

Pain center waiting room design: An exploration of the relationship
between pain, comfort and positive distraction.

by

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ABSTRACT

"Too often, people in pain are stuck in limbo. With no diagnosis there is no prognosis. They feel that without knowing what is wrong, there is no way to make it right" (Lewandowski, 2006, p. ix). Research has shown that environmental factors, such as views of nature, positive distractions and natural light can reduce anxiety and pain (Ulrich, 1984). Patients with chronic, painful diseases are often worried, anxious and tired. Doctor's appointments for those with a chronic pain diagnosis can be devastating (Gilron, Peter, Watson, Cahill, & Moulin, 2006). The research question explored in this study is: Does the layout, seating and elements of positive distraction in the pain center waiting room relate to the patients experience of pain and distress? This study utilized a mixed-method approach. A purposive sample of 39 individuals participated in the study. The study employed the Positive and Negative Affect Schedule (PANAS), the Lewandowski Pain Scale (LPS) and a researcher developed Spatial Perception Instrument (SPI) rating the appearance and comfort of a pain center waiting room in a large metropolitan area. Results indicated that there were no significant correlations between pain, distress and the waiting room environment. It is intended that this study will provide a framework for future research in the area of chronic pain and distress in order to advance the understanding of research in the waiting area environment and the effect it may have on the patient.

DEDICATION

This thesis is dedicated to my sister Crissa Draper Levin, the bravest, strongest most stoic person I know. Too bad she had to get hit by a truck in order for my inspiration to strike. No pun intended.

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CHAPTER 1

Introduction

1.1 Background

Chronic pain may be one of the more difficult diagnoses to receive as a patient as well as to be treated by a doctor. Therefore, every step of the patient's journey through the doctor's office or hospital should be comforting, supportive and complimentary to care. Too often, the patient's journey begins with a waiting room that features sterile rows of attached seating, the room lacking in patient entertainment and flexibility. Updating the waiting room will not treat the illness. Yet a supportive waiting room combined with caring staff may help to mitigate the anxiety and stress associated with visiting the doctor.

This chapter discusses the justification for the study, operational definitions associated with the study as well as the scope and limitations associated in conducting the study. This chapter provides a general overview of the topics discussed in the study as well as the importance of researching chronic pain and the interior environment.

1.2 Justification

This section explores the importance of studying the issue of chronic pain and the impact chronic pain has on the patient, the care giver and on the healthcare system. It also introduces the relationship between chronic pain and the physical environment.

Chronic pain is a devastating diagnosis, often with little chance for a cure. Relief is often an individual's wish, which sadly medicine fails to grant (Gilron, et al., 2006). Chronic pain is a debilitating condition. It can have a serious impact on quality of life and functions performed in the day to day life of the individual. The diagnosis in itself is terrible, for the patient, the doctor and the caregivers. The pain itself is scary, but the patient's fear of causing more pain compounded with the fear of not being able to perform basic activities can cause a vicious cycle of avoidance and anxiety (Lewandowski, 2006). In addition to physical and emotional burdens, chronic pain is a burden to the healthcare system (Opsina & Harstall, 2002).

Chronic pain is prevalent in the general population, according to the Institute of Medicine (IOM), as many as 116 million Americans are affected by chronic, long lasting pain (2011). In a study conducted by the American Pain Society (Johannes, Le, Zhou, Johnston, & Dworkin, 2010), approximately 30% of the adult population surveyed has reported having on-going pain lasting for at least six months with an average pain intensity of at least seven on a scale of one to ten. Of the respondents, 34% were female and 27% were male and the number of respondents reporting chronic pain increased with age. Back pain was the most reported source of the pain reported by eight percent of the sufferers; arthritis pain was second at four percent. This study also noted a correlation between chronic pain and lower socioeconomic status (Johannes et al., 2010).

Chronic pain is expensive to the patient, the healthcare system and society. The cost of treating chronic pain poses a problem in the United States (U.S.) healthcare system (CDC, 2006). According to the Board on Health Sciences Policy, the national estimated economic cost of treating chronic pain was approximately \$560-635 billion dollars in medical costs and reduced productivity (IOM, 2011). Many of the patients are unable to work or sustain their normal lives without the aid of government programs and taxpayer-funded medical coverage. A study conducted by Ospina and Harstall, (2002) found that individuals with chronic pain are five times more likely to seek welfare related programs (Ospina & Harstall, 2002). Therefore, there is demand for the study of chronic pain, as it is a common, expensive and growing problem in the U.S.

1.3 Operational Definitions

Several constructs are used in this research. The following terms are defined in this section: pain, chronic pain, distress, elements of nature, biophilia, positive distraction, the waiting room, layout and reception area.

1.3.1 Pain

According to the International Association for the Study of Pain (IASP) website (2012) "pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of

such damage” (para.2). Pain can be helpful, as it acts as a warning system to the body.

1.3.2 Chronic Pain

Chronic pain is pain that is no longer helpful. It is defined by the IASP (2002) as “pain without apparent biological value that has persisted beyond the normal tissue healing time, (usually taken to be 3 months)” (p.1). .

1.3.3 Distress

Distress is an umbrella term that encompasses stress, feeling fearful or emotional and feeling anxiety. It is defined by the National Comprehensive Cancer Network (NCCN, 2007) as:

An unpleasant experience of an emotional, psychological, social, or spiritual nature that interferes with the ability to cope. It extends along a continuum, from common normal feelings of vulnerability, sadness, and fears, to problems that are disabling, such as true depression, anxiety, panic, and feeling isolated or in a spiritual crisis (para. 4).

1.3.4 Elements of Nature

Elements of nature in a waiting room area are defined as plants, exterior landscaping visible through windows, through paintings or photographs on the wall, water features or aquariums, and nature shown on television. Elements of nature have more than one dimension, allowing the patient to interact with the object using more than one sensory organ.

1.3.5 Biophilia

The definition of biophilia, according to Wilson (1993), is that humans have a genetic predisposition through evolution to respond positively to unharmful elements of nature both physically and mentally.

1.3.6 Positive Distraction

Ulrich (1992) defined positive distraction as “an element that produces positive feelings, effortlessly holds attention and interest, and therefore may block or reduce worrisome thoughts” (p. 24). Research has shown that positive distraction can reduce the intake of pain and anxiety medications in inpatient settings (Ulrich, 1984).

1.3.7 The Waiting Room

The waiting room is the area in which patients sit and wait to be called to their appointments. In this study, the waiting room is an outpatient space in a large metropolitan hospital.

1.3.8 Layout

Layout is defined as the physical space in which humans are present. It includes the arrangement, orientation, size and shape of the furniture in the space, a seat’s vicinity to the next adjacent seat, as well as

its proximity to the reception desk. Lastly, it includes the way patients, staff and equipment move through the space.

1.3.9 Reception Area

The reception area is a large desk or series of counters where patients can check in for their appointments. The purpose of their visit is often discussed here. It is also the location where insurance and personal information is disclosed to the staff.

1.4 Conclusion

In closing, this chapter discussed the justification for the study, and that chronic pain is a serious social and economic issue facing today's healthcare system (Johannes et al., 2010). This chapter also discussed the operational definitions that are defined and further explored in the literature review in chapter two. This chapter also discussed the scope, limitations and general framework of the study. The next chapter elaborates on the areas of research pertinent to this study through a detailed literature review.

CHAPTER 2

Literature Review

2.1 Introduction

This chapter discusses the need for further research into the relationship between chronic pain, patient distress and the waiting room area. The chapter begins with an overview of the available literature followed by the study research question and hypotheses. The chapter continues with the framework that covers the practice of healthcare interior design, the theories that influenced the research question and hypotheses and finally the variables associated with the study.

2.2 Background

Chronic pain is an experience that influences all aspects of an individual's life. People with chronic pain seek ways to heal in numerous ways, such as working with health care professionals to get relief, avoiding activities, and making physical compensations to maintain function and quality of life. The environments in which people with chronic pain seek care are an important aspect of healing.

Creating a healing environment is one key to the overall spectrum of healing. Available research focuses on the area of healing environments in a hospital setting. The literature covers topics about increasing productivity and reduction of medical errors (IOM, 2001), infection (Charnock, 2005) and noise (Topf & Thompson, 2001). A few

large scale literature reviews exist that summarize the current literature in the design of healthcare environments, such as *The Role of the Physical Environment in the Hospital of the 21st Century: A Once-in-a-Lifetime Opportunity*, compiled by Ulrich, Zimering, Quan, Joseph and Choudhary (2004). That dataset was further updated by Ulrich, et. al. (2008). Still After thorough research there is difficulty in finding research linking chronic pain to the built environment thus the need for further exploration in this area.

2.3 Research Question

There are many studies linking pain and the environment and the environment and distress, beginning with Ulrich's famous *Room with a View of Nature Study* in 1984. Ulrich's 1991 study that correlated higher pain to those without artwork in their rooms post surgery was also pivotal to this field of study. In 1992, Miller, Hickman, and Lemasters evaluated patients with severe burns in the hospital and found that when the patients were shown a video of nature during painful dressing changes, pain was reduced. Parsons and Hartig's 2000 study linked short exposure to natural elements with restoration and reduction of stress. In 2003, Diette, Lechtzin, Haponik, Devrotes, and Rubin studied patients undergoing a painful brochoscopy. The control group stared at a blank ceiling while the other group viewed a natural scene printed on a canvas on the ceiling. The experiment group reported a reduction in stress and pain when

compared to the control group. However, thorough research of several databases found that few studies exist on the relationship between chronic pain and patient distress, and the key features in the environment shown to affect patient comfort. This study is an exploration into the relationships between three elements: patient's perceived pain, patient distress and the design of the waiting room area. Based on the subsequent literature review, the following research question was proposed for this study:

Does the layout, seating and elements of positive distraction in the pain center waiting room relate to the patients perception of pain and distress?

2.4 Hypotheses

Based on the literature and the research question, the following hypotheses were developed. Again, this study methodology utilized three data collection instruments, the PANAS which measures positive and negative affect, the LPS which was used to report patient's perceived pain, and the SPI which was created to evaluate the patient's opinion of the three environmental aspects of the space in question in this study.

Hypothesis One:

Patients with scores high in negative affect on the Positive Negative Affect Schedule would report negative perceptions of comfort, layout and elements of positive distraction in the space on the Spatial Perception Instrument.

Hypothesis Two:

Patients with higher scores of perceived pain on the Lewandowski Pain Scale would report lower scores associated with comfort, layout and elements of positive distraction on the Spatial Perception instrument.

Hypothesis Three:

Patients with scores high in negative affect on the Positive Negative Affect Schedule would report higher pain scores on the Lewandowski Pain Scale.

These hypotheses were informed by the preceding literature review and are discussed further in Chapters Four and Five.

2.5 Global Topics

This section covers the over-arching ideas that encompass the practice of health care interior design. They include Interior design, positive health outcomes in association with interior design, and the Institute of Medicine (IOM) recommendations for the improvement of the U.S. healthcare system.

2.5.1 Interior Design

This study proposes that architects, who create the shell of the space, interior designers, who are responsible for the layout, lighting and furnishing of the environment, and healthcare practitioners, who spend their days at work in the space, are all aware there is a link between the built environment and patient well-being. In order to fully treat the

individual while in the healthcare setting, treatment begins with facility planning, architecture and interior design. As shown in figure 2.1, relationships between design and patient outcomes are emerging and the need for further research is in high demand (Ulrich, 2008). It is important to understand the relationship between the design umbrella, physiology (which is the way the human body responds to stimuli), and psychology (which is the way that stimuli is processed in the brain and how the individual reacts to said stimuli). The medical community may become more empowered to treat more than just the pain, but also the mind and the body of the patient.

Summary of the Relationships between Design Factors and Healthcare Outcomes											
Healthcare Outcomes \ Design Strategies	Single-bed rooms	Access to daylight	Appropriate lighting	Views of nature	Family zone in rooms	Carpeting	Noise-reducing finishes	Ceilinglifts	Nursing floor layout	Decentralized supplies	Acuity-adaptable rooms
Reduced hospital-acquired infections	**										
Reduced Medical Errors	*		*				*			*	*
Reduced Patient Falls	*		*		*	*			*		*
Reduce Pain		*	*	**			*				
Improved Patient Sleep	**	*	*				*				
Reduced Patient Stress	*	*	*	**	*		**				
Reduced Depression	**	**	**	*	*						
Reduced Length of Stay		*	*	*							*
Improved Confidentiality	**				*		*				
Improved Communication	**				*		*				
Improved Social Support	*				*	*					
Increased Patient Satisfaction	**	*	*	*	*	*	*				
Decreased Staff Injuries								**			*
Decreased Staff Stress	*	*	*	*			*				
Increased Staff Effectiveness	*		*				*		*	*	*
Increased Staff Satisfaction	*	*	*	*			*				

Figure 2.1 Interventions and Outcomes in Healthcare Design

2.5.2 Positive Results of Interior Design in Healthcare

As shown in figure 2.1 design can improve the areas in many aspects of patient care. This comprehensive list shows many common healthcare problems and design solutions. Patient falls have been reduced by adding lighting and carpet or hospital acquired infections have been reduced by changing to single patient rooms. Similarly, medication errors have been reduced with improved layout of equipment in a patient's room (Ulrich et. al., 2008). Using research to design the interior of the hospital can provide improved outcomes for both the patient and the staff (Devlin & Arneill, 2003).

2.5.3 Institute of Medicine Six Recommendations

The Institute of Medicine (IOM) is a non-profit, independent organization who's mission is to provide advice to healthcare providers and the public. In 2001 the IOM released six recommendations to improve the American healthcare system. Health care should be:

- *Safe*—Avoiding injuries to patients from the care that is intended to help them.
- *Effective*—Providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and overuse, respectively).
- *Patient-centered*—Providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.
- *Timely*—Reducing waits and sometimes harmful delays for both

those who receive and those who give care.

- *Efficient*—Avoiding waste, including waste of equipment, supplies, ideas, and energy.
- *Equitable*—Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status (IOM, 2001, p. 5-6).

These are leading factors in the drive for further understanding of healing environments. The IOM's goals for the healthcare system have important implications for the design of physical environments. The space must contribute to the health and healing of the patient (IOM, 2001). Lastly, the space must flow and function in an efficient manner. According to Becker and Douglass (2009), the environment can communicate the healthcare organizations' goals, objectives and values and can positively impact the patient. This idea is the foundation of patient centered care. In turn, the improvement and importance of the design of health care and healing environments is important for the well-being of the patients.

2.5.4 Healing Environments

As early as the ancient Greeks, humans have created healing spaces. The Greeks built several temples celebrating Asclepius, the god of healing. Each temple was situated on a hill overlooking the sea and provided for the sick, a refuge for recovery, revitalization, and healing (Sternberg, 2009). The concept of the healing environment was explored scientifically beginning in 1984 by Roger Ulrich. He studied the pain level

and healing time of gallbladder surgery patients who had a view of a wooded area and compared that group to those patients who had a view of a brick wall. By comparing medical records from both groups, he found that those with the view of nature had a shorter hospital stay and took less pain medication than did those with the view of the brick wall (Ulrich, 1984).

According to Stichler (2001), “the physical environment of healthcare settings can make a difference in how quickly the patient recovers from or adapts to specific acute and chronic conditions” (p. 2). In a hospital setting, many well designed elements can come together to create a healing environment, such as ventilation, access to areas of respite and meditation, daylight, and functional layouts for staff, visitors and the patients (Ulrich et. al., 2008).

2.6 Parent Theories

Three theories helped to inform the research question and hypotheses of this study. These related theories provide the foundation for the study of healthcare environments and are presented in this section. These theories include the Theory of Supportive Design, the Theory of Positive Distraction and the Biophilia Theory. Each of the theories stem from the idea that positive and natural distraction are necessary for the comfort and well-being of the patient.

2.6.1 The Theory of Supportive Design

The theory of supportive design (Ulrich, 1991) is an important theory related to the design of healing environments. This theory proposed that healthcare facilities should aid in the patients' coping with stress and help to promote wellness. It further states that the physical design of the facility increases coping and reduces stress by: 1) increasing the patient's sense of control, 2) providing access to social support, and 3) providing access to positive distractions and lack of exposure to negative distractions. In discussion of the theory of supportive design, when looking at a waiting room area, patients need to feel that they are in control of their environment. When the interior of a healthcare setting provides the patients with headphones, light level controls or individual reading lamps, the patient feels as though he is in control of his environment, which can help to ease the uncertainty of visiting a hospital (Ulrich, 1997). Small adjustments made by patients, such as the ability to adjust the temperature or lighting in their room or adjust the angle of their seat; to large-scale adjustments, such as the ability to select the furniture, artwork or color scheme in their room are becoming popular in hospital settings. This allows patients to make themselves comfortable, taking the focus off of the environment and allowing them to relax and heal. The theory's second recommendation is suggested because patients who

have access to others feel encouraged by the relationships made with family members, fellow patients and staff and provide support system and a healing environment. The third portion of the theory postulates that when patients are exposed to annoying noises for long periods of time, lights that are uncomfortably bright and a multitude of negative stimulants while waiting to see a doctor or staying in a hospital the patients' level of stress is elevated (Ulrich, 1997). Similar results have been found when the patient is deprived of any stimulation in a hospital setting (Schweitzer, Gilpin, & Frampton, 2004). Thus, the providing the patient with sources of positive distractions, like magazines, television, music or views of nature, can help the patient reduce his stress. This theory has shown to be the preferred method for design when conducting market research about preferred improvements in the hospital. Patients felt that control, socialization and distractions provided a more comfortable, homelike environment (Douglas & Douglas, 2005).

The theory of supportive design essentially indicates that providing patients with the ability to control their own comfort, via companionship, physical adjustments or entertainment, patients could potentially require less pain medication, be released from the hospital sooner and have improved satisfaction with the healthcare provider and facility (Ulrich, 1997). This study focused on the distraction portion of the theory and only touched on the aspect of control, it did not test social support. The positive distraction portion of the theory of supportive design is further developed

in the following two theories that focus on the area of positive distraction.

2.6.2 Theory of Positive Distraction

As described in the theory of supportive design, the theory of positive distraction proposes that positive distraction can help patients avert attention from the stressors associated with visiting the doctor or from their malady (Ulrich, 1982). A study conducted by Pati and Nanda (2011) explored positive distraction for children in both a dentist's waiting room and a cardiology waiting room. They found that in both cases, the use of distraction elements such as a television, a toy or a book increased calmness in the children studied. Television was found to be the most calming distraction for the children.

Pictures of nature (and other forms of nature related distractions) have been shown to reduce pain ratings and the amount of pain medications in hospitalized patients (Ulrich et al., 2008). Nature can provide a positive distraction that can occupy the patient's mind so that his body perceives his pain as lower and therefore the intake of pain medication is also lower. (Ulrich et al., 2008). Other studies have shown that the presence of natural foliage in a hospital room may instill a feeling of comfort and home in the patient which results in lower anxiety (Dijkstra, Pieterse, & Pruyn, 2006). In another arena of long-term stays, prison research has also shown that a view of nature from the cell window can reduce prisoner stress and headaches (Moore, 1982; West, 1985).

The same results have been found when evaluating out-patient waiting areas. A study evaluating patient distress in the waiting room of a dentists' office revealed through self-reporting and heart rate monitors that the presence of a large image of a natural scene reduced heart rates and reported stress compared to patient reports on the days when the wall was blank (Heerwagen & Orians, 1990).

2.6.3 The Biophilia Hypothesis

The idea that nature can influence healing stems from Wilson's biophilia hypothesis (1993), which is a collection of research discussing the evolution of the human experience and that people innately respond positively to the natural environment. Kellert (1993) summarizes Wilson's hypothesis by stating:

The wildest valuational affiliation with life and lifelike processes (ecological functions and structures, for example) has conferred distinctive advantages in the human evolutionary struggle to adapt, persist, and thrive as individuals and as a species (p.42).

Kellert (1993) also discusses the idea that humans are constantly searching for validation of their existence. Exposure to and time spent in nature helps develop that validation, and therefore improves the quality of life. Humans are rejuvenated, relaxed, inspired and supported by nature. The lack of natural elements in the constructed world has a detrimental effect on the human psyche (Wilson, 1993).

Ulrich (1991) continued on the assumption that nature can provide patients with a biological restorative response after being exposed to a stressful situation. Ulrich's work in 2008 strengthened the argument for using nature as an element of positive distraction in the hospital environment. He discussed that the biophilia hypothesis has a relationship with interior design and architecture. Designing around nature may help to provide the building's inhabitants with the positive influences of nature that humans have evolutionarily developed to need. Using nature in healthcare settings can provide patients with a recuperative, soothing environment (Ulrich et. al., 2008). This reinforces the idea that humans gain restoration, fulfillment and relaxation from exposure to nature and natural elements.

2.6.4 Theories Conclusion

These three theories, the theory of supportive design, the theory of positive distraction and the biophilia hypothesis provide the framework for defining the research question, methods and the design of this study. They are discussed further in relation to the findings in chapter five. The next section covers the variables associated with this study, as framed by the preceding theories.

2.7 Variables

There are several variables in this study. These include pain, chronic pain, distress, the waiting room environment, positive distraction, room layout, furniture and ergonomics and privacy. The variables are discussed and further defined in this section.

2.7.1 Pain

Pain is a necessary evil (Milne, 2011). Pain prevents humans from injury, warns people of illness and acts as a siren for the human body. This pain signal is essential for self-preservation (Henry, 2008).

2.7.2 Acute Pain versus Chronic Pain

There is a difference between acute pain and chronic pain, according to the International Association for the Study of Pain (2011). Pain becomes chronic after the normal healing time of approximately three months has passed yet the pain still persists (Ospina, 2002). Pain is a body's response to stimuli that is harmful. Pain acts as a warning. Acute pain is a helpful signal of danger and tells the body to stop the movement or activity to avoid harming the area further. Chronic pain does not serve as a warning to the body and is no longer signaling that the area of the body is damaged or healing. Chronic pain continues to hurt without the presence of the harmful stimuli and is no longer considered a helpful stimuli to the body (Paneral, 2011).

2.7.3 Chronic Pain

When pain ceases to warn the individual of damage and is no longer triggered by damage to the body, pain becomes chronic and can often occur as a result of the nervous system, not of the injury. The mechanism for on-going pain may not be in the area injured or hurting at all. It is becoming clear that the brain and nervous system have the power to sustain the original pain even after the initial cause of the pain is healed or gone (Henry, 2008).

In addition to the economic repercussions to the individual and larger healthcare system discussed in chapter one, chronic pain can also lead to other medical problems for the patient, such as immobility in muscles or joints, a weakened immune system, dependence on pain killers, poor sleep and extreme dependence on family and/or healthcare systems (Henry, 2008). The inability to move in a normal way for some patients can lead to deterioration of muscles and joints. The stress from dealing with chronic pain can lead to a less functional immune system, difficulty sleeping, decreased appetite, overuse of medication, pressure on caregivers and the inability to maintain employment and social connections (Henry, 2008). The psychological long-term effects of chronic pain can be, "isolation, anxiety, fear, bitterness, frustration, depression and suicide" (Henry, 2008, p.466). McCracken (1998) stated that:

When patients find their pain unacceptable they are likely to avoid it at all costs and seek readily available interventions to reduce or eliminate it. These efforts may not be in their best interest if the consequences

include no reductions in pain and many missed opportunities for more satisfying and productive functioning (p.21-22).

Pain is meant to act as an alarm to tell the body to stop what it is doing because it is irritating or causing damage. Yet if the pain does not go away, chronic pain patients may then try whatever they can to self-soothe at the risk of their health and relationships (McCracken, 1988).

2.7.4 Distress Associated with Chronic Pain

Another important area of patient well-being is mitigating distress. According to a study by Manchikanti, Fellows and Singh (2002) that investigated the treatment of chronic pain, depression and anxiety are very common in patients of chronic pain. The study found that approximately ten percent of the chronic pain population in the United States suffer from depression and 13% of the the same population suffer from an anxiety disorder as a result of their pain. Both depression and anxiety disorders often occur in combination with each other as well as with substance abuse (Manchikanti, Fellows, & Singh, 2002). Some anxiety is a normal aspect of dealing with chronic pain and is not the same as an anxiety disorder. However, there is a high instance of general anxiety disorder and post traumatic stress which occurs as a result of chronic pain. The presence of these disorders can influence pain levels, treatment, long term recovery and permanent physical and/or mental disability (Manchikanti, Fellows, & Singh, 2002).

Research has shown the amplification of chronic disease symptoms in patients with chronic medical illness who have co-morbid anxiety or depressive disorders (Katon, Lin, & Kroenke, 2007). Pain wears on the body's functioning, making it difficult to cope with other everyday and environmental stressors. Taylor, Repetti and Seeman (1997) found that "negative emotions, such as depression, anxiety, and hostility, appear to play a significant role in health risks" (p. 415). The bodies' response to these stressors (through being overly alert, resistant and exhausted) can lead to damage over time (Taylor, Repetti, & Seeman, 1997).

Other factors of distress such as anxiety tend to appear 26% more often in patients with chronic pain as compared to patients in a healthy population (Manchikanti, Fellows, & Singh, 2002). Forty-nine percent of a sample of 200 patients suffering from chronic pain displayed a clear diagnosis of an anxiety disorder. In addition, there did not seem to be a difference among men and women (Manchikanti, Fellows, & Singh, 2002).

There is a strong link between pain and distress. McCracken Zayfert and Gross (1992) found that patients experiencing higher levels of distress also reported higher levels of pain intensity. The fear of the pain plays a significant role in the life of a chronic pain patient (McCracken, Zayfert, & Gross, 1992).

2.7.5 Distress

Distress is more common among the chronic pain population compared to the healthy population (Gormsen et al., 2010). Distress may have similar symptoms and complications to depression, as it covers a wide range of psychological states (Mitchell, Rao, & Vaze, 2011). Catastrophizing, which is the inclination of the patient to focus on the worst possible scenario and the inability to cope with the potential situation, is a common aspect of distress (Jensen, Moore, Bockow, Ehde, & Engel, 2011).

2.7.6 Distress and the Environment

A constant cycle between fear of the pain and adapting to the environment can be exhausting for an individual with chronic pain. Leather, Beale, Santos, Watts, and Lee (2003) found that elements in the design of the environment may not directly cause the patient to feel distress. However, elements in the environment may compound other forms of psychosocial distress to increase patient distress. Examples of compounding psychosocial distress factors are fear associated with the financial outcomes of the diagnosis and the inability to perform duties at the workplace or at home. Therefore, any adjustment to the environment that can reduce the effect of added distress on the patient may be important. Taylor, Repetti and Seeman (1997) stated that “environmental factors are also reliably related to sustained depression, anxiety, and

anger. As such, mental health/distress constitutes a second important route by which environments may get under the skin” (p. 416).

2.7.7 Chronic Pain and the Environment

Given the wide range of issues that are associated with chronic pain, the demographic addressed in this study is quite different from the acute pain patient. The chronic pain sufferer’s shield to the stressors of the outside world are lower and therefore these individuals may be more affected by environmental stressors (Shofield & Davis, 2000). According to Leather et al., (2003), the physical environment can either help or hinder the coping of the patient. This study focused on three specific areas of the environment that have been shown to influence patient well-being in prior studies.

2.7.8 The Waiting Room

There are many variables that can potentially alter the waiting room experience for a patient. With any space and any experience, there are a myriad of factors that can alter one’s perception of pain, distress and the surrounding environment. Wait time is a big issue in healthcare (IOM, 2001). Patients who are seen promptly have less time to become anxious. They may not need the same levels of distraction than patients with a relatively long wait time. Another notable element that may affect one’s perception of the waiting room environment is the attitude of the

staff and their behavior towards the patient (Leather et al., 2003). A receptionist who is overwhelmed or in poor spirits has a direct effect on the distress of the patient (Baeder, 1998).

Bitner (1992) states that waiting rooms are what he calls “servicescapes”, that frame the space as a business. A transaction is taking place and the perception of the clientele is very important. Therefore, having a complete understanding of the client perception of the area is very important. By controlling the environment, designers can potentially reduce perceived waiting times. Shorter wait times may lead to lower patient anxiety levels (Ayas, 2008). According to Ulrich (1991), because of the needs of the space healthcare designers may sometimes create hospitals and clinics that are functional for the medical team but psychologically difficult for the patient.

2.7.9 Positive Distraction

Positive distraction is an important feature of the healthcare setting that can help to soothe the patient. A study of positive distraction conducted by Ulrich (1991) found that patients who were exposed to low levels of environmental stimulation encouraged patient boredom and that lack of stimuli led to negative feelings and depression. A lack of natural positive distraction can allow patients more time to focus on their condition and worries, which in turn can increase patient distress. It is suggested that the interior design of a space can influence stress and in turn induce

the patient to become more aware of his or her pain (Ulrich, 1991). In 1992, Miller, Hickman and Lemasters performed an experiment on patients undergoing painful burn dressing changes. The control group was offered no distraction, while the treatment group was shown a video of nature during dressing changes. The patients in the treatment group showed a significant reduction in pain ($p = .01$) and pain anxiety ($p = .02$) (Miller, Hickman, & Lemasters, 1992).

According to Becker and Douglass (2008), the shorter the perceived wait time in the space, the higher the perceived quality of care. Shorter wait times were more frequently perceived by those in waiting rooms offering televisions, magazines and exposure to views of nature. It is suggested this allows the patient to adequately distract himself from negative thoughts and sensations. Besides views of nature, Ayas, Eklund and Ishihara (2008) found indoor plants were a good choice for positive distraction as plants within the space can reduce patient distress and physical discomfort.

The space investigated in this study does not provide patients with magazines, as it may be a source for disease transmission according to the hospital. According to Charnrock (2005), the opposite seems to be true. He conducted a study collecting, swabbing and culturing magazines from several clinics and hospitals in the area. It was found that magazines were not likely to be significant sources for contamination and disease transmission.

2.7.10 Room Layout, Furniture, and Ergonomics

The layout of the room can have an impact on the patient experience in the waiting room. Ulrich (1991) believes that social support plays a large part in the patient's state of distress and wellness. Interior designers can help to encourage social behaviors among patients by selecting adjustable, comfortable furniture that can be arranged in small, flexible conversation areas and groupings. Flexibility in the space also has ergonomic benefits to the patients who may have trouble getting comfortable in standard waiting room furniture.

Ergonomics, or the seated position of the patient, can be a contributor to pain. Smidt (1994) observed several waiting environments and found that the majority of people waiting sat in a cross legged position in order to get comfortable. This position causes strain on the knees, hips and lower back. Therefore adjustments could be made to waiting room furniture to provide patients with the ability to get comfortable without putting stress on areas that may already be causing them pain.

2.7.11 Privacy in the Waiting Area

In addition to layout and ergonomics, the reception area should be private (Mobach, 2009). A feeling of privacy can come from small seating groups as well as the proximity of the seating area to the reception desk. More research is needed in the assessment of discretion and privacy in

the waiting room and how privacy relates to the psyche of the patient (Ulrich et al., 2004).

The Health Insurance Portability and Accountability Act Privacy Rule (HIPAA) provides guidelines for the privacy needed for conversations held between patients and staff. The guidelines suggest “shields, curtains or similar barriers to minimize the chance of incidental disclosure of confidential conversations to others who may be nearby” (Mobach, 2009, p. 1005). According to a study conducted by Mobach (2009), patients who visited a large counter divided into individual windows tended to feel more private when conversing with the receptionist, even though often they could still be heard from the seating area. That is a positive finding, given the fact that many waiting rooms may not have the square footage necessary to provide adequate distance between the counter and the seating area in order to minimize sound transmission.

2.8 Conclusion

The current research in design lacks attention to the relationship between chronic pain and distress. Many theories support the idea that designers can actually create healing environments. Therefore, more research is needed in order to explore the correlations between chronic pain, distress and the interior design of the waiting room area. The following chapter discusses the study methodology to explore the

relationship between chronic pain, patient distress and the design of the waiting room area.

CHAPTER 3

Methodology

3.1 Introduction

This chapter discusses the data collection instruments, the steps associated with collecting the data. This study used a mixed method approach to better understand the relationship between perceived pain, distress and the subject's evaluation of the chronic pain waiting room area. Quantitative analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software application. Open-ended responses to the space evaluation were analyzed with a card sorting method in order to determine specific elements of the waiting room area that were perceived as positive or negative.

3.2 Data Collection Instruments

This study utilized three instruments to gather data. Each of the three instruments measures ratings at one point in time. This section discusses the three instruments selected.

3.2.1 Positive Negative Affect Schedule

The first instrument was the Positive and Negative Affect Schedule (PANAS). This is a commonly used and well-validated distress assessment instrument in the field of psychology used to quantify the

subject's mood and state of mind (see Appendix B). Crawford and Henry (2004) found that the Positive Affect portion of the PANAS has a strong and well-tested internal consistency ranging from 0.86 to 0.90. The Negative Affect portion of the PANAS is also reliable with internal consistency ranging from 0.84 to 0.87. The validity of the entire PANAS instrument is well documented through several independent tests and in both clinical and non-clinical subject pools. This instrument is superior in its ability to measure the subject's positive and negative affect in a snapshot in time, which is preferred when studying the patient experience in an outpatient basis (Crawford & Harry, 2004). This is unlike other tests that examine the distress of the subject over time, such as the more widely used Beck Anxiety Inventory.

3.2.2 The Lewandowski Pain Scale

The second instrument was the Lewandowski Pain Scale (LPS) developed by Dr. Michael Lewandowski, a psychologist specializing in chronic pain management (see Appendix B). This scale of measurement requests the patient to rate his current pain level on a scale of zero to ten, with zero being no pain and ten representing unbearable pain. According to Rosier, Iadarola, and Coghill (2002), the patient's pain rating may vary between measurements. These changes occur both from the patients' typical pain variations as well as how the patient reports each experience. As pain is subjective, the LPS helps to specifically notate the pain level at

that particular moment with both a number and a written description about how the pain is affecting the patient's focus, concentration and daily activities. Lewandowski (2006) stated that pain is personal, changing, and individual to each patient. Most people, however, can agree on the functional definitions provided. Therefore, the LPS is a good choice for this study because the scale is descriptive and specific.

3.2.3 The Spatial Perception Instrument

The third instrument, the Spatial Perception Instrument or SPI, was developed by the researcher to focus on particular elements in the interior space that may impact the patient. Design elements were selected based upon the research collected and the features of the existing research site. According to Douglas and Douglas (2004), the hospital's physical environment has an enormous impact on a patient's mental and social well-being. Their study examined the patient perspective of how a hospital focusing on patient centered care should look and feel. Patients want to feel like they are at home when they are unwell (Douglas & Douglas, 2004). This idea is enforced by the theory of supportive design. At home, patients can adjust their environment to suit their needs by making themselves comfortable and easily distracting themselves from their pain. From the preceding literature review, patient comfort, layout and positive distraction in the waiting room were shown to be important variables in influencing patient pain and distress. The SPI collected limited

demographic information from the patients, such as age, gender and how many times they have previously visited the study pain clinic. The demographic information was selected by the researcher to determine the range of respondents to the survey in terms of age and gender. The instrument asked study participants their perceptions of the waiting room's levels of comfort, positive distraction and spatial layout. Responses were given using a five point Likert scale with one representing strong disagreement and five representing strong agreement to each statement. The instrument also contained three open-ended questions in order for the sample participants to report any additional positive and negative elements in the waiting room area, as well as general comments.

3.2.4 Pilot Test

A pilot test of the LPS, PANAS and SPI (see Appendix A) was distributed by the researcher to 39 graduate and undergraduate students visiting the student health center at a large public university during a five day period in January 2012. The pilot study location was newly constructed and the design of the pilot study space focused on the elements listed in the SPI: spatial layout, patient comfort and positive distraction. The pilot test was designed to test the reliability and clarity of the SPI and ensure that the other two instruments were clear and easily understandable by the study participants.

Twenty-one females and 17 males participated in the pilot study with an average age of 22. The subjects in the pilot study were not chronic pain patients. The SPI responses from the pilot study were not compared to that of the main study as the rooms, demographics and many variables were different. The responses to the SPI were used as suggestions to the health center director for areas of improvement needed in the next phase of construction.

The reliability for the Pilot Study SPI was determined by the Chronbach alphas of each portion of the instrument using SPSS. The results were moderate for an instrument of small size. The nine SPI statements was grouped into three sections by topic: layout, distraction, and comfort.

The layout section had a Chronbach Alpha of 0.76, reliable for a scale consisting of three items according to University of California Los Angeles' SPSS help website (2012). Due to the high reliability of this section, the questions in this portion remained unchanged for the main study.

The distraction portion of the SPI reported a Chronbach Alpha of 0.30, which is quite low. Given that the pilot study location did house a television and magazines and the main study did not, it was expected that when the study was performed in the main study area that did not contain the two the alpha would adjust. The last item in this section was changed as it was worded differently than the other eight statements in order to

strengthen the consistency. This section of the pilot study is discussed further in chapter five.

The comfort section of the SPI had a Chronbach's Alpha of 0.571, a moderately reliable rating for an instrument consisting of three items. The items were rearranged with the intent to improve clarity of the questions and in turn improve the reliability of the scale in the main study.

The pilot study SPI also included a question regarding the clarity and simplicity of the tools. Eighty-six percent of respondents stated that the instruments were clear and easily understood. The question following then asked, "If no, what was confusing?". From that question a few issues were reported. Three respondents stated that the LPS needed instructions and one respondent reported that the wording on the SPI was unclear.

Based on the results of the pilot study a few items were changed from the pilot SPI to the main study SPI (See Appendix B). Those changes included the reorganization of the questions, adjusting the wording of one question to ensure proper coding, and the addition of a new open-ended question that asked: What would you change about this waiting room to make yourself more comfortable? This was added help to clarify any unclear responses to the SPI. In addition to changes to the SPI, instructions were added to the LPS to improve comprehension for the main study.

3.3 Main Study Setting

The main study setting was a pain center in a hospital located in a metropolitan area of approximately five million inhabitants. The hospital features a pain clinic with a separate waiting room for its out-patients.

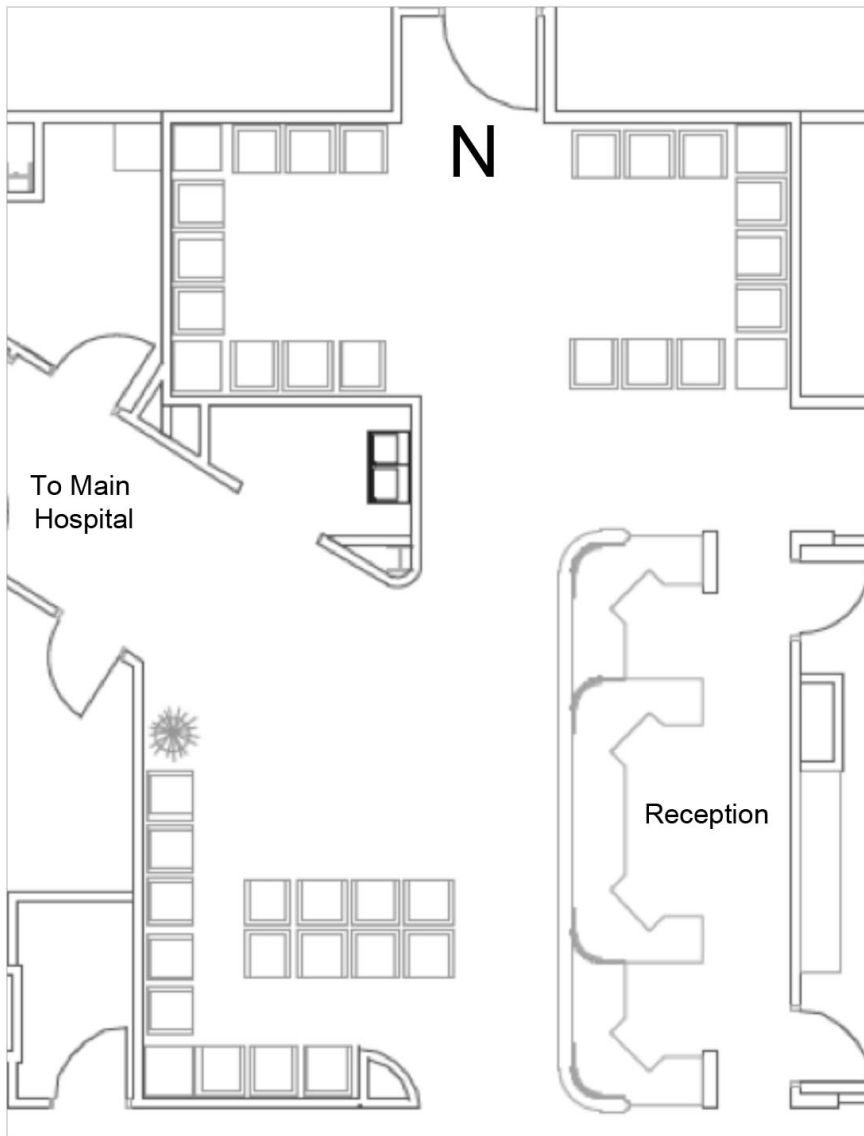


Figure 3.1 Waiting Room Existing Floor Plan



Figure 3.2 Waiting Room South Wall

Figures 3.2-3.5 show the four walls of the waiting room area. In all photos, the lights are dimmed as the photographs were taken after hours. Figure 3.2 shows the south wall of the waiting room area. The seats are rigidly in line, though there is plenty of artwork, most of it is subtle in color and consists of abstract sketches and paintings. The carpet, walls and ceilings are neutral in color. There is one live plant and one silk flower arrangement.



Figure 3.3 Waiting Room North Wall

Figure 3.3 shows the north wall. The artwork in this area is abstract shapes composed of bright colors. There is one plant and one silk flower in the corner. Like figure 3.2, the chairs are rigid and close together. The chairs can be moved but are tightly in line and heavy. This waiting room provides a hallway to the sleep center to the west as well as the treatment area for the outpatients to the east.



Figure 3.4 Waiting Room West Wall

Figure 3.4 shows the proximity of the seating and the west wall artwork, which was abstract with small amounts of color. There are no magazines, windows, television, or aquarium.



Figure 3.5 Waiting Room East Wall

As shown in figure 3.5, the east wall consists mostly of the reception desk. This desk provides no privacy for those checking in and is also lacking visual access to an American Disabilities Association (ADA) height counter. Those patients approaching the counter in a wheelchair are not able to comfortably reach the counter and are therefore sent around the desk to the left to meet the receptionists away from their computer area. This area features a large piece of brightly painted abstract artwork.

A Pain Center waiting room was selected due to its high demographic of patients in chronic pain, as opposed to a surgical center where the patients are in pain due to an injury or procedure. The space

investigated was in the interior of the hospital. As seen in the floor plan in Figure 3.1, the space contained no windows and had no access to natural light. A recent study investigating lighting and neurology showed that “normal fluorescent lighting and its related apparent flicker and motion may cause significant visual and general discomfort in some [traumatic brain injury] patients” (Chang, Cuiffreda, & Kapoor, 2007, p. 1056). Due to the large neurological population using this particular space alongside the chronic pain patients, adjusting the lighting would require much research to accommodate the other populations outside of this particular study. Therefore, both natural light and control of artificial light were eliminated as a variable from this study.

3.4 Institutional Review Board

The researcher applied to the Institutional Review Board (IRB) at Arizona State University in December 2011 (see Appendix C). The pilot study was deemed exempt and approved the following week pending approval from the hospital (see Appendix D). The pilot study was conducted in January 2012. After the changes were made to the study instruments and instructions, the researcher applied for IRB at the hospital in February 2012. The study was again deemed exempt and permission was granted in March 2012. The IRB approval letter was then sent from the hospital to the university and the researcher was given permission to proceed to full data collection.

3.5 Data Collection

Data collection occurred during the week of March 5, 2012 between the hours of eight in the morning and five in the afternoon. Data collection lasted 3 days.

3.5.1 Sample

The sample for this study was a purposive sample of patients in the waiting room at a large hospital outpatient pain center. Thirty nine study participants were surveyed in order to attain a substantial size for quantitative measurement. The study participants were between the ages of 23 and 85 and able to read and speak English without the aid of the researcher.

The hospital features a waiting room for the outpatient treatment of several disorders including neurology, psychology, sleep conditions and physical therapy. This study focused only on the patient population visiting the pain center during the study period.

In order to assemble the appropriate sample in a limited time, the specific maladies visiting the clinic were not investigated individually. Individuals with rheumatoid arthritis and fibromyalgia may have different opinions of the waiting room space from those suffering from chronic back pain. The goal of this study was to gather data in order to make design recommendations that would accommodate patients with a broad spectrum of chronic pain disorders.

3.5.2 Data Collection Protocol

The researcher was not present while subjects completed the survey instruments. Instead, receptionists asked patients of the pain center if they would like to participate in a study evaluating the waiting room environment. Upon deciding to participate, the patients were handed a copy of the oral consent form attached to the three survey instruments. If the subjects had questions, they were to ask the receptionists or were given the phone number of the researcher who was at the facility and could come and assist the subject. None of the subjects required the assistance of the researcher. After participation, the subjects returned the forms to a receptionist and the completed instruments were collected daily by the researcher.

3.6 Conclusion

This study took place in a large hospital's outpatient pain clinic. The data collection was a mixed method approach using both quantitative scales and qualitative open-ended responses with an aim to establish whether there are relationships between the patient's pain and distress, with the spatial layout, patient comfort and elements of distraction in the waiting area. The next chapter presents and analyzes the study data.

CHAPTER 4

Analysis

4.1 Introduction

This chapter reports the analysis of the data collected from the study. The chapter discusses the study demographics, the results from the individual instruments, and relationship between the study findings and the study hypotheses.

The data were analyzed using SPSS software application. The pain scores collected on the LPS were compared to the scores of the PANAS to test for correlations. Correlations were explored between pain and room layout, patient comfort, and positive distraction. Correlations were also tested between distress and comfort, room layout and positive distraction. The pain and distress ratings were also compared to the overall scores of the waiting room area from the SPI. The responses were organized into categories in order to determine if there were common responses to the open-ended questions about areas in the waiting room that were bothersome or pleasing.

4.2 Study Demographics

Fifty-nine patients participated in the study. Twenty surveys were incomplete and eliminated. Therefore the sample size was 39. The age of

participants in this study ranged from 23 to 85 with an average age of 61. Sixty-one percent of the respondents were female and 39% were male.

4.3 Instruments

This section presents the analysis of results from each of the study instruments. Discussion of these results occurs in Chapter Five.

4.3.1 LPS

Patients in the waiting room reported pain levels ranging from one to nine. The mean pain score was 5.2, median 6.0 and standard deviation of 2.1 (N=39). The mean of 5.2 falls into the category of Uncomfortable, which ranges from pain levels four to seven. This category's description reads: It's hard to move. You're having difficulty concentrating. The pain interferes with activities daily living.

4.3.2 PANAS

The PANAS was scored in accordance with the PANAS X Manual (Watson, Clark, & Tellegen, 1988). Positive affect items were added together and multiplied by the number of responses in the positive section. The same process was used for negative scores. Those scores were then compared and analyzed. Patients reported both positive and negative affects. Sixty-five percent of patients were more positive in affect than negative, 15% reported neither negative nor positive, and 20% of patients

were more negative. The positive affect scores had a standard deviation of 83 and ranged from 98-390 with a mean positive score of 226 (N=39). The negative scores had a standard deviation of 53 and ranged from 100 to 300 with a mean negative score of 153 (N=39).

4.3.3 SPI

The reliability of the SPI was tested for the main study. Two of the three subscales of the SPI reported an acceptable alpha for a three item set. The first section, entitled Layout, had a Chronbach Alpha of 0.78. The second section, entitled Comfort, had a Chronbach Alpha of 0.72. The final portion of the SPI, the Distraction section had a Chronbach Alpha of only 0.02. As a result of the unreliable alpha in the Distraction section, this section will be correlated item by item instead of the section as a whole when evaluating the hypotheses. The reliability of this instrument is discussed in further depth in chapter five. The results of the individual items are shown in figure 4.1.

SPI Subset	SPI Question	Mean	Std. Deviation	N
Layout	The chairs are too close together.	3.74	0.94	39
	I like the layout of the furniture.	3.21	1.13	39
	I have enough personal space.	2.79	0.98	39
Comfort	The chairs are comfortable.	2.82	1.07	39
	I would like to be able to adjust the seat.	2.92	1	39
	I cannot get comfortable in my seat.	3.31	1.1	39
Distraction	I would like to watch television to pass time.	2.69	1.1	39
	I enjoy viewing the plants.	2.51	1.2	39
	The room offers little opportunity to distract.	2.62	1	39

Figure 4.1 Spatial Perception Instrument Results

As described in figure 4.1, the Layout section of the SPI consisted of three items. Each item had 39 respondents. The analysis for each individual item is as follows:

Item number 3: I feel the chairs are too close together. The mean for this item was 3.74 with a standard deviation of 0.94.

Item number 5: I like the layout of the waiting room area furniture. The mean for this item was 3.21 with a standard deviation of 1.13.

Item number 7: I have enough personal space around my chair. The mean for this item was 2.79 with a standard deviation of 0.98.

The Comfort section of the SPI consisted of three items. Each item had 39 respondents. The analysis for each item is as follows:

Item number 1: The chairs in the waiting room are comfortable. The mean for this item was 2.82 with a standard deviation of 1.07.

Item number 4: I would like to be able to adjust the seating to make myself comfortable. The mean for this item was 2.92 with a standard deviation of 1.00.

Item number 8: I cannot get comfortable in my seat. The mean for this item was 3.31 with a standard deviation of 1.10.

The final section in the SPI was Distraction. Each item had 39 respondents. This section consisted of three items and the analysis for each item is shown in figure 4.1 and as follows:

Item number 2: I would like to watch television to pass the time. The mean for this item was 2.69 with a standard deviation of 1.10.

Item number 6: I enjoy viewing the plants in the waiting room. The mean for this item was 2.51 with a standard deviation of 1.20.

Item number 9: I think the waiting room offers little opportunity to distract myself. The mean for this item was 2.62 with a standard deviation of 1.00.

4.3.4 SPI Open-Ended Questions

The results from the open-ended responses in the SPI were photocopied, physically cut into separate questions and card sorted according to theme. Each answer was sorted into thematic categories and the percentage of responses were then tallied for each category. This section will only report the most commonly reported elements. All three contained several individual categories that are either irrelevant to the study or represent the feeling of only one individual.

Patients reported several answers for the most pleasing element of the waiting room. The most common element that subjects found pleasing was the piano music heard through the atrium on the first floor, according to 22% of the responses. Other pleasing elements included artwork in the space (14%) and lighting (11%), color (11%) and the auditory quiet of the waiting room (11%).

The common answer for the least pleasing element in the waiting room area was that the chairs were too close together, which was reported by 27% of the responses. The second most cited least pleasing

element was color, the chair comfort and the lack of TV and magazines each with 15%.

When asked in an open-ended question what the patients would change about the space in order to make themselves more comfortable, 20% reported they would like to have more space between the chairs. Seventeen percent stated that a TV would be an improvement for the waiting room area. Ten percent requested more comfortable chairs.

4.4 Hypotheses

This section presents the analysis in accordance with each hypothesis. Findings are discussed in chapter five.

4.4.1 Hypothesis One Analysis

Hypothesis One stated that patients with scores high in negative affect on the PANAS would report negative perceptions of comfort, layout and elements of positive distraction in the space on the SPI. The results from the PANAS were correlated to the two reliable sections of the SPI and the individual elements of the distraction portion. The results of the analysis indicated there were no significant correlations for any of the three sections on the SPI.

The negative portion of the PANAS and the elements of the Comfort section were not significantly correlated. The analysis reported a ($p= 0.25$) and a one-tailed significance of 0.06.

Correlations were run between the negative PANAS and elements in the Layout section. The results of the one-tailed correlation were not significant with a ($p= 0.23$) and a Significance of 0.77.

Correlations were run between the negative PANAS and the individual elements in the Distraction section of the SPI. The results of the one tailed correlation was significant. Item 2 (I would like to watch television to pass the time) had a ($p= 0.02$) and a one-tailed significance of 0.45. Item 6 (I enjoy viewing the plants in the waiting room) yielded a significant ($p= -0.349$) and a one-tailed Significance of 0.02. Item 9 (I think the waiting room offers little opportunity to distract myself) was not significant, with a ($p= -0.35$) and a one-tailed significance of 0.42 when compared to the negative affect scores in the PANAS.

The results of the correlations conclude that Hypothesis One was not supported and no significant relationship can be drawn between a negative opinion of the elements in the space and higher distress level. These results are discussed further in chapter five.

4.4.2 Hypothesis Two Analysis

Hypothesis Two stated that patients with higher scores of perceived pain on the LPS would report lower scores associated with comfort, layout and elements of positive distraction on the SPI. The results from the LPS were correlated to the two reliable sections of the individual items in the Distraction section of the SPI. The results of the analysis indicated there

were no significant correlations for any of the three sections of the SPI and the patient's reported pain level.

The reported pain level and the Comfort section were not correlated. Analysis reported a ($p= 0.92$), one-tailed significance of 0.29.

The pain level reported on the LPS and the Layout section were correlated with no significance. Analysis reported a ($p=-0.15$), one-tailed significance of 0.17.

Correlations were run between the reported pain scores on the LPS and the individual elements in the Distraction section. The results of the one tailed correlation were not significant. Item 2 (I would like to watch television to pass the time) had a ($p= -0.25$) and a one-tailed significance of 0.61. Item 6 (I enjoy viewing the plants in the waiting room) yielded a ($p= 0.71$) and a one-tailed significance of 0.34. Item 9 (I think the waiting room offers little opportunity to distract myself) had a ($p= -0.39$) and a significant correlation of 0.04 when compared to the pain score reported in the LPS.

The results of the correlations conclude that there was no significant correlation between patients with a higher pain level on the LPS reporting a lower opinion of the space three elements of the SPI. Therefore Hypothesis Two was not supported and are discussed further in chapter five.

4.4.3 Hypothesis Three Analysis

Hypothesis Three stated that patients with scores high in negative affect on the PANAS would report higher pain scores on the LPS. The results from the PANAS were compared to the LPS. The findings were not significant with a ($p= 0.22$) and a Significance (1 tailed) of 0.09. Therefore, Hypothesis Three is not supported by these results and are discussed further in chapter five.

4.5 Research Question Analysis

The overall study research question (Does the layout, seating, and elements of positive distraction in the pain center waiting room relate to the patient's experience of perceived pain and distress?) was no, as all three hypotheses were not supported. No correlations were found between the sections listed in the hypothesis to adequately answer this question.

4.6 Conclusion

Hypothesis One compared the negative affect portion of the PANAS to the elements of the SPI with no significance. Therefore Hypothesis One was not supported. Like Hypothesis One, Hypothesis Two compared the reported pain levels from the LPS to the elements in the SPI with no significance; therefore Hypothesis Two was also not supported. Lastly, for Hypothesis Three, the reported pain levels from the LPS were compared to the negative affect portion of the PANAS with no

significant results. Therefore Hypothesis Three was not supported. The cumulative effort of the study was addressed by the research question portion of this chapter. These results are discussed in depth in the next chapter. The findings of this study were not significant enough to adequately answer the research question.

CHAPTER 5

Discussion

5.1 Introduction

This chapter discusses the limitations and results of the study and how the findings relate to the study hypotheses and research question. The chapter also discusses how the results relate to theories involved in defining the research question. The chapter continues with suggested areas for future research. It concludes with an overall summary drawn from the results of this study.

5.2 Limitations

This chapter begins with the discussion of the study limitations in order to better explain the results found in the discussion of the hypotheses and research question that follows. This section also suggests potential improvements in future studies of this kind. The section discusses the pilot study, instruments, study setting, and study sample.

5.2.1 Instrument Limitations

Upon reflection and based on the data analysis, the researcher-developed SPI was flawed. The comfort and layout section were both reliable but the distraction portion of the instrument was not reliable. The

Comfort and Layout sections both had a Chronbach Alpha of over 0.7, the Distraction section had a Chronbach Alpha of 0.024 despite the correct coding of the items. The Distraction section needed work in the refining of the questions. The three questions involved in this section were: I would like to watch television to pass the time, I enjoy viewing the plants in the waiting room and, I think the waiting room offers little opportunity to distract myself. The statements were different in structure and content and may have been difficult to understand by study participants.

Beginning with the first statement in the Distraction section about a television, the researcher was attempting to ascertain whether the patients would like to have a television in the space. Because a television was not present in the space, it may have been misunderstood. Answers in this section were all over the scale, with 15% strongly disagreed, 33% disagreed, 23% agreed and 5% strongly agreed. If the instrument were to be utilized again, perhaps identifying another item currently present in the space would help to strengthen the reliability of this section.

The second statement, (I enjoy viewing the plants in the waiting room) also had a variety of responses. This statement was a little more concentrated in distribution. Five percent did not answer the question, 10% strongly disagreed, 35% disagreed, 33% were neutral, 8% agreed and 8% strongly agreed. There were only four plants and two silk flowers in the space, therefore, the numbers could have been skewed, (as seen in

figures 3.2- 3.5) there is a chance some patients could not see the plants from where they sat.

The third statement, (I think the waiting room offers little opportunity to distract myself) may have been worded in an incomprehensible way. The other two questions, and the remainder of the SPI, were all statements that could be perceived as true or false. This question could have been reworded more similarly to the remainder of the instrument. The responses to this statement also varied, with 13% strongly disagreed, 35% disagreed, 30% were neutral, 18% agreed and 3% strongly agreed. In conclusion more work will be needed to refine the instrument if used in a future study.

5.2.2 Pilot Study Limitations

The pilot study site was originally selected due to its similarity to the pain clinic waiting room. Unfortunately, the old waiting room was closed when data collection began and the new waiting room used for the pilot study no longer contained plants, yet did contain a television. These changes to the room impacted the distraction portion of the SPI.

The SPI asked the subjects whether they'd visited the space before. That response was not quantified because the students who had not been to the health center were given a large amount of paper work and would not have time to complete the survey instruments. A patient

who has spent more time in the space may have a different perspective of its interior than a patient experiencing the space for the first time

The pilot study could have been improved by selecting a pain center similar to the waiting room in the main study. The demographics could have been similar and could have provided a much more reliable result for use in the main study.

5.2.3 Setting Limitations

The pain center waiting room lacked many elements of positive distraction. As mentioned previously, the space did not contain windows, which does not allow for the patient to view natural elements. Upon observing the space, the researcher was unaware that the live piano music from the lobby five floors below could be heard for an hour or two per day. This would have provided a very pleasant positive distraction and was not taken into account in the design of the study. The only elements of positive distraction in the room while the music was not present were two silk floral arrangements and four small plants. The space also lacked magazines, a television and other common forms of distraction. There was artwork on most of the walls, though some were line drawings, which were subtle in shades of grey and may have been difficult for the study participants to see.

5.2.4 Sample Limitations

This study utilized a self-selected sample for study participants. The receptionists reported to the researcher that many patients responded grumpily when asked to participate in the study and thus declined to participate, thus possibly skewing the results of the study. If the majority of the patients participating in the study were in a positive state of mind the data may be skewed thus validating the assumption of parametrics. O'Leary (2010) described non-response bias as only capturing a specific portion of the sample due to a portion of the population declining to participate. This causes a skew in the results, as the sample will not be representative of the population, which was shown sampling situation created by this study. Therefore attention is needed to how the individuals are recruited, such as requiring patients to participate or providing an incentive in order to capture a wider range of patients for a future study of this kind.

Patients were recruited to the study by one of four receptionists who cycled on and off shift throughout the day. The number of overall patients who were asked to participate was not compared to those who agreed to participate. The receptionists were given an oral consent form they were to read to the patients but it is unclear as to whether the scripts were followed verbatim or whether the patients were urged to participate.

The importance of unbiased recruitment was discussed by Farrin, Russell, Torgerson and Underwood (2005). Their study explored different

types of randomized trials. The researchers concluded uniform recruitment of the patient is of the utmost importance and the utilization of a third party researcher was deemed to be the only way to get an unbiased sample (Farrin et al., 2005). In addition to an unbiased sample, it is important to recruit a cross section of the population.

The patients understood the aim of the study prior to voluntary participation, which was to explore the relationship between pain, distress and the waiting room environment. Therefore, there was risk that the patients could have become hyper-vigilant, paying more attention to the pain, distress, or the waiting room design than they usually would have been, thus skewing their responses.

A major factor that a study of this nature needs to take into account is mindfulness. Mindfulness is defined as a cycle of attention, intention and attitude about what is happening in the present moment, essentially paying deliberate attention (Shapiro, Carlson, Astin, & Freedman, 2005). People are used to moving throughout the day without noticing the individual parts and pieces that create our built environment. Patients visiting the waiting room may have been annoyed by the environment but may not have been able to identify exactly what was the irritant. Perhaps a combination of elements could affect the subject such as a, long wait, uncomfortable seating, boredom, dimmed lighting, and so forth. The subject may only notice one or two of the features leading to any perceived discomfort. Future research could address the issue of

mindfulness by perhaps exposing patients to mindfulness training and compare them to a control group who has not participated in the training.

In contrast to a state of mindfulness, some of the questions may have caused the patient to become more aware of elements in the waiting room. For example, the question on the SPI that states “I would like to watch television to pass the time” may have put the idea in the heads of study participants. Several people who responded to the short answer portion stated they would like a television in the waiting room. That could have been the result of suggestion by the survey instrument itself.

Patients making multiple trips to the waiting room may have had a pre-conceived opinions based on a positive or negative past experience. Also, having the support of family and/or friends in the waiting room could have changed the level of distraction in the space. Future studies could address these two issues by the addition of questions to the instrument pertaining to how many prior visits have been made and whether or not the patient is alone while they are participating in the study.

After conducting the study, it also became evident that perhaps the patients who agreed to participate in the study may have had a greater acceptance of their pain. This finding was discussed by McCracken, (1998) who reported that in some cases the only treatment for chronic pain is to learn how to live with it. Study participants visiting the pain center who have been suffering for years may not be as affected by distress and may have developed better coping mechanisms than others.

It would be interesting to assess how long ago each study participant were diagnosed.

This study was not generalizable to other patient demographics or waiting room areas. The study was intended to capture the current state of pain and mood of the patient in that particular pain center waiting room at the moment the study was occurring.

5.3 Discussion of Results

The data analysis rendered all three hypotheses unsupported, despite the evidence found in the literature review. As mentioned in the previous section, this was likely the result of the sampling errors as well as the reliability of the SPI. Each hypothesis and its findings are discussed in the next section.

5.3.1 Hypothesis One Discussion

Hypothesis One stated that patients with scores high in negative affect on the PANAS would report negative perceptions of comfort, layout and elements of positive distraction in the space on the SPI. Per the analysis section, there were no significant findings relating the Comfort or the Layout sections of the SPI and negative affect.

There was a significant finding in the Distraction portion of the SPI. Item 6 (I enjoy viewing the plants in the waiting room) which significantly correlated to negative affect ($p=-0.35$). This supports all three theories as

well as the foundational study conducted by Ulrich (1984) that stated people with a view of nature had reduced anxiety. This is also supported by Dijkstra et al., (2008) who found that when plants were introduced to patient rooms, there was a significant reduction in reported stress.

As a result of the self-selecting and possibly skewed sample and the shortcomings of the SPI, any conclusion drawn from the individual results would not be logical. Therefore, further exploration is needed to determine whether there is a strong relationship between higher distress and a lower opinion of the waiting room area.

5.3.2 Hypothesis Two Discussion

Hypothesis Two stated that patients with higher scores of perceived pain on the LPS would report lower scores associated with comfort, layout and elements of positive distraction as reported on the SPI. The results from the LPS were correlated to the three elements in the SPI. As noted in the previous chapter, there was no correlation found, however an individual significant finding was item 9 on the SPI (I think the waiting room offers little opportunity to distract myself.) Participants with high pain scores agreed with this statement with a significance of 0.04. Therefore, the conclusion may be drawn there could be a connection between higher pain and lower opinions of distraction, though the remainder of the distraction section showed no relationship. Previous research states there is a connection between positive distraction and lower pain levels in

patients undergoing painful burn dressing changes (Miller et al., 1992) and in patients undergoing bronchoscopy (Diette et al., 2003). In both of these studies the patient was undergoing a procedure. Perhaps there is a different reaction when exposed to distractions for procedure-related pain than for chronic pain. Further research is need to be conducted in order to discover whether there is a relationship between reduction in chronic pain and distraction in the short term pain level reduction and distraction.

5.3.3 Hypothesis Three Discussion

Hypothesis Three stated that patients with scores high in negative affect on the PANAS would report higher pain scores on the LPS. No significant correlations were found in this section, which was surprising given the strong evidence in the literature review to support this hypothesis.

The currents study's findings could be a result of the sample demographic compared to the overall waiting room population, including those who were not interested in participating. The lack of participation by this group may have greatly impacted the distress portion of the study demographic.

Finally, as mentioned previously, perhaps short term pain results in higher distress than the on-going chronic pain. Given that patients are going through their normal routine, visiting a doctor that they may have seen before and experiencing moderate pain, the current visit to the

chronic pain waiting room may be nothing out of the ordinary. Perhaps their distress is lower because they have already established good coping mechanisms when dealing with their pain. The way to evaluate this would be to determine how long the patient has been suffering from the pain and to include an instrument that measures pain coping skills in this study.

5.3.4 Research Question Discussion

The research question explored in this study was: Does the layout, seating, and elements of positive distraction in the pain center waiting room relate to the patient's experience of perceived pain and distress? In light of the findings from this study, the answer to this question can not be emphatically yes or no. More research is needed to ensure a positive or negative response. There were a few items that correlated to pain or distress but the majority of the SPI did not correlate. The issues associated with the SPI and the sample were discussed earlier in this chapter. Both factors may have played a role in the inconclusive findings of this study.

The literature indicates there should be a relationship between patient comfort, layout, distraction and perceived pain and distress. But the relationship between chronic pain and the environment is lacking evidence. Because the pain is long-lasting, behavioral modifications are necessary in order to maintain a normal life (McCracken, 1998). Due to the long exposure to pain, the patient's environment may not be as

stressful because the body shuts out stimuli in order to cope. Thus, this research question may have been misguided and will need further refinement in order to fully capture the chronic pain demographic and its relationship with the built environment.

5.4 Theories

This section discusses the findings and compare and contrast to the theories selected to support the study. Three theories were addressed in this study 1) the theory of supportive design, 2) the theory of positive distraction and 3) the biophilia hypothesis.

5.4.1 Theory of Supportive Design

The theory of supportive design postulated that the physical design of the facility increases coping and reduces stress by: 1) increasing the patient's sense of control, 2) providing access to social support, and 3) providing access to positive distractions and lack of exposure to negative distractions.

This study did not explore access to social support and only one question on the SPI touched on the patient's ability to control their environment. This question had a surprising result. Item four on the SPI stated I would like to be able to adjust the seating to make myself more comfortable. Forty-five percent of the subjects reported to be neutral in agreement to this item, 27% disagreed and 25% agreed. With such a high

response to neutral agreement, there could have been an issue with the wording of the statement. From the results, it is unclear whether the study subjects were bothered by the inability to adjust their environment. The result could change, however if the patients were given chairs that could easily move around the room or recline and then ask them to report the fixed seating in the waiting room.

One other notable finding from the open-ended portion of the SPI were the responses to the question, What would you change about the waiting room to make yourself more comfortable? One respondent requested reading lights next to the chairs that they could adjust. When asked What of the least pleasing element of the waiting room environment, two respondents reported it was too cold and they would like to be able to adjust the air conditioning. One respondent requested controls to be able to aim the air conditioning away from her seat, the other stated he would like to be able to control the temperature. So a small percentage of patients are reporting the preference to control their environment.

The next portion of the theory of supportive design is providing access to social support. This study did not delve into the area of social support. However, six percent of study participants (N=2) reported on the level of receptionist friendliness. There was no other mention of social support, companionship or conversation in the open-ended responses of

the SPI. Therefore no conclusions can be drawn on this topic based on the study findings.

The final part to this theory is providing access to positive distractions. The SPI focused a section of the instrument on positive distraction. That section, though it was deemed to be not reliable, found some results that contradicted the expected findings according to this theory. Item two stated I would like to watch television to pass the time. Thirty-three percent of respondents disagreed with the statement and 15% strongly disagreed and 23% were neutral. This finding was not offset by the findings in the open-ended portion of the SPI. When asked about the least pleasing element in the waiting room area, 15% reported the lack of television and magazines. When asked what could be changed about the waiting room to improve comfort, only 17% of study participants reported the addition of a television. Therefore, the majority still would prefer not to have a television as a source of positive distraction.

One or two of the respondents noted they would like the addition of each of the following items: an aquarium, more plants and different artwork. Participants may not have been reporting the need for distraction because they often visit doctors and the majority of waiting rooms look just like the one used in this study. They may have the same sources of distraction and is considered the status quo. This portion of the theory is discussed further in the next section. Overall, no conclusions can be

drawn as to whether the presence or lack of distraction had an impact on the well-being of the patients involved in this study.

5.4.2 Theory of Positive Distraction

Building on the previous theory and the discussion of this topic earlier in the chapter, the Theory of Positive Distraction stated that patients who are well stimulated by positive distraction tend to have a lower level of pain. Results of this study cannot support this theory. The patients reported mostly moderate pain levels. Due to the low reliability of the distraction portion of the SPI it is unclear as to whether the respondents understood the instrument statements. Participants in this study were experiencing moderate-high pain, an average of a level six on a one to ten scale. Some reported the lack of distraction, but it is unclear whether the patients would be salient of the presence or absence of distraction and be able to verbalize the difference unless directly manipulated. This study did not propose the manipulation of the variables, as it was not allowed in the hospital setting. In future studies, manipulation of variables and comparative analysis would be helpful in determining whether the results of the theory can be reproduced.

5.4.3 The Biophilia Hypothesis

Much like the theory of positive distraction, it is unclear whether this hypothesis is supported by the study findings. The hypothesis is based on

the idea that the need for exposure to nature is part of the innate nature of the human as a result of evolution (Wilson, 1993). The majority of the sample that elected to take part in the study were more positive in affect than negative at the time the study was being conducted. As noted in the previous theory sections, the open-ended section of the SPI did not uncover a recognized connection to the lack of natural distractions. This could have also been a result of the patient, dealing with so much new stimuli and being unable to process every element of the environment around him or her. In this hypothesis, the need for exposure to nature is innate, part of human instinct and therefore, perhaps not easy to recognize or verbalize. Due to the lack of correlations and open-ended responses that directly address the hypothesis, no relationship can be reported between the need for connection to nature and this study. As with the previous theories, the patients were not able to identify the need for nature. Therefore, no conclusions can be drawn as to whether the distress level of the patient was affected by the lack of exposure to nature. Further research could ascertain a clearer relationship between pain and nature in a comparative analysis or a manipulated environment.

5.5 Areas of Future Research

This section discusses areas of future research that could come as a result of this study, followed by areas of potential research sparked by the exploration of related literature in the development of this study. In the

future, if continuing with the study's model it would be imperative to develop a spatial environment instrument that could accommodate multiple waiting rooms. The development and testing that instrument would make for an interesting study too, that could help the design profession pinpoint weaknesses in the space and improve future designs based on feedback from the patients.

Another similar study could use the groundwork from this study with a reliable SPI as a model. A two group comparative study could be developed. This would involve choosing two similar waiting areas in separate pain clinics and comparing the results to see whether the same relationships are evident in both sites. Building on that topic, the study could compare a Leadership in Energy and Environmental Design (LEED) certified pain center waiting room with one that is not LEED certified.

This research can also provide a stepping stone for a future study involving manipulating variables in the waiting room, such as: adding or subtracting plants, moving the chairs closer and farther apart, adding and removing access to television, changing the stations on the television. Also, a study comparing natural light conditions to artificially lit conditions could be interesting based on the literature regarding views and day lighting. Using a comparison of this particular space and a pain clinic full of windows may provide insight into the relationship between daylight and pain levels.

One notable finding from the pilot study was that 65% of the subjects responded quite negatively when asked about the comfort. When given the statement the chairs in the waiting room are comfortable, 50% disagreed and 15% strongly disagreed. In addition when given the statement I can not get comfortable in my seat, 55% agreed and 24% strongly agreed with the statement. That finding was significant in that the setting for the pilot study was new construction and had only opened two weeks prior to data collection. The chairs were of multiple sizes shapes and in small groupings as research would dictate and all were new. Future study into the opinion of space by age range may be an interesting study as the average age of the pilot study was 22 as opposed to the main study which had a rather neutral opinion of the old, uncomfortable rigid chairs and an average age of 61.

Looking beyond the waiting room, the study could look at chronic pain in long term care facilities. Also, a similar study could explore chronic pain and children's relationship to hospital environment, which would broaden both ends of the age spectrum.

In addition to exploring different age ranges, the study could be altered to study specific patient ailments and their evaluation of the waiting room area. A comparison from each pain category demographic could help specialized pain clinics design for the needs of the specific patient population.

This study has provided a multitude of avenues for the pursuit of future research in this field. The improvement of the SPI will be necessary to proceed with many of the previous study suggestions in order to find meaningful results that can in turn inform the design of future chronic pain waiting areas.

5.6 Suggested Design Changes

This study was valuable for the specific hospital site and not generalizable to other waiting rooms. Based on the findings from the SPI, several recommendations can be made for future remodels of this particular space.

Currently the chairs in the waiting room are small and close together. Twenty seven percent of patients noted that the chairs were too close together. It is recommended the hospital chairs with wider armrests and re-designing the space so that patients feel they have enough personal space. Chair comfort was a highly reported issue. Therefore, finding chairs with proper support and cushioning is very important. Also, six percent of subjects reported the need for chairs of different sizes. The waiting room currently only contains one type of chair with a 20" width with two inch wide wooden armrests. The current chairs may be too small for some patients. The addition of chairs designed for bariatric or large patients dispersed throughout the space can accommodate a larger range of patient and companion sizes. A rendered model of the addition of different types of seating to the current space is shown in Figure 6.1.



Figure 6.1 Proposed Multiple Seating Types

The theory of supportive design also suggests multiple seating types as a way to encourage interaction between patients. (Ulrich, 1991) In addition to the social support, multiple seating types and adjustable seating would aid in patient's sense of control (Ulrich, 1991).

The second most prevalent item discussed in the open-ended responses was the lack of positive distraction in the room. Fifteen percent of the subjects reported the least pleasing element of the waiting room to be the lack of television and magazines. This was reported in the open-ended responses that asked the subjects what they would change about the space to make themselves more comfortable. Seventeen percent noted they would like the addition of a television. However, that item was contested during the distraction section of the SPI, when 33% of

respondents disagreed with the statement. Therefore, areas in the space that can see and hear the television could be separated from the patrons that may be bothered by the television, as suggested in figure 6.2.



Figure 6.2 Proposed Television Area

The addition of a television that shows only nature programming could help to increase the access to nature in the space. The Biophilia hypothesis suggests that having access to nature should reduce distress (Wilson, 1993). This hypothesis was confirmed by Miller, et al. (1992). The researchers found that patients undergoing burn changes who were shown a nature video reported lower pain scores than the patients without an audio-visual distraction. Thus, the addition of a television in the waiting

room could not only help to bring more elements of nature into the space, it could potentially calm and relax the patients.

Another element of positive distraction reported was the lack of magazines. This would be an easy solution. The addition of a variety of magazines could help patients relax and distract themselves easily and inexpensively. The addition of an aquarium was also requested as a helpful feature for distraction. This element also is considered a connection to nature and may mitigate distress and pain as suggested by all three theories. A study conducted by Katcher, Segal and Beck (1984) found that patients waiting to undergo a dental procedure in a waiting room with an aquarium reported lower distress. Therefore, the addition of an aquarium may provide some restorative benefits to the patients.

In addition to restoration, placement for the aquarium in the location shown in Figure 6.3 would also help to separate the reception area from the seating area and increase the amount of privacy in the waiting area by separating it from the reception desk.



Figure 6.3 Proposed Aquarium

In addition to seating and positive distraction, several other small changes were requested, such as, the addition of tables, reading lights, outlets in reach to charge electronics, the ability to adjust the temperature, more color, different colors and updating the carpet. The majority of the items in this portion of the list would be taken into account with any remodel and would not be a surprise to an interior designer.

One suggestion that is supported by literature and was not reported by the patients was the replacement of the artwork to depict natural scenes. Research suggests that patients tend to prefer representational art over abstract art, which currently adorns the waiting room area (Nanda, Hathorn, & Neumann, 2007). The study brought patients several pieces of

art during their stay in the hospital and the patients were asked to rate each piece. Results indicated that patients prefer artwork that depicts plants and foliage as well as water and were made uncomfortable by abstract artwork. The theory of positive distraction also notes a decrease in distress when patients view a natural scene on the ceiling while undergoing bronchoscopy (Diette et al., 2003).

The implementation of the majority of these suggestions would not require more than a weekend of down time and would not require any changes in the architecture in the space. Simple, interior design changes may help to improve the comfort, distraction and pain levels of the waiting patients.

5.7 Study Conclusions

This section discusses the overall conclusions from this study. Though all three hypotheses were not supported by statistically significant findings, the study did provide helpful directions for future research as well adding to the existing body of knowledge.

Interior design research is a relatively new field. Identifying how to test what people are experiencing, developing reliable and valid instruments to effectively evaluating the patient's perspective on the interior design of the healthcare environment will help to build on the existing research. In order to build on the current body of knowledge, unsupported hypotheses are also important results that often are not

published and should not be discounted. This study, in particular, showed that there was not a correlation between patient pain and reported distress, which is a finding contrary to prior findings. This likely was a result of the self-selecting sample or the location of the test site. Therefore, by lack of careful attention to procedure, sample selection, instrument development and analysis, it is easy to jump to conclusions. Valid research is essential to building the credibility of the field of interior healthcare design. Psychology, medicine and other research-based fields are quite skeptical of interior design research because of the lack of rigor (Pable, 2009).

In closing, this study provides important information in this area of waiting room design. Further development of the SPI, refinement of sample selection procedure for the demographic studied and more research into the proposed connections between the waiting room environment and the patient's perceived pain and distress is needed in order to provide a healthy, calming environment that is supportive to patient care.

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APPENDIX A
PILOT STUDY INSTRUMENTS

COVER LETTER

**Pain Center Waiting Room Design: An exploration of the relationship
between pain, comfort and positive distraction.**

Date

Dear Participant:

I am a graduate student under the direction of Associate Professor Diane Bender in the School of Design at Arizona State University.

I am conducting a research study to investigate the relationship between chronic pain and the waiting room area. I am inviting your participation in the pilot study, which will involve 10-15 minutes to fill out three questionnaires.

Your participation in this study is voluntary. You can skip questions if you wish. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You must be 18 or older to participate in the study and able to read English without assistance.

The results of this study will be used to inform the reliability of the instruments for the main study. The results of this thesis could inform future waiting room design decisions. There are no foreseeable risks or discomforts to your participation.

This study will not collect any identifying material. Your responses will be anonymous. The results of this study may be used in reports, presentations, or publications but your name will not be known.

If you have any questions concerning the research study, please contact the research team at: Heather.Draper@asu.edu or Diane.Bender@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Return of the questionnaire will be considered your consent to participate.

Sincerely,

Heather Draper
ASU Graduate Student
775.232.8005

Spatial Perception Instrument

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel the chairs are too close together.	1	2	3	4	5
I would like to watch television to pass the time.	1	2	3	4	5
The chairs in the waiting room are comfortable.	1	2	3	4	5
I would like to be able to adjust the seating to make myself comfortable.	1	2	3	4	5
I like the layout of the waiting room area furniture	1	2	3	4	5
I enjoy viewing the plants in the waiting room.	1	2	3	4	5
I have enough personal space around my chair.	1	2	3	4	5
I cannot get comfortable in my seat.	1	2	3	4	5
I think the waiting room offers little opportunity to distract myself from the pain.	1	2	3	4	5
The most pleasing element in the waiting room is:					
The least pleasing element in the waiting room is:					

Spatial Perception Instrument

What would you change about this waiting room environment?

Please circle the appropriate answer:

Have you visited this space before? YES NO

Are you Male or Female? M F

How old are you? _____

How long did it take you to complete the survey instruments?

_____ minutes.

Were the Instructions clear and easily understood?

Yes No

If no, what was confusing? _____

Do you have any suggestions for improving this survey's procedure or content? _____

Lewandowski Pain Scale

	Mild	Moderate	Severe	
0	1 2 3	4 5 6 7	8 9	10
No Pain	Functional	Uncomfortable	Severe	Unbearable
	<p>You are aware of your pain.</p> <p>Your daily life is affected somewhat.</p> <p>The impact on your life is minimal.</p>	<p>It's hard to move</p> <p>You're having difficulty concentrating</p> <p>The pain interferes with activities of daily living.</p>	<p>You cannot leave home.</p> <p>You have difficulty doing anything.</p>	<p>The pain is out of control.</p> <p>You find it is necessary to seek medical care.</p>

The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way at the moment. Use the following scale for your answers.

PANAS ITEMS	Very Slightly/ Not At All	A Little	Moderately	Quite A Bit	Extremely
Interested	1	2	3	4	5
Distressed	1	2	3	4	5
Excited	1	2	3	4	5
Upset	1	2	3	4	5
Strong	1	2	3	4	5
Guilty	1	2	3	4	5
Scared	1	2	3	4	5
Hostile	1	2	3	4	5
Enthusiastic	1	2	3	4	5
Proud	1	2	3	4	5
Irritable	1	2	3	4	5
Alert	1	2	3	4	5
Ashamed	1	2	3	4	5
Inspired	1	2	3	4	5
Nervous	1	2	3	4	5
Determined	1	2	3	4	5
Attentive	1	2	3	4	5
Jittery	1	2	3	4	5
Active	1	2	3	4	5
Afraid	1	2	3	4	5

APPENDIX B
MAIN STUDY INSTRUMENTS

Mayo Clinic: Office for Human Research Protection
Oral Consent Script

Protocol Title: Pain center waiting room design: An exploration of the relationship between pain, comfort and positive distraction.

IRB #:12-001510

Principal Investigator: Dr. David Rosenfeld

Co-Investigator: Heather Draper, MSD Interior Design

You are being asked to participate in a research study about patient pain, distress and the waiting room environment. As a patient of the Pain Center we ask that you participate in this study while you wait to see the doctor.

If you agree to participate you will be asked to complete 3 brief questionnaires, which will take about 8-12 minutes. The surveys will not collect any identifying material and your identity will remain completely confidential.

There are no known risks to you from taking part in this research study.

This study will not make your health better. It is for the benefit of research and will help to inform design decisions for the potential remodel of this space.

Please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. Specifically, your current or future medical care at the Mayo Clinic will not be jeopardized if you choose not to participate.

If you have any questions about this research study you can contact Heather Draper at 775-232-8005 or draper.heather@mayo.edu. If you have any concerns, complaints, or general questions about research or your rights as a participant, please contact the Mayo Institutional Review Board (IRB) to speak to someone independent of the research team at 507-266-4000 or toll free at 866-273-4681.

Spatial Perception Instrument

Please Circle the answer next to the statement that represents what you are experiencing at the moment.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The chairs in the waiting room are comfortable.	1	2	3	4	5
I would like to watch television to pass the time.	1	2	3	4	5
I feel the chairs are too close together.	1	2	3	4	5
I would like to be able to adjust the seating to make myself comfortable.	1	2	3	4	5
I like the layout of the waiting room area furniture	1	2	3	4	5
I enjoy viewing the plants in the waiting room.	1	2	3	4	5
I have enough personal space around my chair.	1	2	3	4	5
I cannot get comfortable in my seat.	1	2	3	4	5
I think the waiting room offers little opportunity to distract myself.	1	2	3	4	5
Provide a short answer for each of the following:					
The most pleasing element in the waiting room is:					

Lewandowski Pain Scale

Please circle the number that represents your pain level at the moment.

	Mild	Moderate	Severe	
0	1 2 3	4 5 6 7	8 9	10
No Pain	Functional	Uncomfortable	Severe	Unbearable
	<p>You are aware of your pain.</p> <p>Your daily life is affected somewhat.</p> <p>The impact on your life is minimal.</p>	<p>It's hard to move</p> <p>You're having difficulty concentrating</p> <p>The pain interferes with activities of daily living.</p>	<p>You cannot leave home.</p> <p>You have difficulty doing anything.</p>	<p>The pain is out of control.</p> <p>You find it is necessary to seek medical care.</p>

The PANAS

This scale consists of a number of words that describe different feelings and emotions.

Read each item and then mark the appropriate answer in the space next to that word.

Indicate to what extent you feel this way at the moment. Use the following scale for your answers.

PANAS ITEMS	Very Slightly/ Not At All	A Little	Moderately	Quite A Bit	Extremely
	1	2	3	4	5
Interested	1	2	3	4	5
Distressed	1	2	3	4	5
Excited	1	2	3	4	5
Upset	1	2	3	4	5
Strong	1	2	3	4	5
Guilty	1	2	3	4	5
Scared	1	2	3	4	5
Hostile	1	2	3	4	5
Enthusiastic	1	2	3	4	5
Proud	1	2	3	4	5
Irritable	1	2	3	4	5
Alert	1	2	3	4	5
Ashamed	1	2	3	4	5
Inspired	1	2	3	4	5
Nervous	1	2	3	4	5
Determined	1	2	3	4	5
Attentive	1	2	3	4	5
Jittery	1	2	3	4	5
Active	1	2	3	4	5
Afraid	1	2	3	4	5

APPENDIX C
UNIVERSITY IRB APPROVAL



Office of Research Integrity and Assurance

To: Diane Bender
CDN

From: Mark Roosa, Chair 
Soc Beh IRB

Date: 12/15/2011

Committee Action: Exemption Granted

IRB Action Date: 12/15/2011

IRB Protocol #: 1112007184

Study Title: Pain center waiting room design: An Exploration of the Relationship Between Pain, Comfort and Positive Distraction

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2).

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

APPENDIX D
HOSPITAL IRB APPROVAL



Principal Investigator Notification:

From: Mayo Clinic IRB
To: [David Rosenfeld](#)
CC: [Heather Draper](#)
[David Rosenfeld](#)
Re: **IRB Application #:** [12-001510](#)
Title: Pain center waiting room design: An exploration of the relationship between pain, comfort and positive distraction.

IRBe Protocol Version: 0.03
IRBe Version Date: 2/27/2012 11:54 AM

IRB Approval Date: 3/2/2012
IRB Expiration Date:

The above referenced application is determined to be exempt (45 CFR 46.101, item 2) from IRB review. Continued IRB review of this study is not required as it is currently written. However, any modifications to the study design or procedures must be submitted to the IRB to determine whether the study continues to be exempt. The Reviewer reviewed the Conflict of Interest (COI) Review Board determination related to H. Draper. The Reviewer accepted the COI Review Board determination of no conflict of interest.

As protected health information is not being requested from subjects, HIPAA authorization is not required in accordance with 45 CFR 160.103.

AS THE PRINCIPAL INVESTIGATOR OF THIS PROJECT, YOU ARE RESPONSIBLE FOR THE FOLLOWING RELATING TO THIS STUDY.

- 1) When applicable, use only IRB approved materials which are located under the documents tab of the IRBe workspace. Materials include consent forms, HIPAA, questionnaires, contact letters, advertisements, etc.
- 2) Submission to the IRB of any modifications to approved research along with any supporting documents for review and approval prior to initiation of the changes.
- 3) Submission to the IRB of all Unanticipated Problems Involving Risks to Subjects or Others (UPIRTSO).
- 4) Compliance with Mayo Clinic Institutional Policies.

Mayo Clinic Institutional Reviewer