realized that he had not wanted live with the reduced quality of life he had prior to this most recent surgery. He had been in constant pain and could not take part in daily activities from commuting by subway or bus to "making social appointments." He explained that even "getting up from the toilet [had been] a major undertaking." Although he was now in the rehabilitation stage, he did not yet have better expectations for his future. In his continued no-nonsense style, he said, “my expectations hinge upon the results of the new surgery. Basically, it’s too soon to determine.”

Although during her interview Betty described that needing to retire from her job was a blessing, when explicitly asked about the meaning of her illness, she said that giving her illness a personal meaning would be to honor it—and she refused to do so. She explained:

> Well I consider [illness] an aberration and…I don’t wanna give my illness that much credence in my life…Illness is something that happens to people and it’s what people surmount and go around and when you have a good medical staff and good people and friends…I wouldn’t give…I wouldn’t bow down to the illness and give it that much credit.

Some participants did not share meaning because they just considered their medical situations to be an expected part of life. For example, Suzanne, who had the undiagnosed autoimmune disease and who had just received a hip replacement, simply thought that “everyone has things come their way” and her illness was what came her way. She also said that she did not think she was “that bad” and she did not think she “deserved it.” When Suzanne was asked about her future, she actually spoke about her *past* and said that wished she had “done a lot of things that [she] wanted to do earlier.” She spoke specifically about how her plan for retirement had been to travel, but that since she became ill, everything went “out the window.” In an attempt to be positive, however, Suzanne did say that she would still take a wheelchair on a plane and ask for the necessary help—“I’m not just gonna sit home—I’m gonna get out there and do things.”

When asked about the meaning of the illness that led to her recent bilateral knee replacement, Helen, who spoke of the "snowball effect" of her multiple illnesses, said that her medical condition was "just part of life." When she was asked if she had *searched* for meaning in her illness experience, she responded with a quick "no" followed by, "whoever cursed me, I don't know them." Even though she said this in a joking manner, it was a hint that she possibly thought she became ill for some reason, or as punishment for something she had done. Even with her "snowball" of illnesses and the understanding of her physical limitations mainly due to pain, Helen said that her expectations for her future had not changed. "I'm hoping that I will be able to walk, to drive my car, to see my grandchildren's Bar Mitzvahs, and that sort of thing…be able to do and just be me."

Lastly, when asked if he could share the meaning of his spinal lesion, Rick offered the curt answer of "no." However, it was clear that he *was* in the process of *searching* for this meaning:

> Like everybody else, I always say, "God, is this…did I do something? Is there something that, you know, I should have done differently…you don't like?" I mean, I've got, I've raised six children, all educated, all…doing what they wanna do. They all show up at the hospital to visit. They don't have any complaints. I got an ex-wife that comes to visit. I have a significant other that's been…many years now we've been together…who has become friendly with my ex-wife. And my ex-wife—who has been remarried by the way. And…far as family functions are concerned…it's always one family. We don't have a distinct situation. What did I do? What did I do?

Again, Rick exhibited a search for meaning that seemed to stem from the belief that illness was brought about as some kind of punishment, or was something that he deserved. Although Rick was concerned about being sick at the age of 71 and not knowing what he was going to be faced with, he said that there were no changes in how he envisioned his future and added, "I'm going to always go forward and see if I can't accomplish…the things I wanna do."

Follow-up

The third set of results was derived from the follow-up interviews, conducted one day after the longer interviews. This section is divided into three subsections: in the first, I present results from participants who experienced a change in how they thought about their illness or injury during the time of their participation; in the second, I present results from participants who discussed disclosure; in the third, I present results from participants who discussed the impact of the interview location on their experience in this study. There were no significant relationships between these themes and the location of either the initial interviews or the follow-up interviews (Tables 13 & 14).

Change in thoughts about illness or injury. Three participants, all in the Hospital Room Group, experienced a change in how they thought about their medical conditions from the time of their initial interview to the follow-up meeting. Two of these participants experienced positive changes and one participant experienced a negative change. These changes also reflect meaning-making processes and steps toward adaptation.

One participant who experienced a positive change during her study participation was Diane. When I first met her she had been devastated by the pain she felt immediately after her hip replacement and was surprised that she had not healed from surgery as quickly as the hypothetical “uncle” on the tennis courts. After a day had passed, however, Diane said, “I feel more positive and more…encouraged that things will get better. I have a lot of hope that I will improve and be able to do everything at home.”

During the time of her first interview, Helen, the woman who had bilateral knee replacements, was also concerned about the rate at which she was healing.   At follow-up, however, she was feeling more optimistic. Helen attributed her changed outlook to the improvement she saw in herself during her physical therapy session. She went on to explain that it was not just others telling her that she was doing well, but she was now personally aware of her own progression. Over the length of the day, Helen became “more encouraged that [she was] going to be better.”

In addition to seeing her own progression, Helen’s roommate, the “rockette” as Helen nicknamed her, had been discharged at the time of follow-up. This woman had undergone the same surgery as Helen, but recovered at a much faster rate than she. Thus, not only on this second day did Helen have the room to herself, she also no longer had her roommate as a point of comparison:

> Well, I saw my partner who was in this room progressing at a much more rapid pace than I do and as some of the psychologists explained to me, you really don’t know somebody else’s background or their…physical being, so that you can’t compare one person with another.

Unlike the previous two participants, Betty, the woman who was being treated for a bacterial infection in her knee, had a less positive outlook at our second meeting.   This was due to complications in her care that she expected would impede her plans to return home. Instead of returning home in the near future, she anticipated having to be transferred to a nursing facility. This worried her because not only was she running out of her Medicare coverage, but her delay in returning home would in turn delay when she could get another impending surgery on her knee.

Disclosure. When asked about their experiences during the previous day's interview, five participants, three in the Garden Group and two in the Hospital Room Group spoke positively about being given the chance to disclose.

Maria, the young woman with Multiple Sclerosis who had broken her knee said, "it feels good to be able to talk about it with people as opposed to keeping everything inside…you just start to realize exactly how much you've been through when you start…expressing it and saying it out loud and you hear yourself say it." Likewise, Rachel said that the interview enabled her to "reflect and concretize" her feelings about her experience going through hip replacement surgery.

Bob, who had been a "prisoner" in own bed, also felt that he benefited from being able to talk:

> It was a nice experience…it brought up things that I don't always think about…a couple of emotions I guess that lay hidden until you actually start to talk about them…it was nice to talk about them…I always hear that…talking is a good healer, you know, and I think that's true.

Helen, who had undergone bilateral knee replacements said, "I was happy to express my feelings and…have somebody take into account all the things that I was going through." Lastly, when asked about the previous conversation, Belinda, who refused to say she was ill said, “It was very pleasant talking to you…I didn’t think anybody would be that interested [in my story]…I’m honored, I’m honored.”

Environment of interview location. Three participants, two in the Garden Group and one in the Hospital Room Group, spontaneously spoke about the effect of the location where the meaning-making interview took place. For example, when questioned about his experience, Rick, who had been interviewed in the Glass Garden, said, “the surroundings were beautiful.” He went on to say that the garden was “very calming.”

Brenda, who had broken her hip during a physical therapy session, and who took part in the interview in the Glass Garden said:

> The conversation was helpful…having it in a situation…where the territory was neutral and had sort of a tranquil feeling was very helpful. It…made you concentrate on the subject better than if you had a lot of outside influences…it helped you realize that you actually were putting some insight into…actually putting some, um, input into the situation in trying to make an improvement. And, um, try to see what kind of feelings could actually evolve from being a patient and from experiencing something that was out of the ordinary.

She added that being in the glass garden made her feel more relaxed and less threatened.

In an expression that was opposite from this woman, Betty, who was interviewed in her room, said that she had felt particularly frustrated during the administration of the Perceived Restorativeness Scale because “the focus of it was how I felt about my room.” She continued:

> …I felt that having the room as the focus was not where I would have put the focus. I would have put the focus somewhere in the program of rehabilitation,

> where you find solace, where you find comfort, where you find escape, within, and I would have said plant therapy or even jewelry therapy, that was not…dealing with illness, but was dealing with the rest of you.

Betty, who had actually been randomized to go down to the garden, had been on I.V. antibiotics when we were schedule to meet, so we had to conduct the entire interview in her room. I reminded her of this and then asked her how she would have felt if she had answered the PRS questions in relation to the gardens. She replied, “that would have been totally different….I wish you would have said, ‘pretend you are in the garden you just came from,’ cause…I would have been able to…just transpose myself to where I had been.”

CHAPTER FIVE

Discussion

During the past three decades, there has been a growing movement focused on researching and developing methods to increase the healing and humanizing potential of hospital settings. Organizations such as Planetree, The Center for Health Design, and Urban Zen, have all been created to support different areas of patient-centered care, including nutrition, access to patient information, building design and complimentary therapies (e.g., yoga and aromatherapy). Within this movement is also a group focused on how to enhance the healing properties of the hospital environment with the inclusion of natural spaces. Several post-occupancy evaluations have been conducted in such spaces, though more in-depth research is required to understand the impact nature can have on patients who are in the hospital (Marcus & Barnes, 1995, 1999; Tyson, 1998**)**

The goal of this dissertation was to contribute to this research by investigating the possibility that a restorative environment located within a hospital setting could enhance adjustment to illness and injury. Specifically, I designed an experimental study to determine if interviews conducted within gardens (a more restorative environment), as opposed to hospital rooms, would lead to greater meaning-making, and less pain and anxiety. The experimental findings did not confirm my original hypotheses, in that patients' perceptions of the restorativeness of the hospital rooms compared with the gardens only differed in one domain, fascination. Propensity for meaning-making was not related to the location where the interview took place; nor did patients exhibit less pain and anxiety as a result of spending time in the natural environment. At the same time, the interviews provided rich evidence that patients made meaning of their illness and injuries in many ways. Specifically, participants engaged in an attributional search. Some participants had “found” the answers as to why they became ill or injured prior to the interview, and the interview served as an opportunity to voice these answers. Others utilized the interview as an opportunity to question attribution—that is, through the interview, they continued their search or even commenced the process of finding an attribution for why they became ill or injured. More importantly, many patients who found meaning in their illness experiences disclosed meaning that was indicative of posttraumatic growth.

Posttraumatic growth was not hypothesized to be an outcome or coping mechanism in the study design. Instead it emerged through the qualitative data. The length of time that participants spoke during the meaning-making interview was positively correlated with the number of posttraumatic growth domains that were disclosed. Longer narratives provided more information to content-code, increasing the likelihood that multiple domains would emerge.

The majority of the research on posttraumatic growth considers it as an outcome, and often uses a structured self-report inventory to measure growth (Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004). The results of my study, however, are in line with other research that has investigated the concept of meaning-making through open-ended questioning. In a longitudinal study of men who survived a heart attack, Affleck, Tennen, Croog, and Levine (1987) investigated the affects of benefit-finding on future cardiac incidences. In the exploration of benefit-finding, they asked their participants, “Despite all the problems and worries which your illness has involved, do you see any possible benefits, gains or advantages in this experience? If so, what are they?” They discovered that the men experienced positive changes in “values, priorities, and personal relationships.” This study’s findings exposed that the participants expressed changes in the subcategories of posttraumatic growth without the researchers initiating this type of response.

Through written narratives, Petrie, Buick, Weinman, and Booth (1999) also investigated benefit-finding, or “positive effects” of illness in myocardial infarction and breast cancer patient populations. They asked, “What positive effects do you feel may have occurred in your life due to your heart attack/cancer?” Analysis of the writings revealed seven themes: healthy lifestyle change; improved close relationships; greater appreciation of life and health; a change in personal priorities; greater knowledge of health; feeling fortunate to be given a second chance; and improved empathy towards others. These themes arose organically from participant responses and are similar to my own findings.

Lastly, although she was not conducting an examination specific to benefit-finding, in her work with stroke patients and their caregivers, Thompson (1991) asked her participants in an open-ended format: “Have you found any meaning in your experience with a stroke?” Like the participants in the studies described above, if they disclosed that they found meaning in the experience, both patient-answers and caregiver-answers fit into the categories of posttraumatic growth. The categories derived from the responses of these participants were: appreciate life more; learned to slow down; appreciate patient (caregiver) more; appreciate family and friends; grown personally; become more compassionate; and closer to God. Again, posttraumatic growth was evident.

In the discussion that follows, I relate my findings to previous literature and theoretical views. I also provide possible explanations for my results. I then describe the limitations of this study, and conclude with a discussion of promising directions for future research.

Meaning-Making and its Relation to Cognitive Appraisal Theory

Park and Folkman's (1997) notions of assimilation and accommodation are useful when analyzing the adaptive character of the meanings that were disclosed by participants. Park and Folkman posit that in an attempt to cope with illness and injury patients will either reappraise their medical condition, interpreting it as nonthreatening and therefore *assimilate* it into their lives, or patients will adapt their more global beliefs about life to *accommodate* their medical conditions. They further state that the tendency for patients to assimilate their medical condition into their pre-existing understanding of life will be more frequent, because in this way, global beliefs are not disrupted and fundamental assumptions about life are not challenged.

Making meaning from an adverse situation allows one to reappraise it as less threatening, and may also promote positive feelings in relation to the experience. Affleck and Tennen (1996) call this benefit-finding—"finding the good in bad events—which can restore comforting views of ourselves, other people, and the world. These adaptations can even nourish the conviction that we are in some ways better off than we were before" (p. 900). In the field of health psychology there is a growing effort to understand clearly the positive aspects of traumatic events including diagnosis of illnesses such as rheumatoid arthritis, cancer, HIV/AIDS, cardiac disease, and spinal cord injuries (see reviews by Linley & Joseph (2004) and Helgeson, Reynolds & Tomich (2006)). A vocabulary has been developed to represent this particular type of positive outcome, including, but not limited to *posttraumatic growth*, *stress-related growth*, *adversarial growth*, and *benefit-finding* (Affleck & Tennen, 1996; Park, Cohen, & Murch, 1996; Linley & Joseph, 2004; Tedeschi & Calhoun, 2004, 2006). Moreover, several quantitative scales have developed to measure these outcomes, for example, the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996); the Stress-Related Growth Scale (SRGS; Park, Cohen, & Murch, 1996); and the Perceived Benefits Scale (PBS; McMillan & Fisher, 1998).

Analogous to the “shattering” impact of traumatic events as described by Janoff-Bulman (1992), Tedeschi and Calhoun (2004) describe psychological trauma as a seismic event—a mental earthquake that shakes the belief system of the victim of the event. In an effort to “rebuild” their life after a trauma (such as illness or injury), survivors aim to incorporate the trauma into their life story. This idea can be likened to Park and Folkman’s notion of *assimilation*. Tedeschi and Calhoun recognize five domains in which trauma survivors regularly report changes, including their: 1) appreciation for life 2) relationships, 3) personal strength, 4) recognition of new possibilities in life, and 5) spiritual growth. When these changes are perceived as being positive, they allow for the assimilation of events into the lives of the survivors, and qualify as posttraumatic growth.

A greater appreciation for life often manifests as a feeling that even the smallest details of a day are meaningful: the ability to tie one’s own shoe, flowers blooming, not being in pain. Diane, for example, expressed her appreciation for being able to dress herself. *Meaningful relationships* are recognized when trauma survivors become aware of the people they can depend on for support. At Rusk, this category of posttraumatic growth was often related to patients' appreciation for the care they received from the staff—Karen and Rick, for example, both shared how pleased they were with the humane and caring treatment they received while they were there. The perception of *personal strength*, particularly with patients at Rusk, can arise after surviving a near-death experience, or living through great pain. Richard, who thought he would need to move into a nursing home, recognized his strength during his time at Rusk—his successful rehabilitation meant that he could return home. Traumas can also influence survivors to consider *new possibilities* for their lives, either by introducing them to something new or by convincing them of the importance of doing something more personal, helpful, or meaningful. Betty realized the new possibilities in her life when her illnesses forced her into retirement. She thought of this experience positively because she was now able to spend her time acting—a pastime that she had wanted to focus on. Lastly, *spiritual growth* is evident in feeling a closer connection to or clearer understanding of religion or God. This was evident in Rachel, who felt not only that her arthritis was a test from God, but that her illness brought out the best of the Jewish community.

In contrast, patients whose medical situation gave them a sense that they were aging or genetically predisposed to their illness can be understood, when evaluated through the lens of Park and Folkman (1997), as *accommodating* their global beliefs about life in order to smoothly incorporate illness or injury into their lives. As Park and Folkman's theory predicts, fewer participants underwent accommodation than assimilation. This type of psychological adjustment occurred, for example, in Dolly, who was diagnosed with osteoarthritis at a young age. Dolly said that she had a genetic predisposition for the disease. Therefore, she accommodated her understanding of her health and the way her life was to go; with a predisposition for arthritis, it struck her as sensible that she would have developed joint deterioration, even at such a young age. In previous studies investigating individuals' understanding of personal risk for a number of medical conditions (i.e., diabetes, heart attacks) heredity was often cited as a "risk increasing factor" (Weinstein, 1984). Thus, it is not surprising, that participants in this study retrospectively understood heredity as increasing their risk for their medical conditions.

Rehabilitation as an Opportunity to Gain Mastery

In a further attempt to understand my findings, I reflected on the notion of rehabilitation and analyzed the discipline with the help of Taylor's (1983) Cognitive Adaptation Theory. Taylor contends that patients make cognitive adjustments in three domains in an effort to cope with illness: 1) they search for meaning in the illness experience; 2) they seek to gain mastery over the illness; and 3) they attempt to restore their self-esteem. It is the second domain—gaining mastery over one's medical condition—upon which I will elaborate in this section.

Mastery, as defined by Taylor, is the "feeling of control over the threatening event [illness or injury] so as to manage it or keep it from occurring again" (p.1163). In her study of breast cancer patients, she learned that the sense of control over illness was presented in many forms including the belief that one had personal control over the recurrence of illness, that one's illness would be successfully controlled with medical interventions, or that illness was controllable because whatever caused the cancer was no longer part of the patients' lives. Patients also enhanced their sense of control with psychological techniques (i.e., visualization, meditation), controlling lifestyle behaviors, and focusing control on particular aspects of their care. To understand the context of my participants, I considered their experience in the rehabilitation medical center as an opportunity for them to gain the necessary physical skills and psychological stability to master their medical conditions.

For many of my participants, being ill or injured meant being dependent on others. Bob spoke about needing to yell downstairs to his sister and her boyfriend in their home when he needed help doing even the simplest of tasks, such as tying his shoes. Suzanne spoke of being vulnerable when she was sick and losing her “sense of dignity,” needing help even going to the bathroom. Thus, for my participants, their time at Rusk focused in large part on reclaiming their independence. By learning to cope with the changes in their bodies and adjusting their physical behaviors, my participants were learning how to re-enter the activities of daily life. Maria explained this when she said that her positive experience at Rusk stemmed from her sense that the hospital therapists were preparing her to go home where she could be “safe and secure” in her own surroundings.

In addition to feeling physically vulnerable due to their dependence on others, my participants also felt psychologically strained. For example, Helen said that “emotionally [she was] normally a very independent person,” but that she lost this sense when she was in acute pain. Treatment at Rusk is designed to prepare patients for emotional reentry as well. Patients often mentioned their appreciation for the Psychology Department and its therapists. The exemplar was Richard who attributed his newly acquired optimism and outlook on life to the encouragement his therapist gave him. Other patients also spoke specifically about how they felt cared-for on a psychological level as well as a physical level. Diane said:

> You know, they're trying to help me get over every fear and every anxiety…in the beginning I was crying and they even met my emotional need by…letting me see [a psychologist] and, you know, [enabling me to] talk out how I was feeling.

With the guidance of her psychologist, Karen, who had hoped to be discharged earlier than was possible, was striving to be calmer and "not expect so much" of herself. She appreciated that her psychologist had suggested she "focus more on relaxing" and practicing her meditation. The progression that these respondents made toward mastery, in this case psychological mastery, positively impacted their experience at Rusk.

Participants' Sense of Coherence

As explained above, each participant fell somewhere along an attribution-finding spectrum. Some participants had "found" the answers as to why they became ill or injured prior to the interview, and the interview served as an opportunity to voice these answers. Others utilized the interview as an opportunity to question attribution—that is, through the interview, they continued their search or perhaps even commenced the process of finding attribution for why they became ill or injured. No matter how developed an attribution was, however, it was clear that the participants developed attributions for their medical conditions that enabled them to understand the illness experience within the context of their lives. Patients aimed to understand their situations in a way that made sense within their personal and family histories. This notion is a reflection of Antonovsky's sense of coherence concept (1979, 1987):

> The sense of coherence is a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement. (1987, p. 19)

It is the first element of this model, or what he calls the notion of *comprehensibility*, which many of my participants were able to obtain. The attributions they held for their illnesses and injuries were "ordered, consistent, structured, and clear" in relation to their past (1987, p. 17). One of the clearest examples of this came from Bob who was told by his physician that there did not need to be a reason for why he developed arthritis. Bob *did* feel the need, however, to make sense of his diagnosis. Thus, he reflected on his history of being very physically active and attributed his arthritis to his past of sports-playing and weight-lifting. Those who were still in the process of understanding the reason for why they became ill or injured seemed to strive for this type of sense and clarity, such as Rick, who was still waiting to hear an answer from God.

Perceived Restorativeness

The single element of attention restoration theory (ART) that was perceived more often in the garden environment than the hospital room environment was fascination. According to Cohen (1992), an effect size of 0.8 is large, thus with an effect size of d=1.63, we could expect that with a larger population, this group difference would remain statistically significant. Fascination is perhaps the strongest element in ART. The Kaplans discuss in detail the difference between hard and soft fascination, and the need for a restorative environment to elicit effortless attention (brought about through soft fascination) (Kaplan & Kaplan, 1989; Kaplan, 1995). The other elements supplement the theory, with fascination playing the key role in the perception of a space being restorative.

The strength of the fascination element is also reflected in the fact that even though the Perceived Restorativeness Scale has gone through multiple iterations to hone in on statements that accurately measure the elements of ART (some versions including additional elements to those defined by the Kaplans (1989)), the element of fascination has never been questioned (Hartig, Korpela, Evans & Gärling,1996; Korpela & Hartig, 1996; Hartig, Kaiser, & Bowler, 1997; Unruh, Smith, & Scammel, 1999; Ivarsson & Hagerhall, 2008).

In understanding why the other elements of ART were not reported more often in the garden, it is important to remember that although empirical studies have demonstrated that people tend to find natural environments most conducive to reflection and restoration, studies have also shown that some individuals prefer to spend time in more built environments (Korpela & Hartig, 1996; Korpela, Hartig, Kaiser, & Fuhrer, 2001; Scopelliti & Giuliani, 2004). Moreover, built environments, such as art museums, may have significant potential for restoration (Kaplan, Bardwell, & Slaketer, 1993). In fact, Ottoson and Grahn (2005) found that individuals residing in a geriatric care facility rated the satisfaction of their indoor environment as fairly high.

In my study, Doug and Richard, two participants who were randomized to be interviewed in the gardens, both made clear that they did not find the garden environment restorative. During the eligibility interview, Doug said that he would be available to participate the following day because he had cancelled his horticulture therapy and would have some “free” time. Furthermore, while responding to the Perceived Restorativeness Scale statements, he voiced several times that he was “not a garden person” and that his answers would be very different from other respondents. Richard explained that he had gardened on his parents’ property for 30-40 years and although he thought the Rusk garden was nice, gardens were “not for [him] no more.” The greenhouse reminded him of the work he had done for so many years, and he interpreted the space as a site of hard labor, rather than one where he could relax and enjoy himself. Further differences in environmental preference were also apparent when participants were asked where they went to reflect on their lives or problems when they are not in the hospital. Several participants *did* mention that they prefer to go to natural spaces (e.g., park, yard), however others mentioned rooms in their homes, synagogues and an art museum.

Another possible reason why restorativeness scores for the gardens were lower than expected is that the gardens are surrounded by the hospital and other New York City buildings. In a study that looked at the difference in PRS ratings of two gardens with differing degrees of built characteristics, it was found that the one with more open views received higher scores than the one surrounded by buildings (Ivarsson & Hagerhall, 2008).

In further consideration of why there was not more of difference in regard to the perceived restorativeness of the hospital rooms and the gardens, I reanalyzed the institution holistically, rather than parsing it into separate spaces. For example, I considered that the gardens, which are a significant part of the environment at Rusk, may have an effect on the mood and behavior of patients throughout the building, not only when the patients are in the natural space. Simply knowing that the gardens are within the hospital grounds may have influenced patients' feelings about the rest of the hospital environment. This was evident when participants disclosed thoughts about the gardens during their interviews, even when they were randomized to the Hospital Room Group. When replying to the statements of the Perceived Restorativeness Scale, a number of Hospital Room Group participants mentioned the gardens. For example, in response to the statement "This hospital room is a place to get away from it all," Diane responded that she "felt that way about the greenhouse." When she first arrived at Rusk, Diane did not want to talk to anyone, including her family and friends, and specifically asked that no one call her so that she would not have to converse. She attributed the re-entry into her social world to being exposed to the gardens. She said, "I think it all started when I went to the greenhouse. You know, that was a touch of reality in the middle of a nightmare. And then it just got better after that." When she started to communicate again, her loved ones told her that they could sense a significant difference in her spirits. Betty responded to the PRS statement "Spending time here gives me a break from my day-to-day routine in the hospital" by saying, "Now, going to the garden, I would say is something else." Again, the garden was on this patient's mind even though she was not in that environment.

Another reason why the rooms may have been seen in a positive light could be the very demanding schedules of the Rusk patients. Patients told me that they were awoken early in the morning (sometimes before 6:00am) to be bathed, and then were in therapy sessions until four in the afternoon, with a break only for lunch. Brenda likened her experiences there to being in a "boot camp." Because participants were away from their hospital rooms during most of the day and in challenging, painful therapies, their rooms became places of respite. It was here where they could relax, meet their visitors, read books and watch television. It was in the hospital rooms where they could take a break from their daily routine and where they could ease the directed attention they had previously been focusing on their rehabilitation.

In addition to seeing their rooms as a place of respite, patient rooms were also the central place to witness the progress they were making in their therapies. It was in their rooms where patients first put their newly obtained real-world skills to the test. As Helen said:

> I had a turn-around about, I think, two days ago, where I saw some progress in myself and was able to get out of bed with a little bit of assistance and…do a side-scoot onto another chair. That was the beginning.

It was in their rooms where, in Diane’s words, patients could see the “major achievement” of getting out of bed; using the bathroom without having to ring for an aide; and getting dressed without needing someone else’s help. It was in their rooms where patients could see that their intense rehabilitation therapies were truly preparing them for life outside of the hospital. The room served as a place to recognize progress, and where patients gained confidence that they were on their way to health and independence.

Lastly, in response to Ulrich’s (1984) seminal work examining hospital room views with patients recovering from gall bladder surgery and Verderber’s work on person-window interactions in hospital environments (1986), I expected patients to react unfavorably to the urban scenes that were visible from their rooms. I was mistaken.

Diane clearly illustrated this when she told me that during her first week at Rusk, she had been confined to her bed. "After so many days," she said, "I finally looked out the window and started seeing something other than pain and agony." What she saw from her window was a clear view down 34th Street in Manhattan, which has as its focal point the Empire State Building (Figure 15). This sight was beautiful to her. Before I left her room, following the completion of the interview, she insisted that I look out the window to experience what she saw.

When I returned to the hospital after my data collection to take photographs, I went back to Diane's room to capture the view from her window. A new patient, an older man, and his son were now there and eagerly welcomed me in. They both said how lucky the patient was to have the room with such a beautiful view and that people were coming in all day long just to look outside. The hospital room had become something of a tourist destination and the two men were excited about sharing its beauty.

Legibility, though not related to the location of the meaning-making interviews, was positively correlated with the length of the meaning-making interviews. Legibility refers to how organized an environment is and how easily an individual believes she or he could find her or his way through a space. In regard to attention restoration theory, a legible space would have eased the directed attention of participants, allowing them to attend to their interviews longer without being confused or distracted by the environment (Kaplan & Kaplan, 1982, 1989).

Emotional and Physical Outcomes

Following Ulrich's hypothesis that the natural environment can induce "quick-onset affective reactions," I had predicted that participants would exhibit a change in anxiety levels in relation to the environment (Ulrich, Simons, Losito, Fiorito, Miles, & Zelson, 1983; p.208). Moreover, in past studies when affect has been examined, it did exhibit a positive response to natural environments (Ulrich et al, 1983; Hartig, Mang & Evans, 1991; Miller, Hickman, & Lemasters, 1992; Korpela & Hartig, 1996). This pattern, however, was not repeated in my study.

On the other hand, although state anxiety in patients did not differ by location, there was a drop in anxiety after the meaning-making interview. There was no control for patient experiences during the period between the interviews, and anxiety could have been strongly influenced by a patient's experiences on any particular day. The fact that patients were less anxious after the meaning-making interview does suggest that discussing personal meaning in relation to one's illness experience can aid in adjustment, at least in the short-term. The implication of this finding is that if patients are prompted on a more regular basis to consider the meaning of their illness or injury, then perhaps this positive effect would last longer. It has been suggested that nurses may be best able to support patients' thinking about meaning as they are often the medical team members who have the most patient contact (Coward, 1997; Svelund, Danielson, & Norberg, 2001; Walton, 2002);

As with anxiety, I had predicted that participants' pain intensity would differ across locations; it did not. When used as a distraction during medical procedures and recovery, exposure to the natural environment has been shown to reduce pain intensity and the need for pain medications (Ulrich, 1984; Miller, Hickman, and Lemasters, 1992; Tse, Ng, Chung, and Wong, 2002 a, b; Diette, Lechtzin, Haponik, Devrotes and Rubin, 2003; Lee, Chan, Wong, Fung, Li, Chan, Mui, Ng, and Chung, 2004). The absence of a finding may be a result of the high stability of pain across all three assessments. This may be because, for the most part, I met with patients after a full day of physical therapy, both for the initial interview and the follow-up. This meant that I would have asked them about their pain on both days shortly after they had been through similar physical exertions and experiences. Also, pain intensity may have been primarily affected by the immediate circumstances of the participants not under the study's control. For example, patients who had just had pain medication or whose injuries were being iced as they lay in bed would report less pain than participants whose injuries were affected by their movement, traveling to the gardens or who were due for pain medication, but needed to wait until they returned to their rooms.

Study Limitations

A number of limitations arose during this study because it was done *in vivo*. That is, unlike in a laboratory setting where constraints are controlled by the researcher, this project was under the real influence of the hospital environment. The most significant limitation was the small sample size that inhibits statistical power and limits my ability to generalize conclusions. Difficulties in recruiting participants in a study such as this are common. Ottoson and Grahn (2005) write about their difficulty recruiting for their study, which examined restoration in and out of doors for a group of residents living in a geriatric care facility. Out of 250 potential participants, only 17 were eligible, and only 15 were able to complete their entire participation.

I also encountered time constraints, specifically restrictions related to how long I could spend with my participants. This type of constraint was also present in Ottoson and Grahn's (2005) study in which they specifically note: "it was not easy to find 'windows of opportunity' in our participants' daily schedules" (p. 32). I originally allotted 10 minutes of acclimation time before beginning the meaning-making interview in the randomized locations, but had to remove this from the study design. This may have affected the perceived restorativeness scores of the hospital room and garden environments because patients were not given the opportunity to "settle in" and engage with their space before the PRS began. For example, Garden Group participants may have felt more relaxed in the natural space had they been allowed time to experience the new environment calmly rather than rushing into the interview immediately after traveling from their rooms. This time limitation could also have contributed to the group difference in the length of the meaning-making narratives—the Hospital Room Group interviews were longer than the Garden Group interviews. Participants in the hospital rooms actually had more time to talk because they did not "lose time" traveling down to the gardens. With an effect size of d=1.94, we could expect that with a larger population this group difference would remain statistically significant. Lastly, participants who were randomized to the hospital room often did not have the opportunity to go to the garden at follow-up, as was planned in the original study design. Because of this, state anxiety and pain measures for these participants were not taken in the more natural environment. This may have affected my findings regarding changes in these two outcomes over time.

I also planned to record heart rate and blood pressure data at the time closest to when individuals began their participation, the time closest to when their interview was completed, and the next day at the same time the original measures were taken. However, in this particular hospital unit heart rate and blood pressure were not taken on a regular basis (for example, sometimes the measures taken closest to the end of the interview were actually taken the next day), so no objective stress measures could be included. However, even if they had been analyzed, the data may not have been significant. In the second study reported by Hartig, Mang, and Evans (1991), the protocol included the collection of blood pressure and pulse measurements from participants, but no significant differences were found among the groups. The authors suggest that this happened because this data was not colleted during the actual treatment conditions. As I, too, had not planned for heart rate and blood pressure data to be taken during actual study experiences, there is a good chance that I may also have found no differences between the groups. Self-reported physical pain *was* measured at three time-points, however, and these scores are most likely accurate because patients often explained why they scored their pain a certain way (e.g., I am in more pain than I was before because I am due for my medication).

Finally, during the genesis of this project I was sensitive to the fact that my presence as a researcher might influence the responses of my participants. In order to reduce my influence, prior to starting the semi-structured portion of the meaning-making interview I asked the participants to speak for three minutes without my interruption. This allowed the patients to tell me their stories before I asked specific questions and guided the conversation. I also allowed participants to speak freely during all portions of their participation (e.g., I did not stop participants from sharing commentary during the quantitative measures), thus I was able to collect spontaneous information from my participants that was not elicited by specific questions. Moreover, participants voiced both positive and negative aspects of their illness experience, so I do not believe that patients said things just to please me as a researcher.

Future Research

As was evidenced by the inconsistent pattern of correlations among the elements of the Perceived Restorativeness Scale (PRS) in this study, future work should continue to focus on the development of a more accurate scale. This study did expand the use of the PRS by applying it to a novel population and environment (inpatients in a hospital), but questions remain regarding the appropriateness of the use of the separate subscales.

Most previous research investigating posttraumatic growth has used the posttraumatic growth inventory as a means to collect data. In order to dialogue with other studies, future work on the connection of meaning-making to the physical environment should employ the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). This quantitative measure could be incorporated into the type of interview plan used in this study, so that participants' individual voices are still honored, but data can be more easily relate to other research.

It might also be wise to incorporate expressive writing into future research. Journaling is an effective way to allow patients the opportunity to use their own voices, with similar benefits of disclosure exhibited across studies of writing and verbal interview (Pennebaker & Seagal, 1999; also reported in Frattaroli's (2006) meta-analysis of expressive writing studies).[7] It would be interesting to investigate the effect of the physical environment on study participants' journal writing and to see if the themes of posttraumatic growth naturally arise in any specific writing locations. Moreover, the theory of cognitive processing (making sense of an event and incorporating it into one's life story) dovetails with the meaning-making theories discussed in this study and creates a clear bridge connecting these two areas of research.

Studies of expressive writing suggest that there are negative short-term psychological effects on participants immediately post-written disclosure, and although these negative effects are seen to decrease over time, in an acute situation in a hospital, where psychological stress may be at its peak, it would be pertinent to examine if these effects can be reduced if the writing is done while in a restorative garden environment (Lepore, Greenberg, Bruno, & Smyth, 2002). The evidence for this is promising, for although there was no significant relationship between participants' anxiety and their immediate environment, everyone who took part in the meaning-making interview in the garden disclosed that they were "not at all" upset when the narrative portion of the interview was completed.

In my study it was found that women spoke for significantly longer periods of time then men during the meaning-making interview. With an effect size of d=1.14, it can be assumed that with a larger population, this group difference would remain significant. In fact, this finding is in line with other disclosure studies. In a meta-analysis of 205 studies examining sex differences in self-disclosure, Dindia and Allen (1992) found that women disclose more than men, and furthermore, that women disclose more to other women than men do to women. It has also been found that positive outcomes in writing studies are positively related to the proportion of male participants in the studies (Smyth, 1998; Frattaroli, 2006). It is hypothesized that stereotypical social roles, which inhibit men from verbal disclosure, are less of a barrier in written disclosure. Thus, incorporating writing into a study such as the current one could possibly benefit male participants who feel restrained in their verbal disclosure.

In response to a target article in *Psychological Inquiry* by Tedeschi and Calhoun (2004), which focused on posttraumatic growth, Wortman (2004) posed some criticism regarding studying the positive aspects of trauma. Not only does Wortman posit that Tedeschi and Calhoun neglect to consider negative changes in trauma survivors, but that in studies investigating posttraumatic growth "there is no information obtained to indicate whether this change is judged as significant or meaningful by the respondent, or as more significant or meaningful than any of the negative changes that the person may be experiencing" (p. 82). In order to reduce the influence of my belief in meaning-making, I asked my participants neutral questions (How has your life changed since you became ill/injured? As opposed to: How has your life changed positively since you became ill/injured?). The interviews, then, allowed for my participants to disclose both positive and negative aspects of their illness experience and both are included in my results. Future research should investigate the degree to which aspects of patients' illness experiences are positive or negative in order to more fully understand what survivors have lived through, and if growth can be appropriately reported.

Perhaps most importantly, this study can function as a pilot study for further research investigating patient meaning-making in connection to research on the effects of the physical hospital environment. Several participants compared their experiences at Rusk to the experiences they had at the acute-care hospital where they underwent surgery, or to other hospitals they had experienced in their past. When a comparison was drawn, Rusk was always deemed to be the better facility. Expanding this research to other medical facilities that are perceived as less healing would broaden our knowledge about the environment’s impact on patient meaning-making. Such findings can help improve patients’ coping potential at the time of their greatest need.

Afterthoughts

The scientific-paper format of this dissertation allowed me to present my work in a way that chronicled the steps I took to complete my study, from the preliminary literature review to the reflections I made in response to my results. This format provides detailed documentation of the timeline of my process. Now that my research has concluded, I would like to allow space for my voice to enter more fully into the writing. Just as I included the voices of my study participants to enrich my findings, I present the afterthoughts below to more fully illustrate what I have learned as a researcher in environmental psychology. To bring closure to my research experience, I now share the personal context out of which this project developed and the additional lessons for which there was not an appropriate occasion above.

A Personal Introduction

The hospital environment has always been a part of my life. When we were young, my father, who is a physician, would take my sister and me to the county medical center, give us rides on the motorized examining table, and inspect our cheek cells under the microscope. For me, his suite was full of adventure and surprise. Later, after I graduated from college, I worked in a hospital as an administrator. It was at this juncture that I became aware of the negative effects that the physical environment of the hospital can have on those it aims to heal. I would regularly direct lost and frustrated patients to their appropriate departments; witness anxious families discussing private matters with doctors in public hallways; and listen to complaints about the staleness of the institution, magnified by its nonexistent connection with the outdoors. My awareness of the environment became even more profound when my mother was diagnosed with cancer.

My family spent several years in and out of hospitals, and in each institution I was highly sensitive to the way in which the physical surroundings affected our experiences. In waiting rooms, doctors' offices, inpatient rooms and intensive care units, I witnessed the noise and lack of seating—as well as the dearth of calming things that might allow us to distract our attention and relax, if only for a brief moment.

In addition to having a new sensitivity to the medical environment, I found myself trying to answer a question, which repeated in my mind: *Why did this happen?* In a characteristic manner, believing that there is a reason for everything, I found myself searching for explanations. I reflected on what I had learned as a result of my mother's illness and contemplated how all of our lives had changed due to the stress that we experienced. I recognized the strength in my family and our ability to support each other and work together.

In the midst of my personal experience, I also considered what my mother was going through while enveloped in the hospital environment—and how she was making sense of her own illness experience. If I were feeling the effects of these strong influences, I imagined that as a patient, in an even more acutely stressful situation, the environmental stimuli (or lack thereof) and the need to understand one's medical condition on a personal level would be even more potent. Thus, I began the preliminary work of researching two areas of literature: the effects of the physical environment on individual health and how patients make personal meaning of their medical conditions. It quickly became evident to me that theorists and empirical researchers in both literatures share an interest in how to best support individual well-being—and the foundation for my dissertation was set.

Lessons Learned

This dissertation process educated me in both my areas of academic interest and research in general. I learned about the negative and positive aspects of analyzing results from a small sample population. I also learned the benefits of rethinking, after data collection, the assumptions I had made at the commencement of the project. Through this process, my excitement about working in an interdisciplinary field was strengthened and furthermore, the confirmation that my interests cross the line between academic and mainstream literature has increased my enthusiasm for the work that I do.

When I finished collecting data with just sixteen participants, I knew that I would not be able to make any concrete conclusions regarding the statistical value of the information I gathered. This was a concern because it seemed to preclude my ability to draw conclusions about the general inpatient population. Soon, however, I began to appreciate the benefits a small sample size offered my project.

As I explained earlier, it was of the utmost importance for me to use my participants' voices as a primary object of my data collection. In my interviews I allowed the space for my participants to share their personal responses during both the qualitative and quantitative questionnaires, and my small sample size allowed me to honor each of these voices by including them, in detailed fashion, in my writing. Instead of reporting generalizations (although I state this with full knowledge that such generalizations are also necessary for further research) I was able to use the words of each of my participants to illustrate and enrich my results, allowing readers to become familiar with the individual stories and idiosyncrasies that would have been lost had I been reporting from a larger sample.

Having a small sample size also made this dissertation a more personal experience. As I reported my results and contemplated my discussion, I could clearly picture each of the interactions I had with my participants. At no point did I feel separated from the experiences I had in the hospital or the conversations I had with the patients. I had their voices in my head as I typed their words and remembered the expressions on their faces.

After sharing my research with someone very close to me who had lived through a near-death experience, I came to understand that my work could be interpreted as unsympathetic to the negative aspects of trauma survivorship. With this understanding, along with being informed by Wortman’s (2004) critique, I became sensitive to this point of view and it became my priority to respect the feelings and experiences of my participants in their entirety. I believe that having a small sample size enabled me to write about the multiple aspects of my participants’ illness experiences and accurately sketch their lives in relation to their medical conditions.

The field of environmental psychology is inherently interdisciplinary, a characteristic that attracted me to my graduate work. My own dissertation committee is comprised of professors with varied backgrounds, and I value what I have learned from each of these professors—their writings, courses, and insights. Furthermore, their differing views have enabled me to look at my work through multiple lenses. I have been given the unique opportunity to analyze my dissertation from each of these vantage points, which served to produce a stronger piece of writing.

Not only does my work cross borders between academic disciplines, it crosses the border between the academic world and the mainstream world. My family continuously sends me newspaper and magazine clippings pertaining to my research and when I speak to someone new, I will often hear a personal story that relates to my work. The conferences I attend are conceptualized by universities, but they are also hosted by organizations focused on complimentary medicine, writing, and horticulture. All of this has encouraged me to be a student in many venues. Illustrations of this overlap became even more apparent when I read about meaning-centered psychotherapy studies both in the *Canadian Journal of Psychiatry* (Breitbart, Gibson, Poppito, & Berg, 2004), and the *Wall Street Journal* (Beck, 2009). I also discovered that Ulrich's 1984 study was one impetus for a recent publication by Esther Sternberg, M.D. (2009) titled *Healing Spaces: The Science of Place and Well-Being*, a book steeped in science, though written for a general audience. Even Arthur Kleinman, the author of *The Illness Narratives: Suffering, Healing and the Human Condition*, makes clear his intention to cross this border:

> I write here to explain to patients, their families, and their practitioners what I have learned from a career passionately devoted to this interest [of learning how people live with chronic illness]. I write because I wish to popularize a technical literature that would be of great practical value for those who must live with, make sense of, and care for chronic illness. (1988, p. xiii)

Additionally, the work that I do crosses the border between research and application. A great deal of meaning-making research is published in nursing journals, with sections of articles devoted to practice implications. It has been suggested that nurses can, as the clinicians who know patients best, aid in helping patients to create meaning in their illness experiences. Nurses can encourage discussions about meaning and how illness and injury has affected patients' lives (O'Connor, Wicker, & Germino, 1990); they can passively be aware that meaning-making is a vital element in coping and listen carefully to patients, learning what is important to them and understanding their feelings (Coward, 1997; Svelund, Danielson, & Norberg, 2001; Walton, 2002); and they can share advice on how to deal with illness symptoms (Richer & Ezer, 2000, 2002). Kleinman, too, writes of his aims to have a practical impact in the medical system. He specifically writes about his desire to teach medical students how to conduct mini-ethnographies of their patients in order for the next generation of physicians to understand that the context from where their patients come is fundamental to patient care. He also encourages a reinstatement of the collection of patients' brief life histories in order to re-humanize the doctor-patient relationship and, again, contextualize illness in patients' lives. Lastly, Lipowki (1983) wrote his "schema and taxonomy of psychosocial reactions to illness" in the hopes that it will "help physicians in their clinical work with patients, especially the chronically ill and disabled." He explained:

> For optimal overall management every such patient needs to be evaluated in terms of the chief meaning of illness, the emotions engendered by it, and the coping styles and strategies displayed. Such an assessment should help the doctor provide more effective patient care as a result of clearer understanding of the patient's behavior and enhanced ability to influence it for optimal physical and social recovery. Moreover, the physician will be better able to predict, and sometimes prevent, the development of psychiatric complications of illness through timely intervention. Such medical care would balance the scientific and humanistic approaches. (p. 1072)

All that I have learned in my own research and the inspiration I have gained from others has motivated me to continue my work in both academia, and in direct application to the lives of those coping with stressful medical conditions and the health practitioners and families caring for these individuals.

After analyzing my data, I was forced to rethink my former assumptions. I did not find a significant disparity between the perceived restorativeness of the hospital room and garden environments. Nor did I find that the gardens were more conducive to meaning-making than the hospital rooms. Although this was admittedly disappointing at first, it compelled me to concentrate on what my findings *did* suggest. During my research, I was particularly touched by Aaron Antonovsky's (1987) autobiographical introduction to *Unraveling the Mystery of Health*, where he shares with his readers a major event that led him to explore a salutogenic approach to research in health. He wrote:

> In 1970 a very concrete experience occurred which led to a fundamental turning point in my work as a medical sociologist. I was in the midst of analysis of the data in a study of adaptation to climacterium of women in different ethnic groups in Israel. One of these groups consisted of women born in central Europe between 1914 and 1923, who were, therefore, aged 16 to 25 in 1939. We had, for a reason I never quite remembered, asked a simple yes-no question about having been in a concentration camp…Looking at percentages of unimpaired women, we find that 51 percent of the control group women, compared to 29 percent of the survivors, were in quite good overall emotional health. Focus not on the fact that 51 is far greater than 29, but consider what it means that 29 percent of a group of

> concentration camp survivors were judged to be in reasonable health…To have gone through the most unimaginable horror of the camp, followed by years of being a displaced person, and then to have reestablished one's life in a country which witnessed three wars…and still be in reasonable health. This, for me, was the dramatic experience which consciously set me on the road to formulating what I came to call the salutogenic model… (p. xi)

Although our studies are obviously quite different, I had a similar moment when I decided to analyze why something works well, rather than critiquing the aspects that are potentially problematic. Instead of focusing on why the hospital rooms were not conducive to restoration and coping, I turned my attention to the positive: why is it that the hospital room *was* perceived in such a positive light?

My experiences during this project taught me to ask what makes Rusk different from other institutions and, furthermore, what can we learn from this medical center in order to help other hospitals improve the outcomes of their patients. While I cannot transform hospitals into the adventure-land that I experienced as a child in my father's office, I hope to contribute to the dialogue concerned with making the hospital environment as patient-centered as possible, focusing on healing and overall well-being.

Footnotes

[1] There have been a number of written reviews documenting the stressors that are prevalent in the hospital environment and how these can adversely affect patient healing (Devlin & Arneill, 2003; Ulrich, Zimring, Quan, Joseph, & Choudhary, 2004; Ulrich, Zimring, Zhu, DuBose, Seo, Choi, Quan, & Joseph, 2008). These reports discuss a variety of topics such as noise, lighting, and hospital-acquired infection. To provide yet another full report on the stressors found in medical institutions would result in a sizable and redundant product, thus, I have included an abbreviated review here.

Patients suffer from severe directed attention fatigue (Kaplan & Kaplan, 1982). They are removed from their usual surroundings, away from their support network, and are often times in pain and scared for a future procedure, their ability to recover, and even their life. Moreover, the relationship with hospital staff can also be stressful due to a lack of personalization (Hughes, 2001) and difficulty in patient-staff communication (Stewart, Brown, Donner, McWhinney, Oats, Weston, & Jordan, 2000).

In addition to the psychosocial stressors, the ambient hospital environment can also add to the distress of the patient experience. The psychologically “hard” environment of health care facilities stems from buildings being designed to support the functions of health care delivery (i.e., spaces structured in particular ways to accommodate machinery) as opposed to focusing on patient-centered care (Orr, 1995; Ulrich 1991).

One of the most cited elements of the environment that increases patient stress is noise. “Hospitals are full of loud noises and the hard environmental surfaces in patient rooms and hallways create poor acoustics, reflecting, amplifying and propagating noise”

(Ulrich, 2007). As summarized in Topf (2000), noise in the hospital from medical equipment alone often exceeds the standard required for rest and sleep as suggested by the United States Environmental Protection Agency (EPA). Aaron, Carlisle, Carskadon, Meyer, Hill, and Millman (1996) studied the affect of noise on sleep in a hospital environment with six patients who had been in an intermediate respiratory care unit (IRCU) for several days. The researchers monitored the noise level in the IRCU during the night between 10:00pm and 6:00am and discovered that the levels were greater than 80 dBA—much higher than the 35dBA that the EPA recommends. Furthermore, intensity in sound level affected both the duration and patterns of patients' sleep, with patients spending more time in Stage 1 sleep and less time in REM sleep.

Another source of stress is sharing a room with another patient. Kulik, Moore, and Mahler (1993) found that anxiety was significantly higher in preoperative inpatients when they were in a room with another preoperative patient, as opposed to someone who was already recovering from surgery. The authors discuss that this may be due to the increased amount of tension in the room with both patients anxiously awaiting their procedures. Sharing a room with another patient also may contribute to the stressful hospital environment because with more patients per room, there is less space for visitors. This not only limits the opportunity for patients to receive social support, but it also reduces the ability for family members and friends to be active in the care giving of their loved ones (Orr, 1995; Ulrich, 2007).

Environmental stress also stems from way-finding issues in medical institutions. Kaplan and Kaplan (2003) report that the greatest source of stress among both visitors and patients in hospitals is fear of becoming lost. In a 2001 survey conducted by New

York Presbyterian/Columbia University Medical Center, researchers found that “most first-time visitors got lost trying to get to their appointments” (Harris, Perry, & Delgado, 2009, p.60). The authors go on to explain that “New York’s top-rated hospital provided the best care but subjected many visitors to a challenging and frustrating travel experience. On any given day, the average visitor spent all or part of their travel time being lost” (p. 60). Ulrich encourages hospital planners to attend to the fact that “hospitals are unusually easy places in which to get lost” and to create systems to help guide patients and visitors through these institutions (Ulrich, 2007).

In recognition of the stressors present in the hospital environment, Ulrich developed a Theory of Supportive Design (1991), which suggests that a healthcare facility can reduce stress and increase wellness if the design encourages: 1) a sense of control with respect to physical-social surroundings; 2) access to social support; and 3) access to positive distractions in physical surroundings.

Of particular salience to this project, each of the above wellness-supporting elements can be fostered with the inclusion of a garden on hospital grounds. Ulrich (1991) states that gardens and outdoor spaces instill a sense of control in individuals; gardens or seating areas promote essential social support; and as described above, nature can serve as a healing positive distraction.

[2] Measures of heart rate and blood pressure were to be obtained from the participants’ online medical charts at the time closest to the beginning of the interview (prior to participation), at the time closest to the completion of the first interview (after the interview) and on the day of the follow-up at the time closest to 24 hours after baseline.

However, as these measures were not recorded regularly, they were not used in data analyses.

[3] I had originally planned to conduct the follow-up interviews of all Hospital Room Group participants in the gardens, but because the follow-up interviews were brief, a great deal of effort went into moving the patients, and almost all HR participants had visited the gardens at a previous time, it was decided that the participants in the HR condition would have the follow-up interview wherever it was most convenient.

[4] I had planned to leave a participant either in the room or in one of the gardens (depending on randomization) for ten minutes at the beginning of Part B of the interview, in order to allow her or him time to acclimate to the “regular” hospital room or garden without my presence. However, in order to complete the interviews within the patient’s schedule this was not feasible. Therefore, with all but the first two participants, I proceeded directly to Part B without any acclimation time allotted.

[5] During the development of the Perceived Restorativeness Scale, items created to investigate the *extent* of environments were found to have inadequate reliability across sites and across studies (Hartig, Korpela, Evan & Gärling, 1996). Items retained in subsequent scales were only those thought to measure a sublevel of this element—coherence—which refers to the ease with which one can organize and structure an environment. The authors warn, however, that even these items do not sufficiently measure coherence.

[6] Hartig, Kaiser, & Bowler (1997) made several amendments to the Perceived Restorativeness Scale—their version of the scale was used in this study. The changes made were as follows: first, in an attempt to further investigate the ability to measure the

element of extent, they included statements that refer to an environment's legibility, a subtheme of this element, which questions one's ability to make sense of an environment and stay oriented. However, in the study, it was found that legibility items aligned more with the element of compatibility than that of extent. The authors warn against combining the legibility items with either the elements of extent (coherence) or compatibility. In this study, the subscale "legibility" is treated as a separate entity. Second, they added negatively worded items to the element of fascination (originally, only coherence had negatively worded items). Lastly, they made some slight alterations to other items (i.e., "Spending time here gives me a good break from my day-to-day routine" was modified to "Spending time here gives me a break from my day-to-day routine").

[7] In her meta-analytic review of 146 expressive writing studies, Frattaroli (2006) examined the growing literature in this field and the theories that have developed to explain why this disclosure is beneficial to study participants. The theory of cognitive processing is particularly salient to this current investigation. Cognitive processing was investigated by Pennebaker (1993) after a hunch he had regarding the types of words his participants used in their writing and the benefits they were experiencing.

To understand this more thoroughly, Francis and Pennebaker (1992) created the Linguistic Inquiry and Word Count (LIWC) computer program. With this program it is possible to input typed transcripts, select categories for investigation and count the number of words in a given entry that fit the categories. In a review of studies that were completed prior to the development of LIWC, transcripts were inputted and when causal, insight and reflection word (i.e., because, why, understand, reason) were counted, it was found that over the course of participation the rate of causal and insight words in individuals' writing increased and furthermore, participants benefited from the writing experience (i.e., improvement in health, grades, and finding a job) (Pennebaker, 1993; Pennebaker & Seagal, 1999). Further study of the relationship between cognitive processing and meaning-making through expressive writing should be investigated (Park & Blumberg, 2002; Creswell, Lam, Stanton, Taylor, Bower, & Sherman, 2007) along with benefit-finding and expressive writing (Stanton, Danoff-Burg, Sworowski, Collins, Branstetter, Rodriguez-Hanley, Kirk, & Austenfeld, 2002; Low, Stanton, Danoff-Burg, 2006).

Table 1

Participant Demographics

	Garden N=8		Hospital Room N=8		
	N(%) or M	SD	N(%) or M	SD	Group Differences χ^2 or t
Gender					$\chi^2(1, 16)=1.07$, *p*=.61
Female	4 (50)		6 (75)		
Male	4 (50)		2 (25)		
Age	58.75	16.47	67.25	6.92	*t*(14)=1.35, *p*=.20
Schooling	3.62	1.19	4.12	0.84	*t*(14)=.97, *p*=.35
Currently Married					$\chi^2(1,16)=.29$, *p*=1.00
Yes	2 (25)		3 (37.5)		
No	6 (75)		5 (62.5)		
Currently Employed					$\chi^2(1,16)=.25$, *p*=1.00
Yes	4 (50)		3 (37.5)		
No	4 (50)		5 (62.5)		
Medical Procedure					$\chi^2(1,16)=.00$, *p*=1.00
Joint Replacement	5 (62.5)		5 (62.5)		
Other	3 (37.5)		3 (37.5)		
Days in Rusk	6.50	2.78	8.50	3.89	*t*(14)=1.18, *p*=.26
Total Days in Hospital	18.00	16.63	14.25	6.61	*t*(14)=-.59, *p*=.56

Table 2

Garden Group Demographics

Participant	Gender	Age	Ethnicity	Education	Currently Married	Currently Employed	Medical Procedure	Days at Rusk	Total Days Hospitalized
Suzanne	F	69	White	Some College	No	No	Joint Replacement	8	12
Maria	F	24	White	College Degree	No	Yes	Other	3	9
Belinda	F	74	White	Above College Degree	Yes	No	Joint Replacement	7	11
Brenda	F	57	White	College Degree	No	Yes	Other	5	10
Doug	M	68	White	College Degree	No	Yes	Joint Replacement	6	9
Richard	M	59	White	High School Degree	Yes	No	Other	7	28
Rick	M	71	White	Above College Degree	No	No	Other	12	56
Bob	M	48	White	High School Degree	No	Yes	Joint Replacement	4	9

Table 3

Hospital Room Group Demographics

Participant	Gender	Age	Ethnicity	Education	Currently Married	Currently Employed	Medical Procedure	Days at Rusk	Total Days Hospitalized
Karen	F	56	Asian	College Degree	No	Yes	Other	6	10
Dolly	F	68	White	College Degree	Yes	No	Joint Replacement	7	10
Rachel	F	59	White	Above College Degree	Yes	Yes	Joint Replacement	2	7
Diane	F	68	White	Vocational Degree	No	No	Joint Replacement	11	14
Helen	F	76	White	Vocational Degree	No	No	Joint Replacement	14	16
Betty	F	67	White	College Degree	No	No	Joint Replacement	11	28
Donald	M	69	White	Above College	Yes	Yes	Joint Replacement	11	18
Howard	M	75	White	Above College Degree	No	No	Other	6	11

Table 4

Intercorrelations Between Subscales of the Perceived Restorativeness Scale

Scale	1	2	3	4	5	6
1. Being Away	--					
2. Fascination	.77**	--				
3. Coherence (Extent)	.19	-.13	--			
4. Compatibility	.69**	.78**	-.09	--		
5 Legibility	.41	.19	.13	.39	--	
6. Total PRS	.90**	.88	.13	.88**	.52*	--

* *p* < .05, ** *p* < .01

Table 5

Meaning-Making Interview

Why do you think you became ill/injured?

According to your physician, why did you become ill/injured?

According to your family, why did you become ill/injured?

How has your life changed since you became ill/injured?

How has your illness/injury made you think about your future?

Have your expectations for your future changed at all since you became ill/injured?

Have you searched for meaning in your illness/injury?

What is the meaning of your illness/injury or why you became ill/injured?

How did you come to understand this meaning or why you became ill/injured?

Please tell me what it has been like being a patient in the hospital.

Is there anything else you would like to tell me about your illness experience, what being ill/injured means to you, or what it has been like being a patient in Rusk?

Table 6

Group Differences in Perceived Restorativeness

			Garden		Hospital Room			
	k	Cronbach's alpha	M	SD	M	SD	Group Differences	*d*
Being Away	5	.94	3.83	1.89	2.63	1.38	*t*(14) = 1.45, *p*= .17	0.73
Fascination	8	.95	4.08	1.73	1.81	.95	*t*(14) = 3.24, *p*= . 01	1.63
Coherence (Extent)	4	.82	4.88	.94	4.91	1.38	*t*(14) = -.05, *p*= .96	-0.03
Compatibility	5	.97	3.30	2.51	1.90	1.40	*t*(10.95) = 1.38, *p*= .20	0.69
Legibility	4	.86	2.78	1.91	3.97	1.26	*t*(14) = -1.47, *p*= .16	-0.74
Total PRS	26	--	98.88	40.78	72.62	19.27	*t*(14) = -1.65, *p*=.12	0.82

Table 7

Intercorrelations Between Subscales of the Perceived Restorativeness Scale and Anxiety

Scale	1	2	3	4	5	6	7	8	9
1. Being Away	--								
2. Fascination	.77**	--							
3. Coherence (Extent)	.19	-.13	--						
4. Compatibility	.69**	.78**	-.09	--					
5. Legibility	.41	.19	.13	.39	--				
6. Total PRS	.90**	.88	.13	.88**	.52*	--			
7. STAI-6 (Baseline)	-.14	-.04	-.11	.11	-.06	-.04	--		
8. STAI-6 (Time 2)	-.03	.22	-.09	.25	-.07	.14	.83**	--	
9. STAI-6 (Follow-up)	-.34	-.19	.20	-.29	-.11	-.26	.37	.40	--

* $p < .05$, ** $p < .01$

Table 8

Intercorrelations Between Subscales of the Perceived Restorativeness Scale and Pain

Scale	1	2	3	4	5	6	7	8	9
1. Being Away	--								
2. Fascination	.77**	--							
3. Coherence (Extent)	.19	-.13	--						
4. Compatibility	.69**	.78**	-.09	--					
5. Legibility	.41	.19	.13	.39	--				
6. Total PRS	.90**	.88	.13	.88**	.52*	--			
7. Wong-Baker (Baseline)	-.09	-.12	-.34	.20	.02	-.05	--		
8. Wong-Baker (Time 2)	-.14	.01	-.27	.18	.03	-.01	.79**	--	
9. Wong-Baker (Follow-up)	.01	.00	-.15	-.04	-.04	-.04	.58*	.49	--

* *p* < .05, ** *p* < .01

Table 9

Preconceived Attributions and Attributions in Development

Participant	Condition	Preconceived Attribution →	Type of Attribution	Attribution in Development
Suzanne	G	X	Other Stressor	
Doug	G	X	Age, Physical Activity	
Maria	G			X
Richard	G			X
Belinda	G	X	Age	
Brenda	G			X
Rick	G			X
Bob	G	X	Physical Activity	
Karen	HR			X
Donald	HR	X	Age, Heredity, Physical Activity	
Dolly	HR	X	Physical Activity	
Rachel	HR	X	Heredity	
Howard	HR	X	Accident	
Diane	HR	X	Heredity	
Helen	HR	X	Life	
Betty	HR			X

Table 10

Group Differences in Attributions for Illness and Injury

		Garden	Hospital Room		
		N=8	N=8		
		N(%)	N(%)	Group Differences χ^2	Φ
Has a Preconceived Attribution				$\chi^2(1, 16)=1.07$, $p=.61$	-.26
	Yes	4 (50)	6(75)		
	No	4(50)	2(25)		
Age				$\chi^2(1, 16)=.41$, $p=1.00$	.16
	Yes	2 (25)	1(12.5)		
	No	6 (75)	7(87.5)		
Genetics				$\chi^2(1, 16)=3.69$, $p=2.00$	-.48
	Yes	0(0)	3(37.5)		
	No	8(100)	5(62.5)		
Physical Activity				$\chi^2(1, 16)=0$, $p=1.00$	.00
	Yes	2(25)	2(25)		
	No	6(75)	6(75)		
Accident				$\chi^2(1, 16)=1.07$, $p=1.00$	-.26
	Yes	0(0)	1(12.5)		
	No	8(100)	7(87.5)		
Life				$\chi^2(1, 16)=1.07$, $p=1.00$	-.26
	Yes	0(0)	1(12.5)		
	No	8(100)	7(87.5)		
Another Stressor				$\chi^2(1, 16)=1.07$, $p=1.00$	.26
	Yes	1(12.5)	0(0)		
	No	7(87.5)	8(100)		

Table 11

Reports of Posttraumatic Growth (PTG), Age/Heredity, and No Meaning

Participant	Condition	Personal Strength	Appreciation of Life	Relating to Others	New Possibilities	Religious Faith	Total Number Of Domains	Age/ Heredity	No Meaning
Suzanne	G						0		X
Doug	G						0	X	
Maria	G		X				1		
Richard	G	X	X	X	X		4		
Belinda	G						0		X
Brenda	G			X			1		
Rick	G			X			1		X
Bob	G	X	X				2		
Karen	HR	X	X	X	X		4		
Donald	HR						0	X	
Dolly	HR						0	X	
Rachel	HR	X	X			X	3		
Howard	HR						0		X
Diane	HR		X	X			2		
Helen	HR						0		X
Betty	HR	X		X	X		3		X

Table 12

Group Differences in Type of Meaning Made

	Garden N=8		Hospital Room N=8			
	N(%) or M	SD	N(%) or M	SD	Group Differences χ^2 or t	*Φ* or *d*
Has Meaning					$\chi^2(1, 16)=.00, p=1.00$	.00
Yes	5 (62.5)		5 (62.5)			
No	3 (37.5)		3 (37.5)			
Experienced PTG					$\chi^2(1, 16)=.25, p=1.00$	.13
Yes	5 (62.5)		4 (50)			
No	3 (37.5)		4 (50)			
Number of PTG Domains	1.12	1.36	1.5	1.69	$t(14)=.49, p=.63$	-.25
Appreciation of Life					$\chi^2(1, 16)=.00, p=1.00$	.00
Yes	3 (37.5)		3 (37.5)			
No	5 (62.5)		5 (62.5)			
Relating to Others					$\chi^2(1, 16)=.00, p=1.00$	.00
Yes	3 (37.5)		3 (37.5)			
No	5 (62.5)		5 (62.5)			
Personal Strength					$\chi^2(1, 16)=.29, p=1.00$	-.14
Yes	2 (25)		3 (37.5)			
No	6 (75)		5 (62.5)			
New Possibilities					$\chi^2(1, 16)=.41, p=1.00$	-.16
Yes	1 (12.5)		2(25)			
No	7 (87.5)		6 (75)			
Spiritual Change					$\chi^2(1, 16)=.00, p=1.00$	-.26
Yes	0 (0)		1 (12.5)			
No	8 (100)		7(87.5)			
Age/Heredity					$\chi^2(1, 16)=.41, p=1.00$	-.16
Yes	1 (12.5)		2 (25)			
No	7 (87.5)		6 (75)			

Table 13

Group Differences in Follow-up Themes

	Garden	Hospital Room		
	N=8	N=7		
	N (%)	N (%)	Group Differences χ^2	*Φ*
Change in Thoughts			$\chi^2(1, 15)=4.29$, *p*=.08	-.54
Yes	0 (0)	3 (42.9)		
No	8 (100)	4 (57.1)		
Benefits of Disclosure			$\chi^2(1, 15)=.27$ *p*=1.00	.13
Yes	2 (25)	1 (14.3)		
No	6 (75)	6 (85.7)		
Location of Interview			$\chi^2(1, 15)=.27$, *p*=1.00	.13
Yes	2 (25)	1 (14.3)		
No	6 (75)	6 (85.7)		

Note. One participant was not available for a follow-up interview.

Table 14

Differences in Follow-up Themes According to Follow-up Location

		Garden*	Hospital *		
		N=4	N=11		
		N (%)	N (%)	Group Differences χ^2	*Φ*
Change in Thoughts				$\chi^2(1, 15)=.09$, $p=1.00$	.08
	Yes	1 (25)	2 (18.2)		
	No	3 (75)	9 (81.8)		
Benefits of Disclosure				$\chi^2(1, 15)=1.36$, $p=.52$	-.30
	Yes	0 (0)	3 (27.3)		
	No	4 (100)	8 (72.7)		
Location of Interview				$\chi^2(1, 15)=.09$, $p=1.00$	.08
	Yes	1 (25)	2 (18.2)		
	No	3 (75)	9 (81.8)		

Note. One participant was not available for a follow-up interview.
*These locations refer to where the follow-up interview took place, *not* the group to which the participants were assigned. “Hospital” refers to both the inpatient rooms and an activity room where one follow-up interview took place.

Figure 1

Double-occupancy Inpatient Room

Figure 2

North-south Inpatient Wing

Figure 3

East-west Inpatient Wing

Figure 4

Elevator Bank and Seating Area on the East Side

Figure 5

View out the Window from the Seating Area on the East Side

Figure 6

Elevator Bank and Seating Area on the North Side

Figure 7

View out the Window from the Seating Area on the North Side
(Ariel View of the Gardens)

Figure 8

Circular Pond in the Glass Garden

Figure 9

Aisles in the Glass Garden

Figure 10

Workroom Where Horticulture Therapy Classes Take Place

Figure 11

Plant Beds in the Perennial Garden

Figure 12

Seating in the Perennial Garden

Figure 13

Central Slope in the Children's PlayGarden

Figure 14

Play Equipment in the Children's PlayGarden

Figure 15

Group Changes in Anxiety over Time

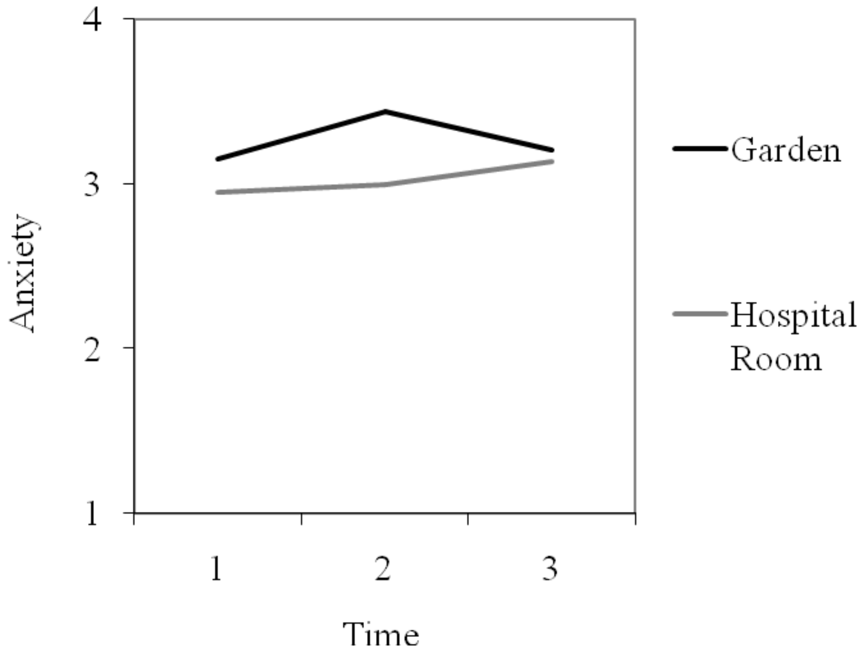

Figure 16

Group Changes in Pain over Time

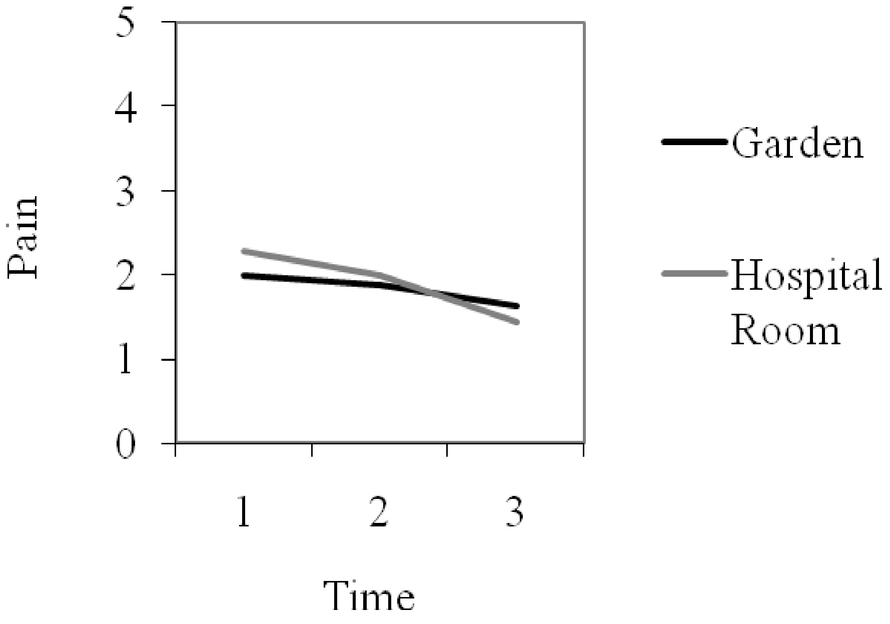

Figure 17

Empire State Building seen from an Inpatient Room

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