Therapeutic Spaces For Veterans With PTSD

THESIS

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By

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Abstract

Landscape architects share an inherent desire to design unique places that promote the health, safety and welfare of users. Integral to this goal is the creation of places where the user is positively impacted. Since the beginnings of garden design, landscape spaces were intended to improve the health and wellbeing of users; from Zen Buddhist gardens like Ryōan-ji to Europe’s first mental health asylums, garden designers have long created spaces that draw on the healing power of nature, with outdoor spaces integral to the healing process. This study hypothesizes that a landscape can be designed to assist in the restorative and therapeutic process for patients suffering from mental traumas such as Post Traumatic Stress Disorder (PTSD), an anxiety disorder that occurs after a person experiences a traumatic event outside the norm of human experience (APA, 2000).

Justification for this study is the millions of Americans that suffer from this debilitating mental disorder. However, one segment of the population stands as a high profile focus of mental health media concern (Doa et al. 2011, Goode 2011, Vogel 2011). Of the 2 million soldiers returning from the recent Iraq and Afghanistan conflicts, some 300,000 are estimated to be suffering from PTSD (Doa, 2011) Not only are the veterans affected, but spouses, families, and the community at large, feel the impacts, with the costs measured in failed marriages, disabled workers, dysfunctional families and a host of other societal tolls (Garske, 2011).
In order to better serve these afflicted men and women of the military, this study responds to the need for evidence based design of landscape spaces that provide an armature for active and clinically supervised PTSD therapy. This need stems from a call from the American Society of Landscape Architect’s (ASLA) Healthcare and Therapeutic Design Network, who appealed for research and design within this topic realm (Mittrione, 2008).

The design and function of such PTSD therapy spaces is based on analysis of specific treatment protocols, veteran symptomology, battlefield spatial analysis and healing garden research. The methodology follows the evidence based design process: researching the foundation literature in both design and counseling, eliciting information from experts through interviews, and the synthesis of spatial analysis information to produce design guidelines. With these evidence based guidelines, a design for PTSD Therapy is developed on a case study site. The test site design for PTSD therapy is critically reviewed by a panel of experts from potential user groups (Occupational Therapists, Clinical Counselors, and Veteran's Affairs personnel), as well as design professionals schooled in aesthetics, healing and/or therapeutic space design. Together the collected evidence provides a process and methodology which may be replicated, evaluated and expanded upon in future studies.
Dedication

This document is dedicated to my parents- Richard and Reva Hartman. Thank you for your continued support and encouragement. Your sacrifices, encouragement and love have helped me realize my hopes and dreams.
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Chapter 1: Introduction

Historically, the act of healing has long been physically tied to the landscape. From ancient healing springs, to meditative spaces like Ryōan-ji, to Medieval cloister gardens, people have sought therapy and care in places closely tied to and immersed in nature (Cooper-Marcus & Barnes, 1999; Gesler, 2003).

![Rock Garden at Ryōan-ji- Kyoto, Japan](www.lamijapan.com/2011/01/ryoanji.html, 2008)

With modern advances in science and healthcare, nature has often been removed from therapeutic places (and subsequently therapeutic techniques). In hospitals and
healthcare centers, landscape is regulated to minimal flower beds or small rooftop or
courtyard gardens (Irvine & Warber, 2002). During the last few decades; however,
research has documented the role nature can play restoring human psychological and
physical health. The work of Dr. Roger Ulrich at Texas A&M University is often cited.
Since the 1980’s, his studies have demonstrated that “nature” (manifested in designed
gardens or other natural settings) reduces stress and anxiety, and has an overall calming
or restorative effect on mood (Ulrich, 2000; Ulrich, 2002).

Given this research, it seems that gardens and nature should play a more
important role in the healing and restoring process. Many healthcare facilities are
beginning to put these ideas into action. Pertinent to this study, the US Department of
Veteran’s Affairs (VA) published a facilities design guide in 2010 describing ideal
aesthetic conditions for mental health facilities. The guide is a detailed description of best
management practices concerning architecture, interior design and landscape architecture.
According to the guide, the design of a mental health facility should be sensitive to the
design and manipulation of natural features and landscape architecture. The guide
specifically recommends (Section 4.2.12), that the landscape (along with the architecture)
should promote the values of “treatment” and “care”. This includes the access (both
experientially and visually) to natural features and vegetation. Overall the VA guide
states that access to, “…nature can promote treatment.” In order to accomplish this, the
VA encourages designers to, “…provide attractive, secure outdoor spaces directly off the
(care) unit. In addition to ample courtyard space for patient activities, consideration
should be given to incorporating healing gardens” (V.A., 2010).
Inspiration for this project came in part from the call for research by the American Society of Landscape Architect’s (ASLA) professional practice emphasis group on Healthcare and Therapeutic Design. In response to media coverage of war-induced PTSD, this group of educators and practitioners scripted a 2008 proposal for the establishment of a National Veteran’s Therapeutic Garden. This proposed landscape designed garden would ideally be located in (or adjacent to) an existing VA hospital. This connection would provide for a working research laboratory that would employ evidence based designed spaces to assist in mental health care for veterans. The garden should yield valuable data for future such therapeutic gardens (Mitrione 2008). This study responds to the ASLA proposal as a framework and guide in research and design.

Another inspiration for this study is the precedent project of the Therapeutic Garden for Children in Wellesley, Massachusetts. Designed by the landscape architecture firm Reed Hildebrand, the garden treats traumatized children through a series of elegantly sculpted spaces that intelligently employ plant material and landform (Crisp, 1998). The one acre site provides therapy for children suffering with behavioral, learning and emotional disorders. Key to the garden is the idea that human growth and development is fundamentally rooted in childhood engagement with the landscape (Reed, 1995). The designers (working with therapists) employed a series of spaces that provide sensory and symbolic experiences. These spaces encourage and allow children to engage in inner healing and outward expression, both keys to successful recovery. This project embodies the hypothesis for this study; that a designed landscape can play an active role in mental therapy and restoration.
Similar to the disorders treated at the garden in Wellesley, Post Traumatic Stress Disorder (PTSD) is also a complex mental disorder with various symptoms and specific treatments. War-induced PTSD is classified as anxiety disorder which elicits specific symptoms including: intrusive re-experiencing memories (flashbacks), avoidance behaviors and hyper-arousal. These debilitating symptoms are treated using a combination of medication and psychotherapy. One such treatment method, Exposure Therapy, holds the most potential for spatial landscape interventions. This study seeks to uncover opportunities within this and other PTSD psychotherapeutic processes where spatial landscape interventions can assist in (and provide a platform for) therapy sessions.

Overall, this study utilizes existing research in the realms of occupational therapy, environmental psychology, counseling, and healthcare design. The multidisciplinary scope of data synthesis produces design guidelines which inform the final design concepts of the project. The spaces, types of materials, color choices and scale (among other details) are a means to providing a platform that both structures and assists PTSD therapy and overall patient restoration.
Chapter 2: Justification and Background Information

As of June 2012, the U.S. has had a military presence in the Middle East and Afghanistan for close to 11 years. Even though the Iraq War officially ended in December 2011 and troop levels in Afghanistan begin to be drawn down, causalities continue to be seen (Shankers et al., 2011). Current soldiers and newly discharged veterans are returning home with physical and mental traumas. Stories of wounded veterans and the implications of their varied impairments have been a constant news topic during these war years (Doa, 2011, Leonnig, 2012). Many veterans return with horrific scars and wounds which visibly give evidence to the sacrifice of fighting in combat, or wounds from every day activities where the citizen based insurgencies are prone to strike. However, the invisible wounds are just as prevalent and manifest themselves in psychological ailments and disorders, or compound the physical wounds suffered.

Estimates as to the prevalence of PTSD among recent (2002-2012) veterans are varied. Due to differences in case definitions or other classification methods, consistent and accurate figures are difficult to obtain. One estimate suggests that 20% of active duty and 42% of reserve duty soldiers suffer from PTSD symptoms (Milliken et al., 2007). Another study estimates between 9% and 31% of recent veterans suffer from PTSD and depression (Thomas et al., 2010). Figure 2 compares veteran PTSD prevalence statistics for the last three US military conflicts.
Finally, a broad based study of PTSD occurrence in the literature of the 2000’s offers a 10-18% range of PTSD prevalence among young veterans (Litz & Schlenger, 2009). This figure will be used in this thesis. With roughly 2 million troops deployed in Operation Iraqi Freedom and Operation Enduring Freedom since 2001, at the range cited by Litz and Schlenger, suggests that between 200,000 and 360,000 veterans suffer from PTSD symptoms from these conflicts alone (Dao, 2011). This number could potentially be larger given that prevalence estimates are based solely on those soldiers seeking help, potentially undercounting soldiers who chose not to seek help. In addition, this number
fails to account for those soldiers where symptomatic PTSD has not yet manifested itself or who have been mis-diagnosed, or have died without a diagnosis.

These thousands of patients receive treatment across the country at VA healthcare and other mental health centers. Each VA medical center offers PTSD specialists who administer treatment and therapy. These specialists range in education and licensure but are typically, Clinical Social Workers, Master’s Level Clinicians, Clinical Psychologists and Psychiatrists. The VA facilities offer medication, one to one psychotherapy, group therapy and family therapy. In addition to these basic care structures, specialized care programs are also available at certain locations. These uniquely designed programs take place at both standard outpatient facilities and at more rigorous in-patient facilities. Specialized care programs seek to treat soldiers with severe PTSD symptoms and/or soldiers that are struggling with substance abuse, chronic depression, suicidal tendencies or other co-morbidities (V.A., 2012).

One prominent VA facility dedicated to the specific treatment of veterans with PTSD is the National Women’s Trauma Recovery Program (WTRP). It is located in Menlo Park California and has been serving female veterans since 1992. This retreat center conducts in-patient PTSD care for female soldiers struggling with PTSD from combat or military related sexual trauma. The multiple-acre center houses a 60-day residential program, promoting emotional regulation, relapse prevention, anxiety management and interpersonal functioning. Therapies and exercises are often conducted in group settings in order to encourage women to overcome isolative and/or untrusting behaviors. The grounds of the facility are touted as a, “beautiful, lush campus” which
offers many, “areas to spend quiet time and enjoy the lovely weather, gorgeous trees and idyllic grounds.” (WTRP, 2011). Outdoor spaces facilitate spaces for meditation, group interaction, and art therapy. According to the center’s website the, “…serene campus...affords women privacy and an opportunity to interact and heal.”(WTRP,2009). Given this description of the physical aspects of the grounds, it is clear that an environment of care is being cultivated here.
Chapter 3: Methodology

Since this project aims to produce evidence based design recommendations for therapeutic spaces, it is important to understand precedent studies and projects which have measured nature’s (or landscape’s) role in healing. Overall little research has empirically proven the true effectiveness of landscape as healer (Cooper-Marcus & Barnes, 1999). The often cited 1983 study by psychologist Dr. Roger Ulrich, “View Through a Window May Influence Recovery from Surgery” provides empirical evidence that hospital patients with a view of nature had statistically shorter hospital stays, lower analgesic use and fewer complaints during recovery (Ulrich, 1983; Ulrich, 2000; Ulrich, 2002). While these patients experienced quicker recovery from physical ailments, the study does not address mental health traumas- central to this project’s focus.

More recent literature from the Scandinavian Journal of Public Health addresses the supposed integral connection between landscape and (mental) health. In this study, researchers systematically reviewed controlled and observational studies of “Nature Assisted Therapy” or NAT for patients with various physical and mental disorders (obesity to schizophrenia). The authors described NAT as using, “…plants, natural materials, and/or outdoor environment” to treat, hasten recovery or rehabilitate patients groups. While the results of the review were positive (26 of the 29 cases studied saw health improvements) the official conclusions of the researchers found that the study showed, “rather small but reliable evidence” that, “NAT was a relevant resource for public health” (Annerstedt & Wahrborg 2011). These positive results are encouraging;
however, once again this study does not specially address PTSD. It is fair to state that this realm of research is still in its infancy.

Design projects that seek to create places for healing and therapy are numerous. Few if any post occupancy or clinical evaluations have been done to truly gauge their clinical effectiveness. Even the precedent project used in this thesis study, the Wellesley Children’s Therapeutic Garden, has won numerous design awards and has much written anecdotal evidence as to its effectiveness; however, empirical research concerning the associated therapeutic benefits are non-existent.

Given the scarcity of applicable research, this project seeks to begin to bridge the gap between therapy and the role of landscape specific to mental disorders like PTSD. In order to establish a methodology for evidence based design, this project draws from different sources in order to ground the design analysis and ultimately the design interventions.

First and foremost, the project defines PTSD, its symptoms and current treatment protocols. The specific therapy process (in-vivo exposure therapy) is detailed with a focus on the applicable aspects to landscape architecture. This therapy involves exposing patients to conditional and contextual distressing elements, many of which are space and place based, allowing opportunity for design interventions as a base for therapy. An inventory of distressing situations and conditions is collected from various sources, after which categories of the stimuli are parsed out. In order to gain greater spatial understanding of these distressing triggers, a “warscapes” analysis was conducted of landscapes of combat as experienced in Vietnam, Iraq and Afghanistan. Spatial
conditions from these “warscapes” then informed a case study site interventions and final conceptual design of potential therapeutic spaces. A flow chart of the methodology was developed to clarify the process (Figure 3).

![Figure 3- Methodology Flow Chart (Hartman, 2012)](image)

**Defining PTSD**

A clinically accepted definition of PTSD is “an anxiety disorder that occurs after a person experiences a traumatic event, such as a natural disaster, act of violence or abuse, or other prolonged life threatening experience such as fire or war” (APA 2000). Basically, a traumatic event is described as anything outside the norm of human experience (Nanda et al., 2010; Spira et al., 2007; APA, 2000). Warfare related traumas include:

- Exposure to dead or injured enemy/fellow soldier/civilian
- Physically affected by explosions/gunfire
- Witness to brutality and inhumanity (soldiers, detainees, friends and civilians)
- Personally killed enemy
- Exposure to uncontrollable/unpredictable life threatening attacks
- A near death experience
- Exposure to sights, sounds, smells of dying men and women
- Observing devastation of communities, homes, refugees

(Garske, 2011; Nanda et al., 2010; Spira et al., 2007)

Studies show that once a traumatic event has been seen or experienced, the brain’s limbic system is overwhelmingly affected. Responsible for a host of functions and memory storage, the limbic system is evolutionarily speaking, one of the oldest parts of the brain. Basic, even primal fight or flight functions are modulated here, as well as fear and threat learning processes. PTSD, in many ways, undermines or presupposes many cognitive or other reason based functions of the brain, leaving many patients with the inability to overcome the disorder on their own accord (Nash & Baker, 2007).

Post-Traumatic Stress Disorder has a storied nomenclature history. We find the first referenced war-induced mental disorder in Homer’s *Iliad* in 850 B.C. Here, Achilles is described to be mentally affected by the traumas suffered during the Trojan War, (Homer, 850 BC). In fact some Spartan accounts labeled the disorder as “The Trembler”. (CBC, 2011). During the American Civil War (1861-65) the term “Soldier’s Heart” was commonly used, and during the two World Wars, terms like, “Shell Shock”, “Traumatic Neurosis”, “Combat Fatigue”, “War Neurosis” and “Gross Stress Reaction” were used
(Garske, 2011; Spira et al., 2007). After the Vietnam War ended and battle veterans were once again suffering from mental wounds, the condition received more adequate study and began to be defined in scientific terms. Officially, the disorder was first listed in the 1980 edition of the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM). The 2000 edition (DSM-IV-TR) classifies PTSD as an anxiety disorder (Garske, 2011; Nanda et al., 2010).
**PTSD Symptoms**

Current research suggests that PTSD symptoms are primarily brought on by internal or external cues which resemble or are symbolic of the original traumatic event (Garske et al., 2011). Symptoms may have delayed onset and surface weeks, if not months or years after the traumatic event. Duration of symptoms is classified as acute (3 months or under) or chronic (over 3 months). (Spira et al. 2007; V.A. 2010; Garske, 2011; Friedman, 2006)

These sources classify symptoms in 3 clusters:

1. **Rexperiencing**
   - Intrusive memories, thoughts, nightmares, flashbacks

2. **Avoidance/Numbing**
   - Of thoughts, feelings, places and situations related to event
   - Inability to recall important aspects of event
   - Decreased interest in significant activities
   - Feeling detached from loved ones and friends
   - Sense of foreshortened future

3. **Hyperarousal**
   - Difficulty sleeping and/or concentrating
   - Hypervigilance
   - Increased irritability
   - Exaggerated startle response (feeling on-edge or jittery)
   - Difficulty modulating arousal
In addition to these symptoms, veterans often experience clinical impacts that go beyond the narrowly defined symptom criteria mentioned above, where they exhibit diminished functionality socially, emotionally and physically. These symptoms are seen in those diagnosed with PTSD.

The VA also recognizes that PTSD often predisposes soldiers to other physiological problems including; difficulty concentrating, difficulties with memory, dizziness, chest pains, lower blood pressure and other physical ailments. The VA estimates that up to 80% of soldiers with PTSD also meet criteria for other psychological problems. These complex issues result in a lowered quality of life and reduced ability to function normally (V.A. 2011). This lower quality of life impacts not only the patient, but also the families, friends and community at large. In the clinical field it is generally understood that PTSD is an ailment that has significant personal and societal costs (Garske, 2011). Costs to society include criminal offences. One source claims that 39% of incarcerated veterans have been diagnosed with PTSD (HBO, 2010).

In addition to other associated symptoms and costs, the mere management of PTSD symptoms often times is problematic to veterans. Often before seeking professional help, soldiers with PTSD attempt to cope with their PTSD symptoms. Some examples of these coping mechanisms include: self-medicating (with substances, drug and alcohol abuse) to numb thoughts/feelings/emotions; living reclusively or in an isolated bubble; and numbing and/or distancing themselves from emotional experiences and relationships (Garske, 2011; Finley, 2011).
PTSD Treatment

Treatment is often not symptom specific, since symptoms are commonly interrelated and are triggered by similar stressors. Treatment has generally two main objectives: Normalize the stress response and facilitate reduction of maladaptive psychological processes (Garske, 2011). Strategies to overcome the disorder typically come in the form of medication coupled with psychotherapy counseling. The medication prescribed lessens anxiety/depression symptoms via drugs that deploy serotonin reuptake inhibitors. These anti-anxiety or anti-psychotic drugs were historically the only measure taken to treat PTSD; however, since the 1990’s the guidelines for the best practices include using both strategies. Counseling approaches typically include the use of three techniques, all of which attempt to aid the patient in the healthy processing of the traumatic event. Detailed below are the most used therapy techniques (Spira et al., 2007).

Cognitive Behavioral Therapy (CBT)

For patients that experience a persistent memory or an unshakeable thoughts, this approach is best suited. During treatment the counselor engages the patient about the traumatic memory in an effort to help the patient better understand and organize their own thoughts and feelings. The patient is taught why trauma impacts their thoughts and emotions. Once this is established, a patient is then instructed to restructure their thoughts and emotions in an objective healthy manner. For instance PTSD patients oftentimes have feelings of guilt and self-blame concerning the event. CBT therapy attempts to restructure this inaccurate and unfounded thought pattern. CBT is an approach that is conducted once a week for 3-4 months with a counselor (V.A., 2011).
Eye Movement Desensitization and Reprocessing (EMDR)

During a traumatic event or multiple events the brain is unable to adequately process the emotions and thoughts that accompany the event. EMDR helps target the main memory or image of the tragic event and physically assists, (with rapid eye movement exercises) the brain’s successful sorting of the memory. Once these are adequately processed, the patient is instructed as to how to install positive thoughts. EMDR therapy courses last 4 to 12 months (V.A., 2011).

Other Therapies

VA healthcare centers also offer alternative or varied therapies. These include group therapies for those struggling with interpersonal issues or distancing behaviors. Group therapies allow for patients to share their thoughts and feelings to a supportive group of their peers. Group therapies can even include work or service groups who actively produce or make things together. In addition to group therapy sessions family programs are offered. Giving spouses and children the chance to share and become part of the healing process has shown to be very successful for PTSD veterans (Johnson & Lubin, 1997).

In addition to these therapies, emergent creative therapies are gaining favor in the therapeutic community. Two authors suggest that art therapy holds potential for PTSD treatment. This can be in the form of art-making or art observation. In their overview of the literature the authors outline guidelines for art (both making and viewing) in the therapeutic sense (Nanda et al., 2010; Moon et al., 2006).

Prolonged Exposure Therapy (PE)
Central to the hypothesis of this design project, PE therapy intentionally confronts the patient with past memories or stimuli, helping them face their fears and avoidance upfront. This therapy is typically conducted using three different techniques, Imaginal Exposure Therapy, Virtual Reality Exposure Therapy and In-vivo Exposure Therapy. Many researchers agree that exposure therapy is the most successful and therefore optimal therapeutic treatment option for veterans with PSTD (Rothbaum et al., 2000; Tuerk et al., 2011; Garske, 2011; Rauch, 2009). The following paragraphs describe the different variations of Prolonged Exposure Therapy.

**Imaginal Exposure**

Similar to in-vivo, this technique has the therapist lead patients through exercises where they talk about and imagine the traumatic event. This imaginal exposure helps establish control over thoughts and feelings (V.A., 2010). These imagined accounts are often audio-taped to allow patients to be reexposed to the stress many times over. After many exposure sessions the anxiety experienced lessens. According to research experts, “Successful treatment requires emotional processing of the fear structures (evoked by trauma) in order to modify their pathological elements so that the stimuli no longer invoke fear” (Foa & Meadows, 1997).

**Virtual Reality Exposure Therapy (VR Exposure)**

Exposure therapy in recent years has been assisted by advances in technology. Since 1997, scientists and counselors have been testing the use of computer based virtual reality environmental exposure to treat PTSD. Since some PTSD patients lack the ability or willingness to adequately or accurately reimagine their own traumatic situation, VR
equipment provides a medium where simulated environments are more clearly experienced using sight, smell, sound and touch (Rizzo, 2008). Commonly re-created environments have included helicopter, supply truck convoy, gun mount, urban street, burning building and explosion simulations (Gerardi et al., 2010). While these treatments have seen success, it does not mean that reality-based exposure therapy is inferior (Reger et al., 2009). One study concluded that exact replications of these environments aren’t necessarily required to elicit proper anxiety for treatment (Spira et al., 2007).

In-vivo Exposure Therapy

In-vivo (Latin for “within the living”) exposure therapy is where design interventions (and thus landscape architecture) can provide assistance, given its conditional and spatial parameters. This in-vivo therapy is conducted with therapists or at home as detailed below:

“In-vivo exposure requires approaching real situations such as driving a car or going to crowded public destinations that the patient has avoided since the traumatic event. The mechanisms for symptom reduction involve activation and emotional processing of the traumatic memories, extinction/habituation of the anxiety, cognitive reprocessing of pathogenic meanings, the learning of new responses to previously feared stimuli, and ultimately an integration of corrective non-pathological information into the fear structure. Such changes allow the survivor to tolerate memories of events without emotional flooding or rigid avoidance, and to restore more realistic views of the self, others, and world. PTSD patients can then begin to process emotional trauma memories adaptively as needed for successful coping and healing” (Rizzo, 2008).
In-vivo exposure exercises are at times conducted with therapists. Patients are gradually led into safe stress-inducing environments over many sessions. During these sessions, the therapist will track the patient’s stress levels for each stimulus, ensuring that the stressor is not harmful (Downey, 2012; Richards et al., 1994). When a patient is assigned in-vivo therapy on their own, care is taken to insure that distressing situations are doled out in careful increments. In addition to this safety measure, patients are allowed coping strategies or support mechanisms that allow escape during the session. While the hope is patients will stay in the distressing space or situation, therapists do allow for relief.

Studies have shown the in-vivo exposure treatments improve trauma related phobia avoidance and other symptoms. Many citations in the psychiatric literature and case studies tell of various situational or spatial exposure sessions for veterans. These include, but are not limited to, unsafe buildings, walking near or on stone or construction rubble, visiting war memorials or museums, visiting airfields and helicopter pads, visiting public places and visiting crowded places (Turner et al., 2005; Salcioglu et al., 2007; Tuerk et al., 2011). Figure 4 displays the in-vivo therapy procedure.
In order for in-vivo exposure to be effective, researchers warn that care must be taken to ensure exposure is safe. One study warned deconditioning a veteran’s fears and stresses should not take place in an exactly replicated environment. In other words, a real-life simulation of battle would likely do more harm than good (Lyons & Keane, 1989; Richards et al., 1994). According to one study, in-vivo exposure need not be precisely accurate to the original trauma experienced, that is, mere abstractions of events can sufficiently induce the correct amount of therapeutic anxiety (Moulds et al., 2006).

**Prime Source- Healing Gardens**

In their seminal work, **Healing Gardens: Therapeutic Benefits and Design** Recommendations, landscape architects Clare Cooper-Marcus and Marni Barnes give an exhaustive look at various types and scales of healing spaces. Beginning with the
historical and cultural foundations of nature’s role in healing the book describes the evolution of various types of healthcare designs through history.

In the third chapter of Healing Gardens, the authors provide a framework philosophy for designers tasked with healthcare projects. They begin by explaining the process by which the environment is observed and interpreted by the user. As humans engaging in the environment we are constantly receiving stimuli. Some inputs are processed and interpreted cognitively while some stimuli subliminally impact our emotions or feelings. Spatial meanings or suggestions, such as an open door feeling “welcoming” or a large scale structure feeling “monumental”, are examples of this intuitive process. Understanding these processes is important for designers, as healthcare clients are a vulnerable user group. In fact, medical patients are known to be more inclined to perceive threatening or depressive messages from objects in the environment. It is therefore imperative that designers thoroughly study and understand how patient groups observe and perceive elements in their environments (Cooper-Marcus & Barnes, 1999).

*Healing versus Therapy*

Important to the exploration of healing and place is the proper distinction between healing and therapy; as it relates to design. Much has been written in landscape architecture media about healing gardens and spaces. The designed spaces found within hospital courtyards, adjacent to a therapist’s offices or spread across an institutional grounds are typically tasked with soothing, recreating or calming patients. Some spaces are designed merely to provide a pleasing view and do not allow occupation. (Gerlach-
Spriggs et al., 1998). This passive approach is solidified in Cooper-Marcus and Barnes work, *Healing Gardens*. As defined in their opening chapter a healing space provides: Relief from physical symptoms, stress reduction and improvement of overall sense of well-being (Cooper-Marcus & Barnes, 1999). While all admirable goals for a space, the active use of space as remedy and part of the therapeutic environment is lacking.

Therapeutic space, in contrast, implies a greatly different approach. Again *Healing Gardens* offers a foundation definition of a therapeutic garden being a;

“…designed space that, facilitates a process”. While a host of literature exists on the study and design of healing gardens, “literature on the use of outdoor space as a therapeutic tool is scarce” (Cooper-Marcus & Barnes, 1999). This project begins to bridge a portion of this research gap by offering a grounded, evidence-based design methodology, though there remains a gap in empirical, clinical evaluation of the healing spaces and therapy places which exist.

*Precedent- Children’s Therapeutic Garden*

An exemplary case study on the research and design of a patient sensitive therapeutic garden can be seen in Reed Hilderbrand’s Children’s Therapy Garden. This one-acre garden and therapy center sat (the facility recently was unfortunately demolished) adjacent to the counseling offices of the Children’s Therapy Center in Wellesley, Massachusetts (Raver, 2005). The center treated children who had witnessed traumatic events through intentional interactions with nature. Collaboration between Douglas Reed (lead designer) and Sebastian Santostefano, PhD (lead psychiatrist) yielded
a developmentally based approach that was sensitive to how the garden’s landform, water and plants were composed.

Santostefano’s three decade career of working with children relies heavily on the notion that human interaction with nature is a vital experience and central to awareness, recovery, transformation and development (Reed, 1997). He explains that, “when trauma strikes, the child’s mind draws a mental line between mind and body. Landscape designed for the therapeutic purposes can help give rise to embodied memories and feelings” (Hammerslough, 1997). The garden then, attempts to provide various sensory and symbolic experiences which enable the child to internally process and externally express thoughts and feelings. Providing these experiences is the garden and its many distinct spaces. These “worlds within worlds” utilize landform (mounded hill) water features (serpentine rill) and specific plant material (weeping tree cave) (ASLA, 1997). Examples of these features are displayed in Figure 5.
Feelings of safety and security, exploration, seclusion, discovery and risk taking are all able to be experienced within these spaces. The winding rill provides one of the most important aspects of the garden- the ability to draw children out into the space. In addition to these active therapeutic roles, the landscape also provides a diagnostic mechanism for the therapist. As a child engages with or struggles to engage with spaces within the garden, therapists can chart and track breakthroughs or set-backs. Elements of
Douglas Reed’s process and final implementation were strong precedents for this study. The collaborative approach—uniting design and the input of psychotherapists coupled with the unique use of landscape—as therapy supplement and diagnostic gauge provided a framework for this study process and development.
Chapter 4: Case Study

While the purpose for this study is the development of a process, and not a polished and explicit site design, having a site context for design interventions is indeed helpful. A physical site allows for spatial interventions to be contextualized, landscape program to be sequenced and arranged, and finally, it offers an ability to forecast how spatial theories translate into real spaces. In addition, case studies allow designers to ask how and why questions more effectively (Lee, 2009). Experts claim that if case studies were, “… applied more frequently, (they) would significantly improve design.” (Windhager et al., 2010).

Distressing Stimuli Identification

In order to provide an armature for better in-vivo exposure, it is necessary to gather data concerning specific situations, experiences and spaces which create distress for veterans. Acquiring this data is difficult, as direct contact with veterans was not realistic for this project. In addition, research related to in-vivo exposure therapy typically does not include qualitative descriptions or anecdotal data necessary for this specific goal. Given these realities, effort is made to utilize different sources to gain a diverse understanding of distressing or anxiety inducing situations. Compilation of these situations comes from soldier/veteran first-hand accounts, clinical articles relating to in-vivo exposure and interviews with clinicians that administer in-vivo therapy. Sources are gathered from
print media, video, and interview formats. These sources are compiled in a Distressing Stimuli Matrix (Figure 6).
<table>
<thead>
<tr>
<th>Anxiety Inducing Stimuli</th>
<th>Spatial Characteristics/Themes</th>
<th>Design Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural scenery (6)</td>
<td>Inexpensive, low cost, close to home</td>
<td>Minimal cost, compatibility, accessibility, aesthetics, safety, sensory experience</td>
</tr>
<tr>
<td>Man-made objects (5)</td>
<td>Inexpensive, low cost, close to home</td>
<td>Minimal cost, compatibility, accessibility, aesthetics, safety, sensory experience</td>
</tr>
<tr>
<td>Indoor environments (4)</td>
<td>Inexpensive, low cost, close to home</td>
<td>Minimal cost, compatibility, accessibility, aesthetics, safety, sensory experience</td>
</tr>
<tr>
<td>Public spaces (3)</td>
<td>Inexpensive, low cost, close to home</td>
<td>Minimal cost, compatibility, accessibility, aesthetics, safety, sensory experience</td>
</tr>
<tr>
<td>Industrial environments (2)</td>
<td>Inexpensive, low cost, close to home</td>
<td>Minimal cost, compatibility, accessibility, aesthetics, safety, sensory experience</td>
</tr>
<tr>
<td>Natural environments (1)</td>
<td>Inexpensive, low cost, close to home</td>
<td>Minimal cost, compatibility, accessibility, aesthetics, safety, sensory experience</td>
</tr>
</tbody>
</table>

**Figure 6- Anxiety Inducing Stimuli Matrix (Hartman, 2012)**
After the matrix of stimuli is populated, categories are identified. Each of the categories in the first column corresponds to different activities/spaces/details: Driving, Walking and Spatial, Architectural, Other Sensory Inputs (Sights, Smells, and Sounds). Next, the stimuli are deconstructed by breaking apart the various characteristics of “why” they happen to be distressing to a veteran with PTSD. In other words, the analysis sorted these stimuli through the mind of a veteran as reported. For instance, a Palm Grove is made up of vertical columns, a high dense canopy and low scrub plantings. Together these characteristics provide multiple places for threats to hide, obscure clear sightlines, and overall, they are disorienting. Finally, the last column in the matrix describes “how” these characteristics can be converted into designable interventions. Elaborating on the palm grove example, landscape architects can recreate this effect by the manipulation of ground plane, canopy (structural or vegetal), and the careful selection of plant material.

After analysis, the stimuli matrix is refined further and categorized more specifically. Distressing situations are then broken into two spatial categories or settings; urban and natural. Occurring within or overlaying both categories are other atmospheric or sensory inputs and stimuli. Figures 7-9 display these refined urban and natural conditions, the characteristics of these spaces and finally simple sketches. Together the elements synthesize the original stimuli matrix into designable features.
**Spatial Conditions** | **Characteristics** | **Sketch**
--- | --- | ---
Overpass/Bridges/Walkways  
(Driving or Walking) | Exposure, Lack of Prospect, Tunnel-like, Limited Entry/Exit, Places to Hide | ![Sketch](image1)

Outdoor Market Settings  
(Shoppers, Tight Spaces) | Lack of Personal Space, Indefensible, Stimuli Overload, Movement of People, Limited Visibility | ![Sketch](image2)

Enclosed Conditions  
(Showers, Tight Spaces) | Limited Entry/Exit, Places to Hide, Disorienting, Claustrophobic, Multi-Cornered | ![Sketch](image3)

Atrium Conditions  
(Jungle, tree farms, groves, etc.) | Layered, 360 Degree Exposure, Indefensible Territory, Places to Hide | ![Sketch](image4)

---

Figure 7- Urban Conditions (Hartman, 2012)

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**Spatial Conditions** | **Characteristics** | **Sketch**
--- | --- | ---
Desert, Sand Condition | 360 Degree Exposure, Indefensible Territory, High Contrast, Lack of Refuge | ![Sketch](image5)

Clearing in the Woods | 360 Degree Exposure, Indefensible Territory, Light Transition, Contrast, Focal Point, Places to Hide | ![Sketch](image6)

Forest Condition  
(Jungle, tree farms, groves, etc.) | Vertical Columns, Shade, Cover, Visually Obscure, Places to Hide, Multi-cornered, Disorienting, Slow to Traverse | ![Sketch](image7)

---

Figure 8- Natural Conditions (Hartman, 2012)
Case Study- Site Selection

A starting point for siting PTSD therapeutic spaces would be at or adjacent to a VA medical center. Reinforcing this idea is the VA’s *2010 Facilities Design Guide*, which gives direction on how indoor and outdoor space should incorporated with duty of care. Pertinent to this study, the Design Guide underlines that, “…access to nature can promote treatment” (V.A., 2010). The Guide goes on to outline other best management practices that promote the visual and physical access to natural features and vegetation, not just in the facility parking lot or drive approach.

Due to the proximity to resources and contacts that nearby VA facilities offer, Ohio VA medical centers are an obvious starting point for case study site selection. In addition to the need for site access to natural spaces, site selection criteria required spaces that offered urban characteristics. Five Veteran’s Affairs Medical Centers exist in Ohio; all located in or near large urban population centers. Facilities are found in Cincinnati,
Dayton, Columbus, Cleveland and Brecksville (suburban Cleveland). Using aerial imagery and brief site visits, the facilities are assessed for both urban and natural amenities. The facility in Brecksville offers the highest quality and quantity of both natural and urban spaces. Located 18 miles south of Cleveland, the campus boasts ample green space; with both field and forest conditions. The site has proximity to Cuyahoga Valley National Park and also provides great opportunities for varied landscape amenity access (Figure 10). In addition to these amenities, the multi-structured facility was vacated in 2011, with no definitive plans for redevelopment.

Figure 10- Brecksville VA Campus (Bing Maps, 2012)
“Warscapes” Visual Analysis

Since veterans are exposed to traumatic events in very contextual and conditional places, rigorous analysis of these combat sites and landscapes (warscapes) is essential in creating appropriate in-vivo exposure therapy spaces. Utilizing spatial criteria from the Distressing Stimuli Matrix (Figure 6), photos from combat zones in Vietnam, Iraq and Afghanistan were curated and analyzed. As seen in Figure 11 the Iraqi urban condition of a market scene is analyzed for its spatial qualities. Various spatial components are deconstructed to highlight aspects that may incite fear, anxiety or avoidance in a veteran. For instance, the market street has many vertical barriers (market stalls, structural columns), complex and occupiable roofs and deeply recessed doorways and windows; all elements that equate to potential hiding places or threats, and add to the feeling of exposure- lessening the sense of defensible space.

Figure 11- Visual Analysis: Iraqi Market Street (Hartman, 2012)
In this warscape analysis is a street scene fairly typical to middle-eastern development, a crooked passageway, dense, complex building fabric and corridor. These elements limit easy entry/exit, concentrate crowds and movement, decrease sight-lines and increase overall stimuli.

Other combat related landscape conditions which are analyzed for the Iraqi conflicts include an urban Iraqi alleyway (Figure 12), an Iraqi highway overpass (Figure 13) and an Iraqi palm grove (Figure 14). For the Vietnam War conflict an open jungle clearing (Figure 15) and dense jungle forest condition (Figure 16) are analyzed. For the Afghanistan conflict, a hillside desert scrub condition (Figure 17) is studied.

Figure 12- Visual Analysis: Iraqi Alleyway (Hartman, 2012)
Figure 13- Visual Analysis: Iraqi Overpass (Hartman, 2012)

Figure 14- Visual Analysis: Iraqi Palm Grove (Hartman, 2012)
Figure 15- Visual Analysis: Vietnam Clearing (Hartman, 2012)

Figure 16- Visual Analysis: Vietnam Jungle (Hartman, 2012)
With these “warscape” prototypical conditions identified, a site analysis of the Brecksville location provides places where like conditions are found or potentially simulated. Once these hotspots were identified conditional opportunities for design interventions were explored.

*Conditional Opportunities As Explored in Case Study*

Conceptual design interventions are based upon the distressing stimuli matrix, coupled with the warscape analysis. Combining the details of these studies yields spatial solutions for site specific in-vivo therapeutic spaces. These conditional opportunities are examples of potential interventions at the Brecksville site- they are not finalized designs. It is also assumed that these conceptually designed spaces are malleable and therefore customizable to a specific patient’s therapeutic needs and trauma experience.

*Overpass*
The first concept design (Figure 18) shows a specific Brecksville site condition, the covered pedestrian passageway, manipulated in a way to recreate a similar overpass or tunnel-like condition. Different distressing stimuli are employed to evoke warscape elements such as a high canopy grove (Iraqi palm grove), inconsistent rubble (urban combat characteristics) and pedestrians on rooftops (urban combat conditions). These elements coalesce to provide a therapeutic space where veterans of urban combat could experience in-vivo therapy on site. Adjacent to this space could be an orienting space prior to therapy or a calming space in which to seek relief.

Figure 18- Design Concept- Overpass (Hartman, 2012)

*Urban Market and Crowding*

The next concept design (Figure 20) utilizes a courtyard space on the Brecksville site. Here, details from an urban market scene are utilized to evoke distress. Elements include inconsistent rooflines, some of which are occupiable, a crooked pathway, vertical
barriers (tree trunks and benches) and the use of provocative imagery projected on the adjacent wall. Overall these stimuli create a complexly layered, multi-cornered and slightly disorienting space for a veteran patient. The ability for other users to occupy the space at grade and above on structure allow for varying degrees of crowding- this aspect tailored to fit the individual therapy needs of the patient. Consistent with the distressing stimuli matrix findings, the use of audio and visual (even olfactory) stimuli is assumed to be included in this and other concept designs.

![Design Concept- Urban Market and Crowding](image)

*Figure 19- Design Concept- Urban Market and Crowding (Hartman, 2012)*

**Natural Landscape Threats**

The next concept design (Figure 20) attempts to evoke a more natural condition, taking cues from landscapes in Afghanistan. Here we see a view of the Brecksville campus near the engineered stream to the north of the site. Interventions include the use
of tall meadow plants to evoke agricultural poppy fields, a vegetated slope, rocky outcrops along the stream and an unclear winding pathway. Together these natural features provide a series of threat conditions that experientially give the veteran patient feelings of being highly exposed, lacking a sense of prospect, and no defensible space.

Figure 20- Design Concept- Natural Landscape Threats (Hartman, 2012)

*Healing and Relief*

Finally, the last concept design depicts a calming space positioned between one of the smaller spaced courtyards of the Brecksville campus. Here design efforts are tailored to the needs of patient veteran’s comfort and relaxation and based upon VA therapist suggestions collected during this study (Cable, 2012; Downey, 2012; Flinn 2012, Yoder, 2012). Elements such as a quiet accessible water feature are included to provide a calming and interactive remedy to the space. Seating on the periphery, with structure to the back specifically allows a veteran to avoid a distressing condition- sitting with rear
exposure. Pleasantly fragrant and tactile plants are used, to provide another calming and interactive moment assisting in the therapy, relief and healing process.

Figure 21- Design Concept- Healing and Relief (Hartman, 2012)
Chapter 5: Conclusions

Limitations and Constraints

This study attempted to engage in research outside the traditional realm of landscape architecture, the time frame of this master’s thesis (6 months) was a limiting factor. In order to fully understand a complex topic like combat induced PTSD, much time is required to understand terminology, sift thorough research and seek out experts. This essential background work placed time constraints on the spatial analysis and conceptual design phases of this complex problem.

The direct involvement of veterans was a missing component of the research process of this study, and therefore a missed opportunity. Engagement with veterans would have yielded valuable testimony to many topics. First, veteran accounts of coping with PTSD symptoms and distressing situations would have added detail rich, narrative quality to other research collected from second or third hand sources. Second, veteran interviews would have provided a great window into the current treatment processes of the VA and other mental health facilities. And thirdly, the feedback and evaluation of this thesis project would have been beneficial to better concluding and positioning this project for future research.

While direct involvement and interview of veterans with PTSD was warranted, the process of engaging this cohort would have presented some challenges. As with any kind of academic research on human subjects, the involvement of The Ohio State University’s Internal Review Board (IRB) would have been required. This board oversees
academic research and is responsible for protecting the rights and welfare of human research subjects (OSU, 2012). Since psychological patients (like veterans with PTSD) are a vulnerable population, any research study or engagement conducted would be held under great scrutiny and would likely have additional safeguards or limitations placed upon it. Understanding the challenges this presented and given the time limitations for this study, it was determined that direct engagement is more appropriate to clinical or longer term research.

The scarcity of research concerning landscape’s role in psychiatric therapy and healing is another limitation of this study. Empirical literature evaluating the clinical effectiveness of using landscape related therapy is a gap this study begins to bridge. While the analysis and final design interventions here yield no built work, the future expansion of this study could allow for PTSD therapy spaces to be built, utilized for therapy and evaluated for effectiveness. Ultimately, a successful design would equate to an improvement of the in-vivo therapy model via the explicit reduction of symptoms in PTSD patients.

**Findings and Contributions**

This thesis’s research question asks whether landscape architecture can assist and enhance in-vivo exposure therapy. Through this process it is clear that landscape architects are well-suited to serve this therapeutic design problem, yet, a full affirmative response cannot be given. With in-vivo exposure therapy demanding conditional, spatial and experiential understanding, trained designers can perform grounded research, proper
analysis and creative design towards this end, but it is imperative that clinical, longitudinal studies of effectiveness must be conducted.

Designing for health and wellbeing requires designers to have an acute understanding of a client (patient) group’s symptoms and therapy needs. In addition care is required to comprehend the psychological interpretations of space by this or any patient group. Therapeutic (and healing) space requirements are altogether different from disorder to disorder. This idea is challenging for landscape architects, as we typically design for the positive wellbeing of a user. As seen in this project, the therapeutic treatment spaces for PTSD necessitate the need for spaces evoke distress- in order that transformation and healing can occur, an aspect of design that we are not normally prepared to provide.

Contestability of this project’s effectiveness is twofold. First, a thorough post occupancy review of the (built) therapeutic spaces would need to be conducted by design professionals to assess the design and performance of the spaces. Second, an empirical study conducted by clinicians is warranted to truly ensure that the therapeutic processes being carried out in these spaces do reduce veteran PTSD symptoms and duration of illness.

Recommendations for Future Research

This project begins to fill a gap in research exploring the use of outdoor space as a therapeutic tool in psychiatric care. While this study focuses on symptom reductions related to veterans suffering from Post Traumatic Stress Disorder, the overall methodology of this work could be applied to other psychiatric patient groups. In order to
accomplish this, more research must be completed to better understand veteran symptomology and treatment. Specific to further study with veterans suffering from PTSD is the needed development of the distressing situation matrix (Figure 6). Gathering anecdotal and other qualitative data from clinicians and veterans themselves adds further breadth to this important research piece.

Another potential vein of research could be the exploration of therapy and diagnosis insertion into the US military’s debriefing protocols. Since the military goes to great lengths to physically and psychologically train their soldiers for battle, the same effort should be made to insure soldiers are retrained and readied for normal life. Analysis of existing debriefing systems, spaces and timeframes could yield valuable information concerning how design might play a role in sculpting PTSD therapeutic and diagnostic spaces. The result would be better debriefing via more rigorous PTSD symptom screening and may allow military personnel to better assist and direct veterans into proper care paths, in a positive and proactive manner.

As part of the thesis presentation review, occupational therapists and recreational therapists (who have worked with combat veterans), identified the “warscape” images as having a potential role in the debriefing and as potential diagnostic tools for veterans, much like visual preference research identifies preferences for landscape. These images or pairs of images could allow clinicians a valuable diagnostic tool, charting anxiety and distress scores for various types of imagery. Such applications are outside the scope and focus of this study, use of the analytical images could have fundamental impacts in treatment and therapeutic investigation, and are worthy of further investigation.
The study developed an evidence based process, which can allow others to explore the complex issues related to design of therapeutic spaces. While the Brecksville site is a hypothetical one for a PTSD residential treatment center, it does present opportunity to explore how and where the needs of nearly 300,000 veterans will be served. The study provides a process and methodology which may be replicated, evaluated and expanded upon in future research work. The underlying study question: “Can we design effective therapy spaces?” will only be answered as the research is developed in the field with post-occupancy evaluations and clinical studies. Ulrich, Cooper-Marcus, Reed Hildebrand and this study demonstrate that Landscape Architects can and will continue to contribute to furthering the exploration, development, and design of spaces for healing. This endeavor will strengthen and continue humankind’s centuries-old healing connection to the land.
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