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## Design guidelines of a therapeutic garden for autistic children

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**DESIGN GUIDELINES  
OF A THERAPEUTIC GARDEN  
FOR AUTISTIC CHILDREN**

A Thesis

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Master of Landscape Architecture

in

The School of Landscape Architecture

by  
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## **ABSTRACT**

This study establishes a set of guidelines for designing a therapeutic garden for autistic children. To understand how a garden may provide benefit, the literature on healing gardens is reviewed. The history of gardens in hospital settings and other healthcare institutions is examined. In addition, published work on the effects of nature on stress and health outcomes and theories as to why nature is restorative is included in the review of the literature. Because the focus of the study is outdoor environments for autistic children, published works on children's outdoor environments and the topic of play are reviewed as well.

The nature of autism and its characteristics are studied to determine the strengths, deficits, and needs of the autistic child as well as current treatment methodologies in use today including whether these treatments would lend themselves to an outdoor environment.

Informal interviews with professionals who work with autistic children on a daily basis give insight into these treatment methodologies. A field study conducted at a facility for autistic children in New Orleans allowed observations of autistic children and the professionals who work with them providing first hand information about the nature of autism and implementation of treatment methodologies.

Based on the extensive literature review, informal interviews, the field study, direct observation, and the writer's own experience of teaching autistic children in New Orleans for a year, design guidelines are established.

## **CHAPTER 1 INTRODUCTION**

### **BACKGROUND**

The environment both built and natural affects all those who use it. Even as a child, I was aware that my surroundings had an effect on me. I remember hopping on my bicycle or going out back to the garden to sit on the swing in order to escape the noises and stress of a big family. And somehow, after spending time outside, the irritation dissipated and I was rejuvenated, ready to go back in and join the family again. Today, environmental psychologists study how environments affect people. And architects, who were once primarily concerned with how buildings looked, now have to consider how they will affect the people who use them. Principles of crowding, privacy, personal space, and environmental perception, and factors such as noise, temperature, air circulation, and cost may all determine how a building is designed and how well it serves its function. This applies to the design of outdoor environments as well.

Even in ancient times there is evidence of the importance of the natural environment and its effect on man. Nature was thought to have restorative powers and “healing spaces were nearly always found in nature...a healing spring, a sacred grove, a special rock or cave” (Marcus & Barnes, 1999). Some of our earlier hospitals were set in monasteries, and herbs and prayer were the focus of healing. For a while though, technology, with the latest gadgetry in surgical procedures and advances in medicine and drugs, became the focus of medicine. And the design of hospitals and healthcare facilities reflected this trend with high-rise buildings surrounded by streets and parking lots and little or no emphasis on nature (Marcus and Barnes, 1999).



Recently, however, studies have been conducted to confirm the positive benefits of hospital outdoor space. The attempts by experts in the field to introduce nature into healthcare settings have been variously described as contemplative gardens, restorative gardens, healing gardens, and therapeutic gardens. *Contemplative* gardens are usually intended to help mend the spirit. In *Restorative Gardens*, Nancy Gerlach-Spriggs, describes *restorative* gardens as places meant for the healthy as well as the sick. “For the healthy, such gardens encourage sociability among companions, promote relaxation and contemplation for the solitary visitor, or create a sense of community among residents who live in quarters around the garden. For the sick of body or troubled in spirit, the same garden relaxes and soothes and thereby encourages the body and the mind to restore themselves” (Gerlach-Spriggs et al 1998, p.7). According to Roger S. Ulrich, “a *healing* garden refers to a variety of garden features that have in common a consistent tendency to foster restoration from stress and have other positive influences on patients, visitors, and staff or caregivers” (Marcus and Barnes, 1999, p.30). The term “therapeutic”, however, suggests more than comfort, according to Gerlach-Spriggs. It implies that the individual will be working toward a goal or outcome. For example, there may be ramps, small curbs, or varied surfaces designed into the environment for the patient (with the assistance of the occupational therapist) to master with a wheelchair, or there may be a small planting garden to improve fine motor skills.

## **PROBLEM STATEMENT**

A great deal of research has been conducted on gardens and their effect on health outcomes. In *Healing Gardens*, Marcus and Barnes identify three aspects of the healing process to clarify how a garden may provide benefit: 1) relief from physical symptoms or

awareness of those symptoms, 2) stress reduction, and 3) improvement in overall sense of well-being. And information is available on gardens for a variety of settings--acute care general hospitals, psychiatric hospitals, mental health facilities, and environments for children. Recently, research has extended into living facilities such as Alzheimer treatment centers, group homes, and assisted living facilities for the elderly. In reading the literature about treatment gardens for Alzheimers patients, I learned that the goal was “to create a well-designed environment with good planning and medical and social management to reduce symptoms and ease the burdens on family members or caregivers” (Zeisel and Tyson as found in Marcus & Barnes, 1999, p. 438-39). Aggressiveness, one of the symptoms or behaviors associated with this degenerative disease, is sometimes reduced by exposure to the natural environment.

One population not mentioned in the literature were those who suffer from autism. In working with and teaching autistic children in a New Orleans public school, I learned that the challenges of working with the autistic child are great and resources for the teacher, caregiver, and parent are limited. My classroom in the public school system was no bigger than an office and except for a brand new computer with no software, there were no teaching materials available to me when I walked through the door. I spent the year gathering materials and resources to engage my students. Because the classroom was so small, we would take the students outside to employ some of our strategies. During these outings when we would work on motor skills, social skills, and life skills, the paraprofessional and I observed little to no outbursts of aggression and/or self-stimulating behaviors and more cooperative behavior. The outdoor environment seemed to have a

positive effect on the students and it gave me a new resource in my teaching environment. Thus, the idea of an outdoor therapeutic garden first came to life.

I also noticed that parents and caregivers often come away from meetings with doctors and organizations feeling like they must make most of the discoveries on their own. This leads to feelings of isolation, stress, and depression. Creating a healing or therapeutic garden in a learning environment, assisted living facility, group home or residence may give these institutions another resource in which to observe and interact with the autistic child. Therefore, this thesis will establish a set of design guidelines for creating a therapeutic environment for the autistic child.

## **OBJECTIVES**

Gerlach-Spriggs clarifies what a restorative garden is and is not, and so too must I. As she states, healing or restorative gardens are not intended to replace medical treatment nor are they cures. In this thesis, I will generate guidelines to support an alternative model for therapeutic gardens as sites where autistic children live, learn, and play. Rather than plan a healing or restorative garden, I will provide guidelines for designing a therapeutic garden especially for the autistic child, in order to create an environment that will enhance the therapies and care that special educators, therapists, and caregivers provide. Such spaces, by enhancing the therapeutic process, will hopefully also contribute to a sense of well-being, improved function in the world, and relief from some of the stress of living with autism. I am not proposing an alternate mode of therapy but rather an alternative environment where goals can be worked on and where therapists, special educators, and caregivers can collaborate. Furthermore, my intention is not to segregate the child with autism from other children, as inclusion and least restrictive

environment are important goals for these children. The garden should be designed for all children but with the needs of the autistic child at the forefront.

## **METHODOLOGY**

First, an extensive literature review was conducted to provide background information on both healing gardens and children's healing gardens per se. This literature review includes research on nature-viewing and stress reduction, published work on design and outdoor spaces, published work on design and healing gardens, published work on children's environments, post occupancy studies on existing hospital gardens, and research into the importance of play in children's environments. In addition, research extended to the topic of autism. The nature of autism is covered as well as types of treatment methodologies in use today. Not all aspects of treatment will be covered as that is beyond the scope of this thesis. Three or four of the most prominent treatments will be discussed to show how aspects of these treatments may be incorporated into the outdoor environment.

In addition to the literature review, informal interviews were conducted with a special educator, speech language pathologist/administrator, and physical therapist. The purpose of these interviews was: (1) to gain a clearer understanding of the individual with autism, (2) to gain additional insight into treatment models or approaches currently being used, and (3) to gain from the experiences of professionals who work with individuals with autism. These interviews also led me in new directions.

The third part of my approach included a field study. Since there are currently no therapeutic gardens for autistic children in New Orleans, I decided to visit a facility that specializes in working with children with autism. Through contacts in the community, I

learned of the Chartwell Center, a non-profit, private facility for autistic children age three to twelve, in New Orleans. The purpose of conducting a field study was to (1) observe children with autism first hand, (2) observe professionals as they interact with these children and implement therapeutic strategies on a daily basis, and (3) initiate the design analysis for a possible therapeutic garden for this population. My own experience of working with children with autism in the public schools gave me additional insight and awareness of this population.

Based on the information gathered in the earlier steps of this process, I will compile a set of guidelines for developing a therapeutic garden for autistic children. Although my thesis will not test these guidelines in an actual site design, the guidelines will provide a valuable starting point for the planning of future therapeutic gardens for children with autism.

## **CHAPTER 2**

### **NATURE AS HEALER**

To begin the process of conceptualizing a therapeutic garden for autistic children, it was important to first delve into the current, ever-broadening collection of literature on healing gardens. As I started my search, several questions came to mind? Does nature (or gardens per se) have an effect on health outcomes? If nature does affect health outcomes, in what way are these manifested? Is there a theory of why this occurs... a theory of Why Nature is Restorative? And have attempts been made to put this idea into action? These are the questions that guided my initial search.

### **NATURE AS HEALER**

Research does exist to support the idea of nature as healer. In his essay in *Healing Gardens*, Roger S. Ulrich summarizes some of the research and theory relevant to the effects of nature on health outcomes. Ulrich uses the term “healing garden” to refer to “features that foster restoration from stress and have other positive influences on patients and staff” (Marcus and Barnes, 1999, p.30). Restoration from stress is an important goal in and of itself. But, it is also important because it directly affects many other health outcomes.

In his summary of the research, Ulrich first focuses on non-patient groups. Restoration from stress was perceived as the most important benefit of users of parks. In these studies, there are indications that a major part of the restorative benefit is from simply viewing nature. In another study, a sampling of university students was asked what they regarded as places of emotional healing (Francis and Cooper Marcus, 1992). The students were asked to recall the type of place that they sought out and helped them to feel better when they were stressed or upset. Significantly, there was a preference for

outdoor settings-seventy-one percent of the sample of one hundred and fifty-four students. Barnes (1994) asked a broader sampling of people (only one-fourth of the 65 participants were students) about places of solace. Approximately the same proportion of participants chose a natural setting and approximately the same proportion chose a designed outdoor space as in the previous study.

In one of his earlier studies, Ulrich focused on students who were experiencing mild stress because of a final exam (Ulrich, 1979). A questionnaire was used to assess restorative influences of viewing slides of built settings lacking nature or slides dominated by green vegetation. Results suggested that the nature views fostered greater restoration. Ulrich goes on to mention numerous other studies including those by Nakamura and Fijii in Japan (1990,1992) and by Hartwig and associates in Sweden that examine the stress reducing influences of nature.

Next, Ulrich focuses on studies that include patient groups. Studies by Marcus and Barnes (1999) asked the simple question: “Where do people choose to go when stressed?” In one study of the users of outdoor space in hospitals, ninety-five percent of the people interviewed reported a positive change in mood after spending time outside. Many of the feelings of anxiety and stress that accompany illness and hospitalization were temporarily relieved and replaced with a more calm, balanced outlook. In one of his most often quoted studies “View Through a Window May Influence Recovery from Surgery”, Ulrich showed, with control for other variables, that patients with a view of nature had shorter hospital stays, lower analgesic use, and fewer complaints during surgery. But when a person views nature what occurs physically to foster restoration from stress? What bodily events occur to make one feel calmer and more restored?

## **NATURE AND HEALTH OUTCOMES**

In their book, *Restorative Gardens: The Healing Landscape*, Nancy Gerlach Spriggs, Richard Enoch Kaufman, and Sam Bass Warner, Jr., give the medical explanation of what happens in the body when one experiences stress. According to the authors, stress produces certain physiological changes such as elevation in blood pressure, increased heart rate, increased muscle tension, and changes in brain wave function and mental concentration. While these changes may help us to cope with stress they also take a toll. We can use relaxation and imagery to “think” ourselves into reducing our stress. But viewing nature seems to be the preferred method of stress reduction. And we begin to feel better within minutes of viewing nature. Spriggs et al. cite other studies to show how stress affects nearly every organ system in the body. Hans Selye showed that the endocrine system works overtime in times of stress. In more recent studies, the evidence showed that the central nervous system and immune system are also affected. Spriggs et al. have also found studies in the field of psychoneuroimmunology that provide evidence that how we feel (stressed, relaxed) influences body function. And the most important finding is that both the central nervous system and endocrine systems communicate with and have an effect on the immune system. So why then does exposure to nature relax us and soothe our senses thus causing our systems to respond? Why are we so attuned to nature?

## **THEORIES ABOUT WHY NATURE IS RESTORATIVE**

Several theories have evolved to address this question and are mentioned in both *Healing Gardens*(1999) and *Restorative Gardens*(1998). In *learning* theories, the subscribers suggest that man has *learned* to prefer nature. For example, people may have



learned to associate restorative experience with nature because of vacations spent in beautiful settings or long childhood summers spent on the beach, or near a lake or stream. Urban settings, on the other hand, bring back images of traffic, congestion, work pressure, filth, or crime. *Cultural* theories propose that we are *taught* by society to have positive feelings towards certain types of environments. For example, Native American and Asian cultures have taught their peoples to respect nature.

Steve and Rachel Kaplan are proponents of the *arousal and overload* theory. They believe that the contemporary built environment taxes our senses by demanding us to remain in forced attention. In their book *The Experience of Nature: A Psychological Perspective* (1989), the authors suggest that a restorative experience is needed to recover from this overload of sensory input. The restorative experience of choice is nature.

Recently, authors have proposed *evolutionary* theories. In his book, *The Experience of Landscape* (1975), Jay Appleton suggests that we respond to landscapes the way we would have long ago. We chose habitats for their safety and their ability to provide food and water, and thus these “selected habitats” were favorable to our well-being and survival. If nature is so important to us then how did the absence of nature in medical environments come about?

## **HISTORY OF GARDENS IN HEALTHCARE SETTINGS**

Sam Bass Warner, Jr. gives an excellent account of the history of gardens in medical facilities in *Restorative Gardens* (1998). And Marcus and Barnes give an historical summary in the introduction of *Healing Gardens* (1999). Restorative gardens first appeared in Europe during the Middle Ages in hospitals and monasteries that cared for the sick and insane. The buildings usually surrounded a courtyard, and an arcade offered

shelter from sun and rain for those who stayed there. During the fourteenth and fifteenth centuries there was a decline in monasticism and the care of the sick fell upon the civic authorities and churches and the focus shifted away from the garden. For example, the Catholic Church had hospital wards created so that every patient could see the priest celebrating mass from his/her bed (Marcus and Barnes, 1999). In some hospitals courtyards remained. And others were reported to have characteristics such as access to fresh air, views to the gardens through the windows and doors, and opportunities to walk in the garden.

In the seventeenth century, statistics and scientific medicine demonstrated the importance of hygiene, fresh air, and cross ventilation. Hospitals were built with long, twenty-four bed wards joined at their ends by a service corridor like the teeth of a comb. These new designs were known as pavilion hospitals and incorporated outdoor space between the wards (Warner, 1994). Florence Nightingale (1820-1910) recognized that this new hospital design provided benefits such as exposure to sunlight, window views, and to the bright colors of flowers, which seemed to have a positive effect upon the mind and to promote recovery. But it was in the eighteenth century with the pastoral movement that the “connection between the nursing and medicine within the hospitals and the gardens without” that nature and gardens once again became places of restoration (Spriggs et al, 1998).

In the nineteenth century, nurses were encouraged to wheel beds out onto sun porches and roofs for fresh air and sunlight to promote recovery. Positive changes began to take place in psychiatric hospitals as well and a more humanistic approach replaced physical

punishment as treatment. This was evident in the design of new psychiatric facilities with large landscape vistas where farming and gardening were used as therapy.

With the twentieth century, the focus shifted towards efficiency and “saving steps for physicians and nurses and away from patient-centered gardens” (Spriggs et al., 1998; Marcus and Barnes, 1999). However, with the establishment of Occupational Therapy and later Horticultural Therapy, garden work was used for therapy in rehabilitation hospitals and facilities for veterans. But in spite of these new fields, gardens in hospital settings continued to disappear. So why the resurgence of interest in healing gardens today? Several trends have led us in this direction. After the fitness craze, the popularity of health clubs, gyms, and spas grew and we started taking responsibility for our own bodies. The American public became interested in prevention and self-healing and interest in herbal remedies, organic produce, vitamins, and alternative medicine grew as well. And with increasing levels of stress, nature and the garden are again becoming healthy and acceptable ways to deal with this stress. It follows then that gardens associated with healthcare settings would become important again, too.

## **DESIGN AND HEALING GARDENS**

In designing a healing garden, the landscape architect then has two goals in mind. The first goal is the process of healing and the second goal is to design an outdoor environment that will support this process. Several books and articles have been written recently to guide the landscape architect in this endeavor. Since healing is the first goal, it is important to determine what characteristics or features of gardens promote stress relief and what, if any, features have a negative effect?

## **Garden Features That Reduce Stress and Promote General Well-Being**

Environmental preference studies have shown that a natural setting is the view of choice. Charles A. Lewis refers to it as “green nature”(Spriggs et al., 1998). Gordon Orians and Judith Heerwagen, in their studies on landscape aesthetics, have shown that people prefer open, distant views with scattered trees, water, and refuges and paths that suggest ease of movement. In studies of users of some urban parks, properties such as vegetation, water, and savanna- like qualities, such as scattered trees, grass, and spatial openness, seemed to correlate with ratings of restoration (Ulrich and Addoms, 1981). In his article, *Healing Words*, J. William Thompson quotes experts in the field of healing garden design: “Anything green makes patients feel better, any plant, any tree,” and “...if they wish to create truly healing spaces, landscape architects would do well to discover – or rediscover—the wonder of the plant kingdom” (*Landscape Architecture*, Jan. 2000: 54-75).

## **Features That May Have Negative Effects**

The literature also mentions negative characteristics considered intrusive to the user of the healing garden. These features may increase stress rather than foster relief from it and may aggravate an already heightened physiological state, say Marcus and Barnes (1999). Urban noise such as traffic, machinery, air-conditioning units, and loud voices are all considered negative distractions in a healing garden. Intrusive sounds should therefore be excluded from healthcare gardens or masked with the sound of water, screened with vegetation, or a different location should be chosen for the healing garden altogether. Smoking is also considered to have a negative impact on the users of the

outdoor healing space. In order to provide a positive experience for all users it would be wise to have separate spaces for smokers and non-smokers.

An unexpected feature included in this list is sunlight. While most people benefit from exposure to sunlight each day, some patients may have adverse reactions to it. For example, some medications may cause the patient to have increased sensitivity to sunlight. For this reason, it is suggested that a variety of spaces be incorporated into the design, some that include full exposure to sunlight and others that have filtered sunlight or dappled shade.

Studies have also shown that abstract garden features may increase stress levels of already sensitive patients. Evidence has shown that the viewer may project his/her current emotional state onto the abstract element. Therefore, if the patient is feeling anxious, depressed, sad, or hopeless then those feelings will be projected onto the object of art resulting in increased stress for the patient. For this reason it is important for the landscape architect to take a patient-centered approach to design. Spatial considerations, the use and control of materials, all decisions made by the designer should enhance the therapeutic process and support relief from stress, promote a sense of well-being, and provide a distraction from symptoms (Marcus and Barnes, 1999).

### **Healing Garden Settings**

Healing gardens are found in a variety of healthcare settings. Not only are they found in acute care general hospitals, but they are also found in psychiatric hospitals, rehabilitation centers, Alzheimer treatment centers, hospitals and settings for children, nursing homes, AIDS and cancer treatment centers, and hospices for the dying. There are many different kinds of outdoor spaces in these settings. These include landscaped grounds, entry

gardens, courtyards, plazas, roof gardens, roof terraces, healing gardens, meditation gardens, viewing gardens, private gardens, nature trails and preserves, and atriums. Numerous articles and books give examples of these (Tyson, 1998; Gerlach-Spriggs et al, 1998; Marcus and Barnes, 1999; Dannenmaier, LA, 1995, and others). However, this thesis will not go into detail on all of these types of healthcare settings. Rather it will focus on the design of healing gardens for children.

## **DESIGN AND HEALING GARDENS FOR CHILDREN**

Gardens have a special place in healing environments for children because of the importance of play in the child's world. Play is the child's way of making sense of his/her physical and social world.

Children of many different types may benefit from a healing garden, whether they are recovering from an operation, working through the turmoil of a traumatic experience, coming to grips with a terminal illness, or living with a permanent or profound mental or physical impairment. The term habilitation rather than rehabilitation is used to refer to the treatment of those with disabilities. It is important to focus on the child's potential. This way the healing garden can become a place to practice and improve old skills while discovering new skills. Inclusion is an important goal for all children. The healing garden is an ideal place to promote inclusion and foster understanding and tolerance.

When reviewing the literature, it became apparent that healing gardens for children are designed based on several assumptions. The following list has been adapted from Moore et al (1987) and Marcus and Barnes (1999).

- 1) Outdoor play is a critical factor in healthy child development.

- 2) The quality of the outdoor play environment can affect the child's perception of it and the range and depth of play.
- 3) Nature plays an important part in play in the development of the child.
- 4) Intervention of play leaders/therapists can extend the range of play.
- 5) Children of all abilities have an equal right to play opportunities.
- 6) Indoor/outdoor links are important in encouraging use of the outdoor environment.

Each of these assumptions is self-explanatory. However, the importance of play in the development of the child will be discussed in more detail in a later section.

Several types of therapies are used in treatment of children. Examples of these are Play Therapy, Horticultural Therapy, Animal Therapy, Nature as Therapy, and Sensory Integration. Any one or a combination of these may be incorporated into a healing garden designed for children. Often the professionals who care for the child form an interdisciplinary team. The Landscape Architect should meet with, and temporarily become part of this team to learn how to design an environment that will support these therapies and meet the needs of those who will use this garden. Furthermore, several types of healing gardens for children have been identified. These include: a formal therapeutic garden, a non-formal play and horticultural therapy garden, an informal strolling garden, and a community-based, multiuse, multipurpose garden (Moore, R. in Marcus and Barnes, 1999).

This thesis focuses on a therapeutic garden for autistic children. As stated earlier, a therapeutic garden suggests more than comfort. It requires consideration of patient types, disease processes (including the nature, prognosis, and progression) and standard

treatment protocols (Westphal, L.A., April 1999). An example of therapeutic-site design is the Alzheimer's garden by Rob Hoover, ASLA, featured in the January 1995 issue of *Landscape Architecture*. In this garden, the designer planned three garden spaces to meet the needs of patients in each of the three stages of this disease. The following section examines three examples of children's gardens, two of which are therapeutic gardens, and one of which is a healing/strolling garden.

### **Three Children's Gardens**

The first example of therapeutic-site design for children can be found at the **Institute for Child and Adolescent Development in Wellesley, Massachusetts**. This design which was the recipient of the ASLA President's Award for Excellence has been cited several times in the literature (Crisp, 1998; *Landscape Architecture*, 1995; Marcus and Barnes, 1999). This therapeutic garden was designed by Douglas Reed, ASLA, for children suffering from a variety of emotional and behavioral disorders resulting from trauma. Its primary purpose is to allow a series of distinct experiences to help the child reveal feelings that he or she may have difficulty articulating. Experiences include safety/security, exploration, seclusion, discovery, and risk taking. The site's most important physical feature was a swale that was once a stream, which inspired the design of a rill of water that weaves its way through the site, connecting the experiences. These spaces in turn correspond to the stages of a child's recovery (Fig. 1).

Another excellent example of a therapeutic garden for children can be found in New South Wales, Australia. **Lucas Gardens School** is located in a suburban community



outside Sydney and linked to a nearby residential pediatric hospital. It was opened as a school for children with multiple disabilities. Many of the children are transported to the school each day from the nearby hospital where they are permanent residents. This garden is a series of connected spaces designed to support numerous activities. There is a sensory garden with activity stations, texture table, splash table, swinging garden bench, a shade house, big grassy “paddock”, an outdoor stage, potting shed and area for propagating plants, earthworm breeding farm, a palm garden, butterfly and bird garden, secret garden, and other features. Teachers, teacher’s aides, and therapists use the garden



FIGURE 1: Institute for Child and Adolescent Development in Wellesley, MA.  
Source: Dunwell, S. Winning Big. *Landscape Architecture*, 87, 11: 42-49.

to work one-on-one with the children. The garden is successful in that it is always being used (See Fig. 2 below).



FIGURE 2: Lucas Gardens School in New South Wales, Australia.  
Source: Moore, R.C. in Marcus and Barnes, 1999, *Healing Gardens*.

**The Leichtag Family Healing Garden** at the Children's Hospital and Health Center in San Diego, California is considered an informal strolling garden for children. Created by Topher Delaney, it too is mentioned several times in the literature. (*Landscape Architecture*, Jan. 1995; *Landscape Architect and Specifier News*; Marcus and Barnes, 1999; and others.) While most healing gardens are about the miracle of life, Delaney says the concept behind this garden was to provide a place to imagine life being larger than what's existing at the moment. The designers have approached the elements of the garden – color, texture, form, and scale- from the point of view of a child. The beautiful colors and interesting textures and forms immediately attract the child and provide momentary relief from the worries of the hospital. Unfortunately, there is little for the child to do. The garden provides little in the way of manipulative play (activities such as digging in sand, piling up blocks, turning over rocks, picking up sticks, and leaves and

such) and the child loses interest quickly. Thus, the garden is empty for long periods of time and significantly underused. In addition, some users found the hard surfaces jarring and suggested adding more trees and greenery (Fig. 3).

There are numerous other healing gardens for children mentioned in the literature. Indeed, experts in the field recommend becoming familiar with existing gardens in health care facilities to become aware of the advantages and disadvantages associated with gardens previously designed (“Healing Words” *Landscape Architecture*, Jan. 2000).

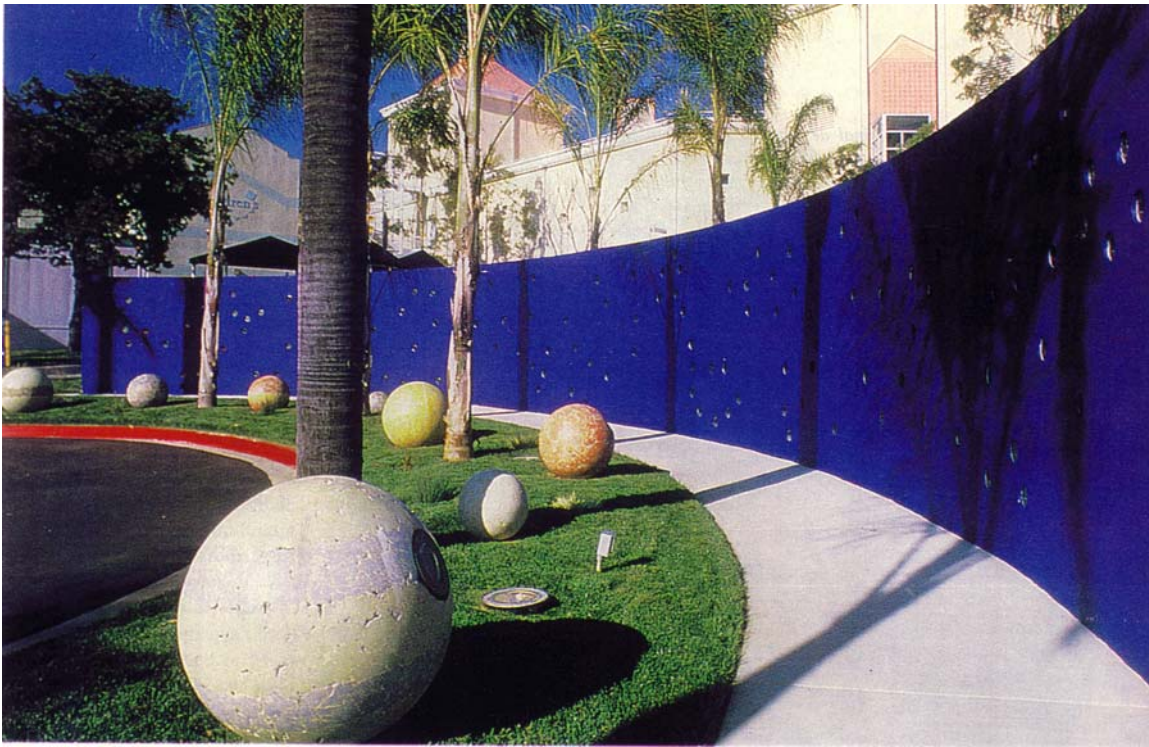


FIGURE 3: The Leichtag Family Healing Garden at the Children's Hospital in San Diego, California. Source: Taylor, G. and Cooper, G. A Healing Garden. *Landscape Architecture and Specifier News*, February, 2001: 64-72.

## **The Importance of Play**

Healing gardens designed for children are based on several basic assumptions. The first of these is that play is important to the development of the child. Therefore, background on the nature of play will be discussed.

First of all, what constitutes play? A review of the literature suggests that there are certain characteristics that distinguish play behavior from non-play behavior (Garvey, 1977; Rubin et al., 1983; Smith and Vollstedt, 1985; Wolfberg, 1999). These characteristics can be observed in the play of typical children everywhere. The first characteristic of play is that play is fun! And a child at play usually displays a positive affect with humming, smiling, and/or laughter. Secondly, play requires involvement by the child. The motivation to play comes from the child and the child chooses freely. Therefore, play is voluntary. And the child is not interested in attaining some goal for it is the process of play that is important to the child. There is an open-ended quality to play and the rules and goals are flexible and ever-changing. Finally, play has non-literal meaning in that children often imagine objects, actions, or events to be something that they are not.

## **Theories of Play**

There are several theories about the nature of play. All children play no matter their race, time, or culture. Psychologists have studied play for years to determine its importance in the life of a child. In her book, *Play and Imagination in Children with Autism*, Pamela J. Wolfberg gives an excellent summary of the various theories of play that have emerged over the centuries. During the romantic period, Jean-Jacques Rousseau regarded play as a natural childhood activity. He suggested building on the

child's natural interests in play as a means to gradually develop his or her potential.

During the classical period, the surplus-energy theory of play emerged. Play was thought necessary for the child to let out excess energy. Karl Groos (1901) viewed play as a way to practice and perfect skills considered necessary for adulthood.

G. Stanley Hall (1906) proposed a recapitulation theory of play. According to his theory, children reenact developmental stages of the human race and get rid of primitive instincts before going on to adult life. This led to the idea that play has a cathartic function.

From Sigmund Freud's (1961) psychoanalytic viewpoint, play is the projection of the child's inner self. Freud saw the role of play as being a therapeutic one. Eric Erikson (1950) proposed that play serves as an ego function and progresses through stages that mirror children's psychosocial development. Play was considered centrally important in the child's intellectual development to Jean Piaget (1962). He believed that as the child transforms objects, roles, and situations in play, he or she is developing higher-level cognitive abilities. And finally Lev Vygotsky (1966) stressed the importance of play in the social development of the child. He proposed that children construct meanings and gather skills, values, and knowledge important to their culture through play.

### **Play and Development**

Play's relationship to the **cognitive**, emotional, social, and physical development of the child is evident in the current literature as well. Pamela Wolfberg gives an excellent summary of some of the current literature. During play, the child explores and manipulates objects, which helps him to become aware of function and meaning. As the child learns the use for these objects and attributes meaning to them, he is able to determine relationships between them and assign them to various categories. Through

play the child also becomes aware of cause-and-effect and spatial relationships too (Wolfberg, 1999). In pretend play, the child transforms objects into things that they are not. This helps the child to develop abstract thought, the ability to associate, and logical memory (Piaget, 1962 and Vygotsky, 1966 in Wolfberg, 1999). Because play is by nature flexible and creative, the child feels at ease to put things together in novel ways. This promotes the formation of problem-solving skills.

Play also provides opportunities for the child to learn subtle **social** skills such as how to enter into play with peers or how to extend an invitation. To establish and keep friendships the child must also learn how to share, and enter into mutually satisfying play activities. Through these play relationships the child has opportunities to express intimacy and affection. Social skills that arise out of conflict with peers such as negotiation, compromise, and trust are learned through play as well (Dunn, 1988; Garvey, 1977; Howes, Unger, and Matheson, 1992; Parker and Gottman, 1989; Wolfberg, 1999). All of these social interchanges with peers require **language** and communication. Therefore, it follows that through play the child learns new vocabulary, complex language structures, and the rules of conversation (Ervin –Tripp, 1991; Garvey, 1977; Wolfberg, 1999).

Through play the child explores and develops his **physical** capabilities as he/she runs, jumps, climbs, and balances. Besides improving gross motor function, the child challenges fine motor skills by manipulating pebbles, sticks, four-leaf clovers, game pieces, and doll clothes. And finally because play helps the child deal with stress (Elkind, 1981) and work through confusing experiences of the past and present (Erikson, 1950; Freud, 1946), it serves an important role in the child's **emotional** development as

well (Wolfberg, 1999). To summarize, play is important to the development of the child because it is the primary vehicle for learning and developing thinking skills, social skills, language, and self-concept, and for developing gross motor and fine motor skills. For this reason, play is an essential element in the design of healing gardens for children.

### **CHAPTER 3**

#### **THE NATURE OF AUTISM**

Autism is one of the most fascinating disorders to be studied by physicians, psychologists, mental health practitioners, therapists, and educators. This is evident from the relatively large body of research on the topic. Although researchers believe that individuals with autistic characteristics lived well before the twentieth century, the syndrome of Autism was first named and described by a psychiatrist, Leo Kanner, in 1943. In his research, Kanner described eleven children whose condition was different from anything reported at that time. The children had certain characteristics in common which set them apart from others( Scheuermann, 2002; Groden and Baron, 1991). These included the following:

- 1) An inability to relate to others in an ordinary manner.
- 2) An extreme autistic aloneness that seemingly isolated the child from the outside world.
- 3) An apparent resistance to being picked up or held.
- 4) Deficits in language including mutism and echolalia.
- 5) In some cases, an excellent rote memory.
- 6) Early specific food preferences.
- 7) Extreme fear reactions to loud noises.
- 8) Obsessive desire for repetition and maintenance of sameness.
- 9) Few spontaneous activities such as typical play behavior.
- 10) Bizarre and repetitive physical movement such as spinning or perpetual rocking.
- 11) Normal physical appearance.

#### **CURRENT DEFINITIONS**

Although autism is a disorder with relatively obvious characteristics, current definitions that are used to describe this population vary. The three most common definitions to describe the autistic syndrome are 1) the definition of the Autism Society of America, 2) the definition for the Individuals with Disabilities Education Act (IDEA, 1990), and 3) the definition found in the Diagnostic and Statistical Manual (DSM, IV)



which was written by the American Psychiatric Association (APA) for the purpose of diagnosing psychological disorders (see figs. 4 & 5). The definitions of the Autism Society of America and the APA are similar to Leo Kanner's original definition. The IDEA was not added until 1990, and set autism apart as a distinct category within special education. Autism usually develops before a child is three years old and will last throughout the child's life (APA, 2000). Autism is four times more prevalent in boys than in girls (Autism Society of America, 2000). Autism is not a form of mental retardation or a mental disorder. It is sometimes misdiagnosed resulting in inappropriate and ineffective treatment. Those who communicate with language and those with average to above-average intelligence normally refer to themselves as "higher functioning persons with autism." However, there can be a wide range in the severity of autistic characteristics. So one can be higher functioning and have mild, moderate, or severe autism.

## **DIAGNOSIS**

Children with autistic characteristics may be classified as having autism spectrum disorder, also known as pervasive developmental disorder (PDD). Pervasive developmental disorder includes several disorders such as autistic disorder, Asperger's syndrome, childhood disintegrative disorder, Rett's disorder, and pervasive developmental disorder not otherwise specified (PDD-NOS) (see fig. 6 for definitions of these differential diagnoses). But children who are diagnosed with any of these disorders exhibit the following characteristics: "severe and pervasive impairment in several areas of development: reciprocal social interaction skills, communication skills, or the presence of stereotyped behavior, interests, and activities" (APA, 1994).

### **Autism Society of America (2000)**

Autism is a complex developmental disability that typically appears during the first three years of life. The result of a neurological disorder that affects the functioning of the brain, autism and its associated behaviors have been estimated to occur in as many as 1 in 500 individuals. Autism is four times more prevalent in boys than in girls and knows no racial, ethnic, or social boundaries. Family income, life-style, and educational levels do not affect the chance of autism's occurrence.

Autism interferes with the normal development of the brain in the areas of social and communication skills. Children and adults with autism typically have difficulties in verbal and non-verbal communication, social interactions, and leisure or play activities. The disorder makes it hard for them to communicate with others and relate to the outside world. They may exhibit repeated body movements (hand flapping, rocking), unusual responses to people or attachments to objects, and they may resist changes in routines.

Over one half million people in the U.S. today have some form of autism. Its prevalence rate now places it as the third most common developmental disability- more common than Down syndrome. Yet most of the public, including many professionals in the medical, educational, and vocational fields, are unaware of how autism affects people and how to effectively work with individuals with autism.

### **Individuals with Disabilities Education Act (Martin, 1996)**

...a developmental disability significantly affecting verbal and non-verbal communication and social interaction, generally evidenced before age 3 (34 C.F.R. ss300.7(b)(1)).

### **FIGURE 4: Definitions of Autism**

## **Diagnostic and Statistical Manual IV (APA, 2000)**

- A. A total of at least six items from (1), and (2), and (3), with at least two from (1), and one each from (2) and (3):
  - (1) Qualitative impairment in social interaction, as manifested by at least two of the following:
    - (a) Marked impairment in the use of multiple non-verbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.
    - (b) Failure to develop peer relationships appropriate to developmental level
    - (c) Markedly impaired expression of pleasure in other people's happiness
    - (d) Lack of social or emotional reciprocity
  - (2) Qualitative impairments in communication as manifested by at least one of the following:
    - (a) Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
    - (b) In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
    - (c) Stereotyped and repetitive use of language or idiosyncratic language
    - (d) Lack of varied spontaneous make-believe play or social imitative play appropriate to developmental level.
  - (3) Restrictive repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:
    - (a) Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
    - (b) Apparently compulsive adherence to specific, nonfunctional routines or rituals
    - (c) Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole body movements)
    - (d) Persistent preoccupation with parts of objects
- B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age three:
  - (1) Social interaction
  - (2) Language as used in social communication
  - (3) Symbolic or imaginative play
- C. Not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

**FIGURE 5: American Psychiatric Association's Definition**

## **Differential Diagnosis of Autism**

**Asperger's disorder** is characterized by social deficits and restricted patterns of activities and interests; however, these individuals show few or no cognitive or language delays. They may possess motor clumsiness in early childhood.

**Rett's disorder** is diagnosed only in females, whereas autism is most common in males, and is characterized by physical and motor differences. Although these individuals show some difficulties in social interaction, they do not show the entire diagnostic pattern of autistic disorder.

**Childhood disintegrative disorder** shows a persistent decline in social, motor, and/or language skills after a few years of normal development.

**Pervasive developmental disorder not otherwise specified (PDD-NOS)** pertains to individuals who show patterns of the autistic syndrome but have a later age of onset than three years old, and/or only some of or less severe symptoms. Sometimes this is referred to as atypical autism.

### **FIGURE 6: Differential Diagnoses of Autism**

**Source:** (APA, 2000)

## CHARACTERISTICS

The characteristics of autism are often categorized as either behavioral excesses or behavioral deficits. Behavioral excesses are characteristics that may get in the way of learning, cause the child to be punished, or make it difficult to deal with the child in normal situations (Scheuermann & Webber, 2002). Therefore, it is a goal of therapy/education to eliminate these behaviors. Examples of behavioral excesses are aggression, self-abuse, and tantrums.

In addition, children with autism often do not have essential skills for living such as talking, dressing, and playing. Without these behaviors or abilities, the child is severely handicapped. These characteristics are called behavioral deficits and believed to be directly related to behavioral excesses (Scheuermann & Webber, 2002). In other words, the more skills or abilities that a child lacks the more likely it is that he/she will resort to behavioral excesses to communicate and function with others in the world.

## BEHAVIORAL DEFICITS

Individuals with autism exhibit **social deficits** that make it difficult for them to relate to others. For example, many individuals with autism avoid direct eye contact. Some turn their heads and look out of the corner of their eyes while others seem to look right through. Some but not all may also be unable to tolerate physical contact and may even avoid it. When a child with autism sees a parent or family member they may show no special recognition of them. And when greeted with a smile, the child with autism does not acknowledge the smile and smile back. On other occasions, the child may seem to smile or laugh for no apparent reason. Rather than interact with people, children with autism prefer to spend time with objects, manipulating them for hours (but usually not in

the way they were intended to be used). Therefore, these children often do not display appropriate play behavior and instead engage in stereotypic manipulations of toys or other objects. They have very restricted interests and seem to have no desire to make friends. Clara Claiborne Park (1967) writes in the opening paragraph of her book, *The Siege: The First Eight Years of An Autistic Child*, about the detached and repetitive nature of her daughter's early play:

We start with an image –a tiny, golden child on hands and knees, circling round and round a spot on the floor in mysterious, self-absorbed delight. She does not look up, though she is smiling and laughing; she does not call our attention to the mysterious object of her pleasure. She does not see us at all. She and the spot are all there is, and though she is eighteen months old, an age for touching, tasting, pointing, pushing, exploring, she is doing none of these...She does not want any objects. Instead, she circles her spot. Or she sits, a long chain in her hand, snaking it up and down, up and down, watching it coil and uncoil, for twenty minutes, half an hour (3).

And Donna Williams, a high functioning person with autism writes about her own childhood play (1992). She recalls her play at the age of six:

Other children played school, mothers and fathers, doctors and nurses. Other children skipped ropes and played with balls or swap-cards. I had swap-cards. I gave them away in order to make friends, before learning that I was supposed to swap them, not give them away (22).

I often played alone, swinging on the monkey bars, looking at my cards, climbing trees, pulling flowers apart, spinning around and around as I stared up into the sun. I would fall to the ground and watch the world spin. I was in love with life but I was terribly alone (24).

Individuals diagnosed with autism often experience language problems. Many do not speak at all and for those who do their speech is very limited. Following are some specific language characteristics related to autism. Some children with autism are mute and possess little or no verbal skills. When verbal language is present, it may be in the form of echolalia or preservation. When children with autism use echolalia, they repeat

words and phrases that have been spoken by someone else, even with the same intonation. Echolalia can be used to ask for something or to communicate a response to a question. A preservation is the repetition of the same words or phrases over and over. This may occur when the child experiences high anxiety or is frightened. The following example is from the author's own teaching experiences.

Stephen is a six-year-old child with autism who shows little desire to speak. With prompts from his teacher or parents he has learned to finish greetings or supply information such as his name, address, and telephone number. However, when Stephen wants something, he has learned to mimic others' words (in the form of echolalia) to get his needs met. He will mimic half of his teacher's question (Teacher: "Do you want milk?" Stephen: "...want milk.") to get what he wants or needs. When Stephen gets excited or stressed he will preserve and/or make strange high-pitched sounds by curling his tongue as if to make the rolling "r" sound in the Spanish language and screeching.

Because children with autism have limited interests, they show few reasons to communicate. Therefore, their language usually lacks communicative intent or, in other words, desire to communicate for social purposes. These children use language to make requests or protests, not typically to converse or explore ideas. The speech of individuals with autism is immature made up of short phrases or sentences. "Outside" or "...go outside" may be the only way the child is able to make that request. Often the speech of individuals with autism contains pronoun reversals. The request "Do you want to blow bubbles?" may really mean "I want to blow bubbles." Or the child may use his/her name instead of the pronoun "I". ("Jacquie want to blow bubbles.") Comprehension may be limited although this population seems to understand a great deal more language than they speak. And understanding may be in a very literal sense. Remember Dustin Hoffman's character Raymond in *Rain Man*, who stopped in the middle of the street when the sign said "Don't Walk".

These problems alone could make communication and social interaction difficult. However, the individual with autism also has difficulty understanding subtle and complex non-verbal interchanges with people. And facial expressions, body language and intonation of voice are all missed cues. Therefore, they have trouble perceiving emotional expressions. Because so much information is missed, they cannot interpret social cues and therefore do not learn what to do in social situations, have difficulty inferring the intentions of others, and cannot seem to empathize with others or see another point of view (Fullerton et al, 1996).

### **Sensory Processing Deficits**

Another characteristic of autism is difficulty with sensory processing (how auditory, visual, tactile and other stimuli are perceived). Researchers speculate that individuals with autism may have differences in their sensory systems.

#### **Auditory**

For example, some individuals may report being hypersensitive to noise, while others may report being hyposensitive to noise. The following is from the author's personal experience:

Stephen avoided the boys' bathroom and would often have accidents in his pants. When the teacher escorted him to the bathroom he would put his hands on his ears when he walked in and almost exhibit a fear reaction. Stephen was hypersensitive to the sound of the flushing toilets and noisy fan that ventilated the boys' bathroom. Even when he was allowed to use a smaller, more private bathroom, he would put his hands over his ears whenever he flushed the toilet.

Temple Grandin (1992) describes her hearing:

My hearing is like having a hearing aid with the volume control stuck on "super loud". It is like an open microphone that picks up everything. I have two choices; turn the mike on and get deluged with sound, or shut it off... It is impossible for an autistic child to concentrate in a classroom



if he is bombarded with noise that blasts through his brain like a jet engine...  
(quoted in Fullerton et al., 1996, p. 5).

### **Tactile**

As with auditory input, individuals with autism may report being hypersensitive to tactile stimuli, while others may report being hyposensitive to tactile stimuli. For example, when the door slammed on Stephen's hand, he barely reacted, seeming to feel no pain. However, Temple Grandin (1992) reports otherwise, stating that it was even difficult to get used to new clothes, which could take three or four days. Some persons with autism may also have resisted being picked up or held as a child. Temple Grandin (1992) gives new insight to what this may have felt like:

...it was an approach-avoid situation. I wanted to feel the good feeling of being hugged, but when people hugged me the stimuli washed over me like a tidal wave. When I was five years old, I used to daydream about a mechanical device I could get into that would apply comforting pressure. Being able to control the device was very important. I had to be able to stop the stimulation when it became too intense. When people hugged me, I stiffened and pulled away to avoid the engulfing tidal wave of stimulation (quoted in Fullerton et al., 1996, p. 6).

### **Olfactory and Gustatory**

Individuals with autism may exhibit hyper- or hyposensitive olfactory and gustatory systems. Therefore, they may not be able to tolerate certain fragrances or flavors, such as strong perfumes or strong tasting foods.

### **Vestibular**

In addition to the five senses of taste, touch, smell, hearing, and vision, the autistic individual exhibits differences in the vestibular and proprioceptive systems. The vestibular system is regulated by the inner ear and provides us with a sense of balance. Just as with the other sensory systems, the autistic individual may be hypersensitive to

sensory input, hyposensitive, or display evidence of both. Persons who have under-aroused vestibular systems may seek increased movement and engage in rocking, pacing, spinning, or bursts of running and exhibit a “floppy” or low body tone. This system also regulates movements of the eye when the head moves. This may affect coordination of the head and body movements, thus affecting motor skills, such as writing or catching a ball. Those who over-register vestibular input may dislike excessive movement. Tasks or activities that require excessive head movements may tax these individuals or may even make them uncomfortable.

### **Proprioceptive**

This system receives information from the muscles, tendons, and joints. It gives one the perception of movement and awareness of the body in space. It acts as our internal eyes and allows for accurate motor planning. Proprioceptive problems may cause a person to be clumsy, bump into things, and inaccurately judge the distance between self and others. Self-help skills may be affected, such as being able to dress oneself. Oral motor difficulties may occur too, which impacts speech and/or feeding.

In conclusion, individuals with autism have reported differences in their sensory systems. Some sensory systems may experience hypersensitivities, while others may experience hyposensitivities. More than one sense may be affected, and both hyper- and hyposensitivities may be experienced at the same time. Some individuals may have difficulty shifting from one sensory mode to another. And if persons with autism experience too much sensory stimulation they may experience what Temple Grandin (1992) describes as “sensory overload”.

## **Cognitive Deficits**

Because these individuals have language and perceptual problems, it is difficult to determine the level of cognitive functioning through intelligence tests. Results from this type of assessment are not accurate and may not indicate specific forms of intelligence. Many children with autism have functional retardation. Others may show areas of giftedness, what Scheuermann & Webber call “splinter skills”. For instance, a child may be able to compute large numbers very quickly but not be able to determine whether he has enough money to make a purchase. The following example is from the author’s own teaching experiences:

Jacquie is a nine-year-old girl who likes to play solitaire on the computer. She has become quite good at it and will play for her teacher. Jacquie sees the desired card and moves it at lightning speed. She then moves equally quickly on to the next. The teacher is amazed at the speed with which Jacquie is able to see the cards, choose the correct card, and then move on to the next play. The teacher is unable to keep up with the dizzying speed that Jacquie is able to do this.

Because the sensory processes and cognitive processes are directly related, differences in one will affect the other. Since individuals with autism have differences in their sensory systems, they will take in different information about the world than others. Therefore, they will probably make different conclusions about the world as well.

In addition, it is thought that individuals with autism have different cognitive styles, too. Jan Janzen compared the brain of an autistic child to a video camera. Since most children with autism have excellent memories, their brain takes in every sight, sound, touch, etc. in minute detail. But then the child has trouble editing out information that is not important. Sometimes the child turns the camera on and records everything. Other times, the child becomes overwhelmed and temporarily shuts it off losing valuable

information. On other occasions, the child does not turn it on at all, or focuses on the wrong thing. This affects the information that is collected and how it is stored for future use.

Later the information must be retrieved for problem solving. However, persons with autism may not understand the meaning of the information to use it to solve a task. They may not be able to generalize the information over a variety of contexts either. And even though they can memorize large amounts of information after hearing and seeing it only once, they may assign no meaning to the information or they may encode it so precisely that it is difficult to retrieve when necessary. Donna Williams describes her thought processes:

He thought he could help me find different ways to tackle various problem situations. I couldn't really see how he could help though. I would learn to tackle a given situation in one context but be lost when confronted by the same situation in another context. Things just didn't translate... Things were stored but the compulsive over-categorization of them was so refined that events had to be close to identical to be considered comparable (quoted in Fullerton et al., 1996, p. 11).

Children with autism have strong visual skills and they seem to remember things by their location in space (Schuler, 1995 in Scheuermann & Webber, 2002). This may explain why they need to do things in the same way and follow the same schedule day after day; otherwise they become confused. Because of these excellent visual skills, some may excel at activities such as putting puzzles together while others may excel at mechanical drawing. They prefer learning in the visual mode and may reach sensory overload if given too much auditory information. Temple Grandin states,

...all of my thinking is visual. When I think about abstract concepts such as getting along with people, I use visual images such as the sliding glass door. Relationships must be approached carefully, otherwise the door could be shattered (Grandin, 1992, p.116).

## **BEHAVIORAL EXCESSES**

When children with autism lack the necessary skills to communicate their wants and needs, they often resort to other behaviors to make these known. Examples of these behavioral excesses follow.

### **Self-Stimulation**

Often individuals with autism engage in self-stimulation. It is believed that the autistic individual craves sensory input and that these behaviors meet this need. Self-stimulation behaviors are usually repetitive and stereotypical in nature. Examples include: spinning and rocking themselves, hand flapping, humming in a monotone, arranging and rearranging objects, moving their hands between their eyes and a light to achieve a strobe effect, gazing up at the ceiling or lights, and smiling or laughing when there seems to be no stimulus. Self-stimulation seems to be a preferred activity and the individual with autism may engage in one of these for long periods of time. The following example is from the author's own teaching experiences:

Each child in the class had a different preference of self-stimulation. Lorenzo's activity of choice was to hum and smile to himself for seemingly no apparent reason. Isaiah looked up at the ceiling lights out of the corner of his eyes and it was difficult for him to attend to the task at hand. Stephen liked to spin and spin or flap his hands. While Jacquie liked to manipulate small objects or pieces of ribbon in her hands. (She often tried to stash these in her socks and she would come to school with her socks bulging).

### **Resistance to Change**

Due to the cognitive processing deficits mentioned above, children with autism may show aversion to change. Often new stimuli are difficult for this child to comprehend

and he/she relies on rote memory to create understanding (Scheuermann and Webber, 2002). Therefore, change can cause frustration, confusion, and anxiety. The child then prefers to do things in a repetitive manner and to maintain a strict schedule to help him/her make sense of the world (Matson, 1994). If change must occur, the child with autism handles the change better when he/she has been previously prepared (Scheuermann and Webber, 2002). For example, if there is to be a field trip in the community on Friday, the students should rehearse what they are to do and know what is to be expected of them. Visual schedules and calendars should be highly visible to remind the students about the upcoming field trip.

### **Other Behaviors**

Individuals may also engage in **self-injurious** behaviors. These may occur when the child is trying to communicate something or when he/she is experiencing fear, or undue stress or frustration. If the child is taught how to ask for what he or she needs appropriately then some of these behaviors may diminish. Self-injurious behaviors include: head banging, hair or hand biting, gouging their eyes, or hitting themselves (Matson, 1994). Individuals with autism may also engage in **aggressive** behaviors when there space is invaded or when experiencing frustration or stress. The child with autism may slap, hit, spit, scratch, or kick. **Other behaviors** include pica (eating inappropriate objects), hyperactivity, impulsivity, short attention span, and tantrums (Scheuermann & Webber, 2002).

### **TREATMENT**

As of the present date, the exact etiology of autism has yet to be found. However, much research has addressed the neurological (Minshew, Sweeney, & Bauman, 1997),

neurochemical (Anderson & Hoshino, 1997), and genetic (Rutter, Bailey, Simonoff, & Pickles, 1997) abnormalities present in autism. Current treatment approaches are based on three main theories (Fisher et al., 1991; Scheuermann & Webber, 2002). The first theory, a **perceptual/cognitive theory**, is based on the premise that individuals with autism have differences in their thinking ability and the way they receive input. Those that adhere to this theory believe that the autistic child is over-stimulated by auditory, visual, and tactile stimuli. If the child cannot make sense of this overload of information, the child may withdraw. Therefore, treatment would include methods that would help the child make sense of his/her seemingly chaotic world. The environment would be uncluttered and organized in such a way as to give the child visual clues as to where he is to go and what he is to do. Highly organized and predictable visual schedules would be used to keep the child on task and directions would be given in brief short steps, including instructions on how to attend and communicate in socially appropriate ways. An example of intervention based on this type of theory is the TEACCH program. The TEACCH program will be discussed at the end of this section.

Followers of the **developmental theory** contend that the child with autism has failed to meet developmental milestones in language, social, cognitive, and motor domains. Therefore, these children must progress through the sequenced experiences that their peers have already mastered to acquire these skills. The therapist or special educator follows the child's interests and encourages more play and interaction based on these interests. The teacher/therapist places stimulating toys, objects, and people in the child's environment to encourage interaction and growth. It is also suggested that gross motor opportunities and sensory stimulation be provided. Examples of interventions based on

this type of theory are Play Therapy and Sensory Integration. These will be discussed at the end of this section.

The **behavioral theory** suggests that the autistic disorder has prevented normal learning from occurring and resulted in behavioral deficits and excesses. Proponents of this theory believe that through identification of the deficits and excesses that are present and direct skill training appropriate behavior can be taught. A discussion of intervention based on this theory follows.

### **Applied Behavior Analysis**

Individuals with autism exhibit many behavioral characteristics that interfere with normal functioning. Behavioral therapists have developed behavior modification techniques, known as applied behavior analysis, that are effective with this population. These techniques are used to decrease inappropriate behaviors, increase desired behaviors, and teach new behaviors to persons with autism.

This type of therapy is based on the assumption that the biological make-up of the child as well as past learning contribute to present behavior. And that behavior, whether appropriate or inappropriate, is governed by two principles. First of all, the behavior must serve some purpose for the child. That is why the child continues that behavior.

The following example is from the author's own teaching experiences:

For example, Isaiah wants cereal for breakfast. He is not able to speak, so he does not ask for the desired cereal. Instead, he must come up with another way to let his mother know that he wants cereal. He stands by the cupboard that contains his favorite cereal. Still mom does not comply. He makes grunting noises to let her know that he wants something. However, she is attending to her other children and does not hear him. Finally, Isaiah hits his mother on the leg and pulls on her clothes. This gets her immediate attention. Because it is morning and time for breakfast she realizes what he wants. Immediately she gives it to him. Isaiah has learned that hitting and tugging gets him what he needs.



Isaiah's mother will have to teach him a better way to communicate that he wants cereal or he will continue to resort to hitting to get what he wants.

The second principle that governs behavior is that behavior is related to the environment in which it occurs. In an earlier example, Stephen was often non-compliant when asked to use the bathroom. The environment (noise from the fan and flushing toilets) affected Stephen's behavior. Instead of punishing Stephen for being non-compliant, the environment could be altered so that he was less fearful. Perhaps if Stephen were allowed to listen to his favorite CD on a headset, he would be less fearful and more compliant.

In applying behavioral techniques, there are several steps or procedures that guide the practitioner in his/her approach. Before attempting to make any changes, the therapist/special educator must first identify behavioral excesses and behavioral deficits. A variety of assessment methods are used for this purpose. In addition to these, direct observation and/or checklists may be used. After identifying *what* the target behaviors are it is important to determine *why* the student engages in these behaviors. Therefore, information is gathered about the student's behavior, including the contexts in which they occur and the antecedents and consequences associated with each. From the information gathered, a hypothesis is formulated. Then an intervention is developed based on that hypothesis. The therapist must choose one behavior at a time as the target behavior. The target behavior is the one that should be diminished, increased or taught. Then the target behavior is measured prior to intervention to set up a baseline by which future measurements will be compared. Interventions are then designed and set up and data collected to determine if the intervention is working.

Behavior does not occur in isolation. Most of the behaviors that occur are related to events in the environment that occur either before the behavior (antecedents) or after the behavior (consequences). This model (Antecedent – Behavior – Consequence) is called the A-B-C Model. Antecedents occur before a behavior is exhibited. These can serve as cues for appropriate behavior or cues for inappropriate behavior. It is important to determine the relationship between the antecedent and the behavior so that the antecedent can either be eliminated or modified to get the desired behavior. Using specific antecedents to cue specific behaviors is called stimulus control. The following example is from the author's own teaching experiences:

At the beginning of the year, when the teacher asked the students to line up, they did not line up but milled around instead. The teacher determined that the term "line-up" was too abstract for the children to comply. Therefore, she changed her directions to include a more visual mode that the students could understand. The teacher put a line on the floor out of electrical tape. Along the length of the line the teacher put sets of footprints in different colors. Then she put each child's name under a set of footprints so that there would be no confusion as to where each child should stand. The next time she asked the children to line up it was easier for them to comply. The teacher changed the antecedent. She changed her directions as well as the environment.

Another part of the A-B-C Model is consequences. If the child's behavior is followed by a consequence that he likes or enjoys, then he is more likely to repeat the behavior. However, the behavior will not be repeated if the individual does not like the consequence. An example of a consequence is a lollipop that is given to a child when he cooperates during his visit to the doctor. In addition to the strategies mentioned above, shaping, chaining, generalization training, and milieu teaching, which are also based in applied behavior analysis, can be used. However, I will not go into these here.

## **Sensory Integration**

The theory of Sensory Integration was developed by an occupational therapist, A. Jean Ayres. “Sensory Integration Theory was developed to explain an observed relationship between deficits in interpreting sensory information from the body and the environment, and deficits in academic or neuromotor learning in some individuals who demonstrate learning disabilities” (Fisher, Murray, and Bundy, 1991). She hoped to identify subtypes or patterns of dysfunction for which she could develop specific treatment strategies.

Ayres (1972) first described the sensory integration process as “the ability to organize sensory information for use”. Later (1989) she stated that

sensory integration is the neurological process that organizes sensation from one’s own body and from the environment and makes it possible to use the body effectively within the environment. The spatial and temporal aspects of inputs from different sensory modalities are interpreted, associated, and unified. Sensory integration is information processing...The brain must select, enhance, inhibit, compare, and associate the sensory information in a flexible, constantly changing pattern; in other words, the brain must integrate it.

Sensory integration theory has three components: (1) normal sensory integrative functioning, (2) sensory integrative dysfunction, and (3) intervention programs that use sensory integration techniques. Each of these components has a major postulate.

The first postulate is that learning is dependent on the ability of normal individuals to take in sensory information derived from the environment and from movement of their bodies, to process and integrate these sensory inputs within the central nervous system, and to use this sensory information to plan and organize behavior. According to the second postulate, when individuals have deficits in processing and integrating sensory inputs, deficits in planning and producing behavior occur that interfere with conceptual and motor learning. The third postulate that guides intervention hypothesizes that the provision of opportunities for enhanced sensory intake, provided within the context of meaningful activity and the planning and organizing of an adaptive behavior, will improve the ability of the central nervous system to process and integrate sensory inputs and to enhance conceptual and motor learning (Fisher et al., 1991, p.11).

Sensory integration is the organizing of all the information that comes in from the senses. However, there are more than the five standard senses of vision, hearing, touch, taste, and smell. There are two other sensory systems: vestibular and proprioceptive. These two systems along with the tactile system provide body-oriented sensory input and perception.

The **tactile** system provides the individual with information about the environment and serves two functions. The tactile *protective* component provides information about the environment that is necessary to our survival. It registers temperature changes, light touch, and general contact with the skin. The tactile *discriminative* component allows us to differentiate between various textures and contours by touch. We rely on this component to plan movements to adapt to the environment and to manipulate objects.

The **vestibular** system is composed of three structures in the inner ear, the semicircular canals, the saccule and the utricle. These register the speed, force, and direction of head rotation and the force of gravity. The vestibular system regulates muscle tone and coordination, balance and equilibrium, ocular-motor control (visual skills and the movements of the eyeball), arousal and attending level, and emotional state (Anzalone, M., 2002).

The **proprioceptive** system includes the receptors in the muscles, tendons, and joints that provide the perception of movement and position of the body in space.

“Proprioception provides information regarding the orientation of the body in space and the relation of body parts to each other; the rate and timing of movements; the force exerted by muscles; and how much and how fast a muscle is stretched (Fisher et al, 1991). Proprioception helps us to develop a body scheme, which is an awareness of our

body parts, how they relate to the whole, and how they move through space. This system also allows an individual to plan, organize, learn and remember movements.

When we process sensory input, it is not processed in isolation but rather it is cumulative in that it is added to the sensation that came before it. This combined sensory information is processed until it activates the central nervous system. When this happens the individual's **sensory threshold** is affected. A person's threshold will modulate between the mid, low, and high ranges depending on the individual's current level of arousal, previous sensory and affective experiences, and expectations. Most individuals will maintain their sensory threshold in the mid-range of the scale. However, some children may remain in the extreme ranges of the scale (low or high) which may indicate dysfunction.

A child with sensory integration dysfunction usually demonstrates problems in two ways. The first involves *sensory threshold* and is exhibited in the child's inability to recover or return to a baseline level of arousal after the sensory event. The second problem involves *praxis* or the ability of the individual to plan and sequence unfamiliar actions. Praxis consists of three different components, ideation, motor planning, and execution. Ideation involves formulating a goal for action. Motor planning involves figuring out how to get one's body to carry out the goal for action. Execution is the actual "doing" of an action. Children who have *dyspraxia* usually demonstrate motor difficulty. Some have behavioral problems as well.

Therapists who work with children regarding sensory processing problems often target three goals. The first goal is to work with the parents to help them understand their child's behavior and to foster nurturing relationships. The second goal is to facilitate "goodness of fit" by modifying the physical and social environments of the child and designing a program to manage the child's sensory diet. A child's sensory diet is a planned and scheduled activity program designed to meet a child's specific sensory

needs. The third goal is to design direct intervention strategies to remediate identified problems. Indirect intervention strategies include management of space, materials, equipment, and individuals in the surroundings. Direct intervention strategies include interaction with the adult through modeling, verbal guidance, and physical prompting (Anzalone, M., 2002).

In conclusion, sensory integration is a child-directed, sensory enriched therapy that depends upon a specialized environment. It can be both playful and fun, while being active and flexible. Most therapists consider it to be both an art and a science.

### **Play Therapy**

Although “play therapy” is rooted in the psychoanalytic tradition, there are different forms of play therapy. The idea of traditional play therapy was to draw the child out of his/her “autistic state” by working through internal conflicts stemming from a dysfunctional mother-child relationship (Wolfberg, 1999). Fortunately, however, physicians, psychiatrists, and psychologists no longer believe this to be the case. And as mentioned earlier, research has focused on an organic cause for this disorder. Therefore, the focus of play therapy has changed to reflect the current thinking and research.

### **Adult-Directed Approach**

This approach requires direct prompting on the part of the adult. According to Wolfberg (1999), this approach reduced play to a series of operationally defined behaviors taught in a “task analysis” fashion. Later this approach included socially competent peers who were trained to prompt and reinforce specific social and play responses of the peer with disabilities. This increased the frequency and duration of social interaction. But the child with autism did not generalize the skills taught.

### **Child-Centered Approaches**

Research has suggested, however, that adults should limit the amount of direct support and structure they provide in order to promote play (Meyer et al., 1987; Shores, Hester, & Strain, 1976; Wolfberg, 1999). A number of developmental interventions to play attempt to do just that and are referred to as child-centered approaches. These interventions focus on the child's interests, vocalizations, and spontaneous initiations to encourage socialization. Studies by Dawson and Adams (1984) and Tiegerman and Primavera (1981) have used imitative behavior to increase attentiveness, eye contact, and play in children with autism with success (Wolfberg, 1999). The "Floor time" approach is an example of a child-centered approach where the adult follows the child's lead. "The adult treats each of the child's actions as purposeful thus encourages the child's attention. Once the adult has the child's attention he engages him/her in more complex communicative and emotional exchanges and symbolic activity" (Greenspan & Wider, 1997).

### **Integrated Play Groups Model**

In her book *Play and Imagination in Children with Autism*, Pamela Wolfberg describes an integrated play group model. In these play groups, children with autism (who are described as novice players) participate in play activities with socially competent peers (who are described as expert players) while being guided or supported by an adult (who is referred to as the play group guide). The goal is to encourage a mutually enjoyable experience, while increasing the novice player's social and play skills (Wolfberg, 1999). The play group guide has three functions in this model. The guide observes individuals at play, gives guidance when needed, and designs the environment so that it encourages

both social and imaginative play. At first the children will require a great deal of assistance from the play group guide. However, as the children become more comfortable and more skillful in engaging each other in play, the adult play group guide will reduce the amount of assistance given and remain close by but unobtrusive.

Integrated play groups take place in a setting where children would naturally play. Play spaces should accommodate approximately five children, have clearly defined boundaries, and explicit organization with materials accessible, visible, clearly labeled, and logically arranged around activities and themes (Wolfberg, 1999). In summary, play is important to the development of every child. Children with autism experience a number of problems engaging in play. It is the purpose of play therapy to design truly effective and meaningful play interventions for children who experience problems with play with the hope that these experiences will have an impact on their social, verbal, and cognitive development.

### **Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) Program**

With recent reports of major progress in the research and treatment of very young individuals with autism (Lovaas, 1987), a variety of preschool projects have been developed around the country. In their book, *Preschool Education Programs for Children with Autism*, Sandra L. Harris and Jan S. Handleman (1994) give an overview of several of these programs. One program of importance is the TEACCH program. It was founded by Eric Schopler in 1972 as a division of the Department of Psychiatry, University of North Carolina at Chapel Hill. Dedicated to improving the understanding and services for children with autism, TEACCH is a statewide, comprehensive, community based program in North Carolina. Catherine Lord and Eric Schopler give an



excellent overview of this program in Harris and Handlemann's book. Gary B. Mesibov also gives an overview of this program in Matson's book, *Autism in Children and Adults*.

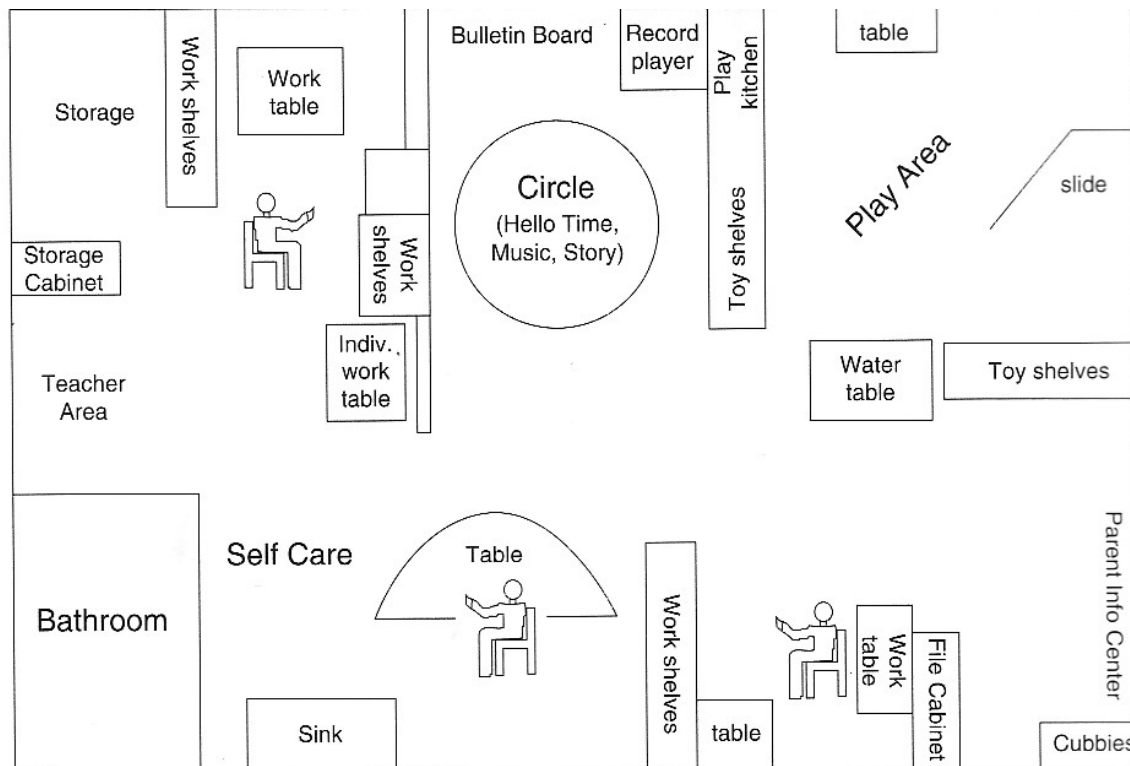
The TEACCH curriculum is of importance to this thesis because it is used across the country, including here in Louisiana. A central aspect of this curriculum is structured teaching. Children in the preschool program are taught how to be students and the appropriate social and communicative behavior to be successful in a regular classroom environment. The children work on fine and gross motor skills, self-help skills (such as toileting, eating habits, washing hands, wiping tables, hanging up coats), expressive communication, receptive language, and social interaction. They work individually, one-on-one with a teacher or therapist, in small groups, and in larger groups. Individual daily schedules help to prevent frustration and behavior problems. The number of students to one teacher with an assistant should not exceed six. Emphasis is placed on the physical structure of the curriculum and the layout of the learning environment. This is illustrated in the floorplan of a preschool class (Fig. 7). Suggested teaching activities and strategies for parents and teachers are published in:

*Individualized Assessment and Treatment for Autistic and Developmentally Disabled Children: Teaching Strategies for Parents and Professionals*, Volume II (Schopler, Reichler, & Lansing, 1980) and *Teaching Activities for Autistic Children*, Volume III (Watson, Lord, Schaffer, & Schopler, 1988). Watson, Lord, Schaffer, & Schopler (1988) also produce a TEACCH communication curriculum that can be used both in school and at home (Harris and Handleman, 1994).

Structuring the environment and facilitating independence at all levels of functioning are the most important goals of this curriculum. Each child's behaviors, skills, and deficits are observed and assessed so that an individualized program can be designed for him/her.

A TEACCH consultant helps the teachers and other professionals understand the needs of the autistic child. While many skills can be taught directly, others require environmental

accommodation. By accommodating the learning environment to the deficits associated with autism, independent functioning of each child is gradually increased and many frustrations and behavior problems are avoided (Lord and Schopler, in Harris and Handelman, 1994).



**FIGURE 7: Example of Classroom Layout using TEACCH Curriculum.**  
**Source: Harris and Handleman, 1994, p. 95.**

There are numerous other treatments for various aspects of autistic disorder. For example, to address communication difficulties, a speech pathologist may suggest sign language, the picture exchange system, or an augmentative device. For auditory problems the therapist may suggest auditory integration training. To improve social interactions the therapist or special educator may use social stories, comic strip

conversations, or social review. A medical intervention by a physician might be vitamin therapy. To address all of the treatments of various aspects of autistic disorder is beyond the scope of this thesis. But it is important to know that these and others do exist.

## **CHAPTER 4**

### **CASE STUDY AND INTERVIEWS**

At the beginning of the thesis process, I was not sure how to proceed. I needed information to support the notion of a therapeutic garden for autistic children. But I had no idea where I should go to retrieve this information. I decided to speak to those people who not only have been trained in the characteristics and treatment of autism, but who also have a deep understanding of what it means to be autistic from working with this population on a daily basis. Therefore, I decided to interview a special educator, a speech language pathologist/administrator, and a physical therapist. Although the number of interviews is small, this personal approach provided answers to questions I may not have thought to ask in a more controlled method. In fact, the somewhat loose format led to the discovery of pertinent information.

My goals as I approached this task were to (1) gain a clearer understanding of the individual with autism, (2) gain additional insights into treatment models or approaches currently being used, (3) gain from the experiences of professionals who work with individuals with autism on a regular basis. The interviews were also helpful in broadening my literature review as each suggested further reading on various topics. For instance, the speech pathologist suggested reading material published by high functioning persons with autism. These resources gave me great insight into the world of autism. A list of possible questions to ask while interviewing professionals, a caregiver, and/or parent was compiled for future reference. These interview questions can be found in the appendix.

## **INTERVIEW WITH A SPECIAL EDUCATOR**

The first interview was with a special educator who works with autistic children on the elementary level. Gina had a self-contained pre-school class of five autistic children ages 3 and 4. Gina had been working with autistic children for three to four years. She explained that at this particular school there is a consultative model in place. This means that the therapists, special educators, and parents collaborate to create an individual educational plan (IEP) for each child. The therapists (occupational therapist, speech language pathologist, physical therapist, adaptive P.E. teacher) design and evaluate therapeutic strategies for the child. The special educator plans the educational strategies for the child and implements those as well as the therapeutic strategies set forth in the IEP. Parents bring additional insights to these meetings and in doing so give a more complete view of the child. They may discuss the child's particular strengths, weaknesses, and idiosyncrasies, make suggestions, or ask questions about how to handle certain situations at home. The Individual Education Plan (IEP) focuses on all areas of education and therapy. An IEP includes long and short-term goals for Motor (fine and gross motor) Skills, Self-Help Skills (such as, toileting, eating habits, washing hands, dressing, hanging up coats, etc.), Language (both expressive and receptive language) Skills, Social Skills, Behaviors (that need to be increased or decreased), and Functional Academics.

Gina described her particular program as very structured. Visual methods are employed to communicate to the child what he/she is to do and how he/she is to do it. These visuals provide understanding, decrease the level of stress, and increase independence. Schedules, visual routines, lists, color-coding, and visual rules are some

of the visual techniques employed by the program. Gina works hard to enable the children to acquire skills that will make them more independent so that they can function at a higher level. Strategies are used to break down each activity into tiny, doable steps to ensure success. This process also involves considerable repetition. Progress is slow but improvement is measurable.

In addition to structure, Gina discussed the type of “Play Therapy” that is incorporated into this program. Gina utilizes the “Floor Time” method of play therapy, devised by Stanley Greenspan, M.D., to engage her students. The room is arranged so that “Floor Time” takes place in a specific area of the room. Floor Time itself is unstructured in that the adult, Gina, sits on the floor with the child and follows the child’s lead, the child’s interests, and the child’s initiations. The play area contains household and dress up materials, and other toys or things that might be of interest to the child. These are designed into the environment to increase the child’s engagement with others, communication, imaginative play, and social interaction. By capitalizing on the child’s spontaneous initiations and allowing the child to select preferred play activities and toys, Gina is able to increase the child’s attentiveness and encourage him/her to engage in more complex communicative and emotional exchanges.

Gina stressed the importance of structure, order, and predictability and the effect these approaches have on the child’s level of stress and, consequently, behavior. She repeatedly used words or expressions such as “engineering the environment” and “creating a visual map” to help the child with autism “make sense of his/her world”. The physical arrangement of the classroom space reflected her belief in these words. The larger classroom was subdivided into separate content areas. Areas are designated for

therapeutic play, circle time, individual work, self-help activities, small group instruction, and large group instruction. Each of these areas has storage for the materials needed for that type of activity and are easily accessible. Partitions on three sides separate one area from another and act as physical or visual boundaries. Shelves, storage bins, chests, or other furniture serve a dual purpose as dividers or partitions. The classroom is orderly and logical to help the child make sense of his/her environment and to encourage independence.

Gina also works on sensory issues with these autistic children. She explained that children with autism have sensory processing issues. Some children with autism may over-register sensory input while others may under-register sensory input. She works with the senses to calm or arouse the child and bring him/her to the optimum level of arousal for attending to tasks. Once the child is able to attend, he/she is more ready to be taught and thus learn. The sensory integration techniques are also used to improve fine and gross motor skills, coordination, balance, production of language, behavior and other skills.

Gina was not only receptive to the idea of a therapeutic garden for autistic children but also very enthusiastic. She explained that the outdoor environment is more conducive to motor activities such as balancing, jumping on a small trampoline, climbing on a small “Little Tykes” play gym, all activities that she and other schools sometimes employ inside. Also, many sensory integration activities are more easily adapted to the outdoor environment, such as tactile activities that involve sand and water tables, fragrances that could be planted into the garden, and surfaces that could be touched or used to guide the child. In addition, the outdoor environment is a natural environment to engage in play

therapy and to have typically developing children engage in activities with the autistic children in reverse inclusion. When or if a child reaches sensory overload, the child could release his/her pent-up frustration in an acceptable way by, for example, twisting himself on a swing and then spinning and spinning to his/her heart's content, whereas spinning in the classroom would be considered an unacceptable behavior.

### **INTERVIEW WITH A SPEECH LANGUAGE PATHOLOGIST**

The second interview was with a speech language pathologist who was also the director of the Chartwell Center in New Orleans. During my interview with Janet Mora, we discussed some of the treatment strategies that are implemented with children with autism. The first treatment strategy that Janet explained was the TEACCH program. Janet explained that autistic children often prefer the visual mode of learning and communicating. And many of the TEACCH strategies use visual communication. Teachers and therapists attend workshops on TEACCH to learn the philosophy of the program and to be trained in ways to implement it. Materials based on the TEACCH rationale must be generated by the teachers and therapists to meet each individual's needs. Children receive one-on-one instruction with a teacher/therapist trained in this approach.

Since the child with autism often has an excellent visual memory it is important to plan how information will be presented. It is difficult to unteach something once the child has learned it incorrectly. Material is presented in a sequential format from left to right or from top to bottom. If the child is to perform a behavior or complete an activity the following three components must be included: (1) the child must be shown what he/she is to do, (2) how he/she is to do it, and (3) the child must be given a cue so that he/she will



know when the activity is finished. It is also important to show a sample of the finished product. Often pictures are taken to show the child the steps in an activity and the order in which they are to be performed. For example, to help the child with the “self-care” activity of washing hands, the following pictures would be placed on a poster near the bathroom sink. The pictures could be displayed from left to right or from top to bottom, but they must be placed in the order in which they should take place.

### Washing Hands

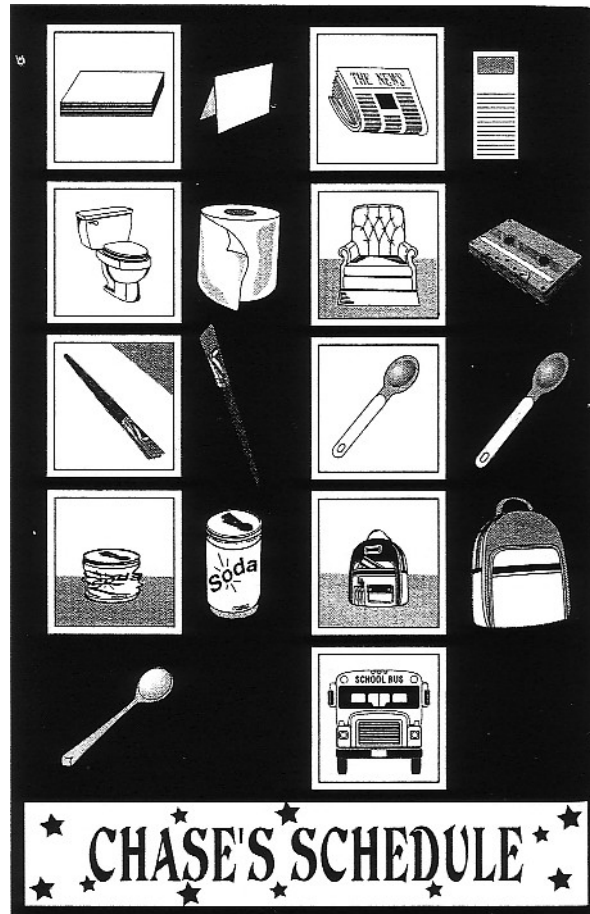
Child turns + child wets hands + child picks up + child rubs hands + child rinses etc.  
On water under water the soap together with water

Often the professional or caregiver will rehearse the procedure with the child, giving cues at first, then gradually giving fewer cues until no assistance is needed.

At the individual workstation, teacher-generated activities are left for the child to work on independently. The work station consists of a desk or study corral similar to that which is found in a library to eliminate distractions by others in the room. Materials are presented in a tray to the left of the desk. The child takes the work from the tray and works on it independently until the activity is complete. Then the child puts the completed activity in the tray on the right of the desk. The child may be expected to do more than one activity. This process continues until the child receives a cue that individual work time is over. The cue may be the ring of an egg timer or the soft ringing of a hand bell within the classroom. The child would then proceed to the next activity. Each child knows where to go and what activity to perform next based on an individual schedule. The individual schedules are usually placed in a prominent place in the room and displayed at the child’s height. When the child first arrives, he goes to the schedule

and removes the first icon and performs that task until a bell rings softly to cue him that it is time to advance to the next activity. These icons are pictures that represent different activities during the day. For instance, an icon of the school bus could signal arrival or departure time. Children with autism have difficulty with the abstract concept of time so they need concrete visual or auditory cues to notify them how long they should do something or when time is up. A sample schedule can be found in Figure 8.

Another visual technique is to put lines on the floor to indicate where the children should line up when moving from the classroom to activities outside the classroom. Again words such as “line up” are abstract and difficult for the child to understand. Sometimes each child is designated a color so that she can find her materials in the “red” cubby, her desk inside the “red” square, her schedule on the red poster, etc. Very few verbal instructions are given when using the TEACCH approach because children with autism have difficulties with verbal comprehension. Transitional times can be a problem for these children so even waiting is spelled out in steps visually. For example, if the child is told to “Wait” the child could be taught to go to the “red” carpet square and sit down with her hands folded in her lap. The visual carpet makes sense of the abstract concept of waiting. The TEACCH method requires that all materials, toys, games, etc. are stored in a designated space and labeled so that they are easily accessible to the child. The purpose of the organization and structure of the TEACCH program is to encourage the child’s independence and therefore better prepare the child for independent living later in life.



**Figure 8: A Visual Schedule.**  
**Source: Scueuerman & Webber, 2002, p.132.**

Janet also gave me examples of other treatment methodologies that are in current use for individuals with autism. Since Janet is a Speech Language Pathologist she was a good source for strategies that improve communication. She explained that having a normal functioning auditory system that allows us to hear speech and environmental sound does not guarantee speech. A person must be able to attend, process, remember, and interpret sounds. In other words, a person must understand what is being said to learn to speak. The vestibular system (in the inner ear) and the auditory system work together to process auditory information. Therefore, if the vestibular system is under-aroused this may have an impact on speech. Stimulation of the vestibular system directly

impacts the auditory system and language. Janet explained that it is not uncommon to note an increase of vocalizations when the vestibular system is stimulated through swinging and rocking.

Janet also mentioned that since the child with autism has visual strengths, that speech may be taught through the use of visual communication systems such as sign language, The Picture Exchange System, or Communication Boards. Computerized systems are another means of aiding communication. All of these are sometimes referred to as augmentative or alternative communication systems. The Picture Exchange System requires that the child exchanges a picture for a desired object. Sometimes the caretaker wears a Velcro vest containing Velcro-backed pictures so that the pictures are readily accessible to the child or a poster board containing Velcro-backed pictures is placed in a prominent place. A communication board contains symbols (letters, basic words, pictures or photos, line drawings, and others) to help the child communicate.

Janet also mentioned that appropriate social behavior or interactions could be encouraged through the use of comic strip conversations, social review, and/or social stories. (A good source for this information is a book called *Higher Functioning Adolescents and Young Adults with Autism* by A. Fullerton, J. Stratton, P. Coyne, and C. Gray.) Social stories, developed by Carol Gray, are usually used with the younger children so I will discuss those briefly here. Children with autism often need assistance in understanding social information. They have difficulty understanding that another person has their own thoughts, feelings, and motivations. They also have difficulty reading relevant cues in a social situation. They don't understand the reasons for "certain procedures, activities and responses, social implications specific to a situation or

descriptions of plans, and activities behind the scenes” (Fullerton et al, 1996, p.75).

Social stories provide information regarding social situations and appropriate behavior.

They may be presented through pictures, pictures with words, or words alone.

Social stories describe situations, experiences, concepts, and rules of social behavior in concrete terms to help the child with autism learn social nuances that others learn naturally. If wording is used, it is kept simple and focuses on positive behavior. For example, one child in the pre-school autistic class would eat soap during the hand washing process. As this is not an acceptable social behavior (nor is it good for the child’s digestive system) the special educator placed a social story on the wall beside the sink and soap dish to eliminate this peculiar behavior. Pictures were taken to show the appropriate use for soap. The caption under the picture of hands washing read “Soap is for washing my hands not for eating.” Social stories should be individualized to meet the needs and interests of the child. They should accommodate the child’s reading level and be written in the first person.

Janet is also an author and has just published a book with a colleague, Nancy Kashman, who is an occupational therapist. Their book, *An OT and SLP Team Approach: Sensory and Communication Strategies that Work*, is an excellent resource for hands on sensory integration strategies to use with children with autism. It was a great resource for this thesis as it mentioned many strategies that I believe could be incorporated into an outdoor therapeutic environment. For example, children with autism often have trouble with handwriting tasks. To develop arm and shoulder muscles and to encourage appropriate hand and wrist positions that are important to handwriting and other fine motor skills, Nancy and Janet suggest having the child stand upright at an art wall, chalkboard, dry

erase board, easel, or other vertical plane. To work on the tactile system, sand and water tables could be used as well as sensory boxes or containers that hold rice, beans, different kinds of pasta, Styrofoam peanuts, shredded paper, cotton balls, popped or unpopped popcorn, etc. Often the therapist hides small objects in the mix for the child to find and manipulate. Pouring activities, such as measuring and pouring rice, beans, etc. facilitate fine motor skills and eye-hand coordination. Other activities include finger painting; rolling and molding play-dough, silly putty, or modeling clay; making dough; finger play in shaving cream, finger paint, whip cream, and color foam; and sticking stickers. Squeezing things such as eyedroppers, sponges, water guns, and hole punchers builds strength. Dressing dolls, or playing dress-up, develop fine motor skills and encourages social interaction. Vigorous exercise, twenty minutes or longer, can have a calming effect. Numerous other activities described in this book could be implemented outside. The interview with Ms. Mora was enlightening. She shared her knowledge and experience openly and eagerly and her enthusiasm was contagious. She too thought that the idea of a therapeutic outdoor environment for autistic children has merit and is open to the possibility of developing a therapeutic garden at the Chartwell Center.

### **INTERVIEW WITH A PHYSICAL THERAPIST**

The third interview was with Missey Ball, a physical therapist. Missey has about fifteen years of experience as a physical therapist working with children of various diagnoses including children with autism. Missey was very helpful in explaining Sensory Integration Theory and Practice. She has studied Sensory Integration, implemented the

techniques, and attended several continuing education seminars or workshops on this subject. Two of the workshops that she mentioned were “Sensory Integration and Self-Regulation in Young Children: Strategies for Assessment and Intervention” by Marie E. Anzalone, OTR, a registered occupational therapist and “Every Child a Shining Star” by Cecilia Cruse, OTR, also a registered occupational therapist. The information packets that were distributed during these workshops were also very helpful.

Missey explained that sensory integration is the organization of sensation from the body and the environment for use. While this may sound simple enough, it involves a complex process that includes five steps. The first step of the process involves **Sensory Registration** or the ability to perceive incoming information. This is when we first become aware of, for instance, a person’s voice, or the smell of cookies baking. This is followed by **Orientation** when we are able to identify the site or location of the sensation. For example, I have been touched here. **Interpretation**, the third step in the process, enables us to describe and label the experience. Then we are able to **organize a response**. The response can be a cognitive, affective, or motor response to the stimuli. After we organize a response, it is possible to **execute** that response. If there is a motor response, new sensory input will be generated.

Because children with autism have differences in their sensory systems and may under-respond or over-respond to certain stimuli the initial steps of Registration and Orientation in this process may be faulty. This in turn, affects the subsequent steps of Interpretation, Organization, and Execution.

At any time during this process, the child’s behavior can be influenced by factors such as (1) the degree of environmental stimulation, (2) the child’s current emotional state and

general level of arousal, (3) accumulated sensory build-up, and (4) availability of a familiar caregiver.

Missey explained to me that these factors would be included in the therapist's assessment. With regards to the **sensory stimuli**, the therapist must observe which sensory mode or system (i.e., tactile, vestibular, visual, proprioceptive, auditory, olfactory) is being affected, the intensity of the sensory stimuli (i.e., Is the touch soft or deep? Is the rocking fast or slow?), the location of the stimulus (i.e., the face, the arm), and how long the effect of the stimulus lasts in the system.

With regards to the **child**, the therapist must understand how the child interacts with their environment through four processes. First, the therapist will observe the child's level of *arousal*. An infant may exhibit one of six possible states: deep sleep, light sleep, drowsy, quiet alert, active alert, and crying. A young child learns best when in the quiet alert state. Therefore, it is the therapist's goal to help the child achieve this state when it is time for the child to learn something. The therapist will also observe the child's ability to *attend*, the child's ability to shift attention when needed, and the length of the child's attention span. Also, a child may prefer to attend using a specific sensory mode. (For example, the child may prefer to learn in the visual, kinesthetic, or proprioceptive mode.) The child's *affective* state may also affect learning and therapy. When a child has a depressed affect others interpret that as lack of interest and are discouraged from interacting further with the child. The number of interactions decreases and the child has less opportunity to engage in meaningful interactions with others thus falling farther behind. Also important is the child's ability to take *action* and engage in goal-directed



behavior. If the child is unable to formulate a goal for action and how that action should be carried out, the child's interactions with the environment will decrease as well.

Each of these processes--arousal, attention, affect, and action--has an effect on and regulates the other processes. If the child is highly aroused this will have an effect on attention. Or if the child has depressed affect then this may affect action. Sometimes the goal of one of these processes is to regulate the other A's. For example, looking away from an overstimulating situation can help the child decrease sensory overload and thus enable him/her to refocus after a short break.

Sensory input builds up in the system and affects the individual's **sensory threshold**. It is important to know that some individuals have a low sensory threshold, while others have a high sensory threshold. This can be determined by evaluating the child's reaction to the stimulus. Does he respond to it in a hyper- or hypo-reactive way? Does she avoid the sensory input or seek it out? These responses give the therapist clues as to how to proceed with the child.

Missey explained that the therapist also assesses the social and physical environment of the child for "goodness of fit". Janet Mora includes a guide to some of the environmental factors that may affect the child in her book. In addition, the therapist will observe the child's caregiver (parent, teacher, other) to see if the adult is able to read the child's cues and attempts to communicate. Parents and/or teachers may need help to understand the child's responses, actions, and behaviors and thus foster nurturing relationships. Of course once the child has been assessed, then the therapist is able to create a therapeutic regime that builds on strengths and works toward positive change.

## **Therapeutic Techniques for Outdoor Settings**

Following are examples of therapeutic techniques that could take place in an outdoor environment. To stimulate the proprioceptive system a physical therapist may use deep pressure, or encourage heavy work patterns such as pushing a wheelbarrow, pulling a wagon, or carrying and stacking toy cardboard bricks (which are weighted with sand). Sometimes the therapist or special educator has the child wear a weighted vest or ankle or wrist weights while doing some other activity (such as a self-help activity like sweeping the floor or raking leaves). Playful games such as tug of war or play wrestling also stimulate the proprioceptive system. The following horticulture tasks involve heavy work patterns that provide increased proprioceptive input, overall muscle development, and (frequently) enhance self-esteem when an individual finishes a product: gardening, planting vegetables, raking, digging, or turning over compost. The therapist also engages the child in resistance activities such as those that use a Thera-band. These activities facilitate overall large muscle strengthening.

The use of an obstacle course increases proprioceptive input and helps to develop motor planning. Swings, slides, and climbing equipment offer unlimited opportunities for vestibular and proprioceptive input. Using balls with a variety of weights and sizes can facilitate coordination and motor planning. Vigorous exercise such as walking, running, hiking, swimming, and bowling, twenty minutes or longer can be calming.

## **CASE STUDY: THE CHARTWELL CENTER**

The Chartwell Center is a non-profit, private educational program designed for autistic children, ages 3 to 12. It was founded by St. Stephen School, St. George's Episcopal

School, and Mercy Family Center. The Chartwell Center is currently located on the campus of St. Stephen School and is certified as a special education school by the Louisiana State Department of Education. The mission of the school is to “develop the maximum potential of each child so that each may function as independently and productively as possible throughout the life span.” It is a small school with eighteen children in three classes. Children are assigned to the different classrooms by age. A team of teachers, assistants, administrators, parents, and therapists meet regularly to develop overall programs and to plan for individual needs.

Since the Chartwell Center emphasizes a holistic approach, a combination of strategies is utilized to encourage growth in all areas of development (that is, social, behavior, communication, physical, self-help, academics, and work skills). Sensory Integration is used at the Chartwell Center to secure the child’s optimum level of arousal so that he/she can attend, maintain attention, and learn. The Chartwell Center also employs the play therapy called “Floor Time.” The goal of this technique is to increase social interaction and improve social cognition. One of the structured teaching tools used at the center is the TEACCH program. The TEACCH program builds on the child’s strengths, such as, visual skills, recognizing details, and visual memory. It capitalizes on the child’s interests to increase motivation and work productivity. For communication, The Picture Exchange System has been used as well as other augmentative systems. To develop adequate social skills and support opportunities for inclusion, Carol Gray’s social stories and rehearsing are used.

The philosophy behind Chartwell's behavioral program is prevention. Chartwell understands that inappropriate behaviors occur for a variety of reasons, therefore, a number of strategies is employed. Through environmental modifications sensory overload is reduced. Structure and organization helps the child understand the environment and what is expected of him/her. These strategies help the child to make sense of the world and feel in control. Compliance is encouraged in several ways, by capitalizing on the child's interests, the use of positive reinforcement, and the use of clear and consistent directions. If or when a child does get off-task, the child is redirected toward the task or asked to take a short break. Sometimes the child is allowed to go to a "Corner of the World." This is a quiet space in the classroom where the child may go to reduce sensory input. Some therapists use a small tent, a big cardboard box, or other device that creates an enclosed, cave-like space. Some have a simple rocking chair or bean bag chair in a quiet part of the room. Sometimes a change of adults or exercise is all that is called for when behavior gets out of control.

Chartwell strives to provide the child with autism a challenging but successful experience that will prepare the child for the least restrictive environment. An inclusion coordinator plans and coordinates inclusion opportunities with St. Stephen's. Chartwell students are included in St. Stephen's library, P.E., Music, Group Time (in Kindergarten), and content area (elementary) classes and recess. Reverse inclusion is also encouraged. St. Stephen's students participate in activities with the children at the Chartwell Center.

The Chartwell Center also provides instruction to individuals with autism during the summer months so that learning and treatment is continuous.

## **Visits to the Chartwell Center**

Because children with autism are sensitive to intrusion and changes in their schedule or environment, my goal during these visits was to be as non-intrusive as possible. Also, I wanted to get as accurate a picture as possible of what a day or week would be like at the Chartwell Center.

During my visits to Chartwell, I observed the students at work and the teachers as they implemented their teaching strategies. The organization and structure of the program became readily apparent. Just as I had found in the research, partitions, shelves, desks, and toy chests separated one activity or workspace from another. Unlike the regular classroom that is designed to stimulate the students, the space at the Chartwell Center was designed to reduce sensory stimulation. The walls were painted soothing colors and were free of busy bulletin boards. The lighting, rather than fluorescent, was soft and free from hanging mobiles and artwork. The space was highly organized and all materials were in the proper place and accessible to the child, encouraging independence.

Individual schedules were also placed within the child's reach and had velcro icons to symbolize each activity. At the sound of a soft bell, each child moved to the next activity on the schedule. One child moved to an area designated for Individual Work. Another child moved to an area where an adult, trained in TEACCH, waited to work with the child one-on-one. A third child went to the play area where he and an adult worked on "Floor Time" activities. One worked on self-help skills and another worked on sensory activities. The ratio of adults to children was exceptionally high and on most occasions when I observed there was only one child per adult. This together with the highly

structured and visual environment created a happy, peaceful environment for students and teachers alike. And seldom did I witness behavioral outbursts or aggressive behavior.

### **Site Description and Inventory**

On subsequent visits, I conducted a site inventory and gathered information about the current conditions of the site. The Chartwell Center is located on Camp Street in New Orleans in a “shotgun double”. The back and side yards are currently empty and could be developed as a small therapeutic garden for the autistic children. Currently the space does not encourage therapists, teachers, and children to use it. The backyard is surfaced in concrete and consequently hot and glary on a warm southern day. While the side yard is covered with grass, it seemed damp and muddy when I walked on it. When I first visited, there was no outdoor furniture, play equipment, or plants on the site. (Two or three garbage cans were all that could be found.) On subsequent visits, I noticed that someone had donated a “Little Tykes” slide/climb-on structure. Additionally, the handicap ramp divided this small space and contributed to the awkwardness of it.

The Administrator and staff all seemed excited about the notion of a therapeutic garden for autistic children, so much so that the administrator is considering writing a grant to secure funds for the project. Therefore, we proceeded to the next step in the design process. On separate visits, I began to take pictures of the Chartwell Center, the possible site, St. Stephen’s, St. George’s, and the surrounding area. Pictures were also taken of the play areas at these schools, which they all share. Measurements were taken of the small backyard and sideyard near the Chartwell Center that would serve as the space for the therapeutic garden. In addition, questionnaires were given to the administrator to give to the teachers, staff, and therapists to get feedback on their needs, and their ideas

for possible activities that they would like to see take place in the therapeutic garden. The questionnaire was adapted from *The Healing Landscape* by Martha Tyson. Since this questionnaire was developed for projects at nursing homes and assisted living facilities, not all questions were applicable for a therapeutic garden for autistic children. Therefore, some of the questions were omitted and others were slightly reworded. Other items were added.

After conducting a site inventory and analysis, and observing both the students and professionals who work with them, I began the next phase of the design process. Three possible site plans were quickly drawn up and presented to the director of the Chartwell Center. Her response was enthusiastic and she made comments and suggestions that will make it possible to continue the design process. In her book, *The Healing Landscape*, Martha Tyson also includes an outline of the design process for building a healing garden. My own process for designing a therapeutic garden for autistic children has been applied to her outline and can be found in the Appendix at the end of this thesis. Although I have not completed this process, the information that I gathered was valuable in establishing the guidelines for a therapeutic garden for autistic children.

## **CHAPTER 5**

### **ANALYSIS AND DEVELOPMENT OF DESIGN GUIDELINES**

The purpose of this chapter is to discuss the findings of the research on Healing Gardens and the findings of the research on Autism to determine if a healing garden would be appropriate for this population. In addition, after discussing several of the therapeutic and educational strategies being used with this population, it will be determined if an outdoor environment would extend and enrich the therapeutic environment. And finally, to meet the second objective of this thesis, a set of guidelines for designing a therapeutic garden for autistic children will be established.

#### **HEALING**

As Marcus and Barnes stated in *Healing Gardens*, the term healing is quite broad and generally refers to a beneficial process that promotes overall well-being. Within the healthcare setting, however, there are three specific aspects of the healing process that can be identified: stress reduction, relief from physical symptoms or awareness of those symptoms, and improvement in the overall sense of well-being. Stress often accompanies sickness and hospitalization. Because autism is a disorder that lasts a lifetime, dealing with stress is an on-going battle. Stress arises from the demands of the social and physical environment and results in sensory overload.

Stephen and Rachel Kaplan believe that the contemporary built environment taxes our senses and demands us to remain in a state of forced attention. They suggest that a restorative experience, preferably nature, is needed to recover from this overload of sensory input. Individuals with autism have sensory processing problems that cause them to experience sensory overload even more frequently than their typically developing



peers. In each of the four therapeutic/educational models discussed in Chapter 3, all addressed the importance of the physical environment. Order, structure, and clarity of intent were all important elements of the design of the indoor environment. And the purpose of these characteristics was to reduce the sensory demands on the individual, promote independence, and reduce inappropriate behavior and/or outbursts. Once the sensory demands on the individual are lessened, the level of stress is reduced as well. If redesigning the indoor environment reduces stress, then it follows too that redesigning the outdoor environment should have this same effect.

Most humans choose the natural environment because of its ability to calm and restore us during times of stress. Studies with hospital patients, who are under considerable stress, indicated that the patients used the hospital gardens to relieve some of the stress that accompanies sickness and hospitalization. Therefore, if altering the indoor environment calms the individual with autism and reduces stress, then a well-designed outdoor environment will do at least that. However, with emphasis on the natural elements of green grass, plants, trees, and the soothing sound of water there are even more tools available to the designer of the outdoor environment to help reduce stress.

While visiting the Chartwell Center, I observed modifications of the indoor environment and the effect that it had on the individuals with autism. The children were able to determine what was expected of them and what they were to do throughout the day. This reduced inappropriate behaviors and acting out behaviors considerably. It also enabled the children to function more independently. Thus, the child became less aware of the characteristics that make him/her different from other children. In addition, because the child is able to function more successfully and independently and with less unpleasant

social interactions the child experiences a boost to the self-esteem and improvement in the overall sense of well-being. If these principles are applied to the outdoor environment, then it will be another place where the child can establish confidence.

In addition, a number of the strategies employed by therapists and special educators are more suited to the outdoor environment. The equipment required for this type of work would fit comfortably within the therapeutic garden.

### **BENEFITS OF OUTDOOR SETTINGS ON AUTISTIC CHILDREN**

Characteristics of children with autism are exhibited in behavioral excesses and behavioral deficits. A number of the interventions that address these behavioral excesses and deficits could take place in an outdoor therapeutic environment. For example, the outdoor “therapeutic” garden would be an ideal place to

- 1) take a break from the demands of the indoor environment and reduce sensory input thus avoiding sensory overload,
- 2) work on delayed gross and fine motor skills,
- 3) engage in activities that stimulate the vestibular and proprioceptive systems, such as swinging, rocking, or spinning on a merry-go-round, thus reducing rocking, spinning, and hand flapping behaviors that are not appropriate indoor activities,
- 4) engage in physical activities that would help release the excess energy that builds up from the frustrations of dealing with autism on a daily basis,
- 5) spend quiet time alone away from the constant demands of living, learning, and working, and getting along with other people,
- 6) use as a reward for or to motivate “good” behavior,

- 7) work on sensory integration strategies, and/or
- 8) engage in “directed” or free play activities.

## **THERAPEUTIC STRATEGIES ADAPTED TO THE OUTDOORS**

Several of the therapeutic strategies that are used with children with autism were discussed in a previous section. By incorporating some of these strategies into the outdoor garden it becomes more than a healing garden, it becomes a place for therapy, a “therapeutic” garden. Each of these therapeutic models will be discussed briefly here and how it can be incorporated into the garden.

### **Sensory Integration**

Individuals with autism have sensory processing deficits. Occupational therapists, physical therapists, and speech and language pathologists implement SI strategies to maintain optimum levels of arousal, attention, and alertness to enhance learning. Several strategies were mentioned earlier in this thesis. During one of the workshops, Cecilia Cruse mentioned “Tips on Creating a Successful Learning Environment”. Many of these tips could be used in the therapeutic garden. For example, for motor development and movement in space, the author suggests tasks that challenge gravity and provide vestibular input such as swings of different types – a garden bench swing, a hammock, a rope chair swing, etc. Other suggestions that could be incorporated into the therapeutic garden include: ball activities, a mini-trampoline, crawl through spaces, a see-saw, a merry-go-round, rocking toys, and gardening activities.

For quiet regrouping, she suggests a cave-like structure, a tent, or something as simple as a big, cardboard box. Lighting may be altered if it is too harsh. Spaces that have filtered sun and dappled shade could be incorporated into the outdoor design. To mask

annoying sounds, she suggests a water feature or fish tank for the indoor environment. However, they are even more suited to the outdoor environment. She suggests the soft colors of blues and greens for classroom walls to encourage a harmonious atmosphere and to enhance learning. These colors are found in abundance in the foliage of plants, grasses, and trees.

SI techniques appeal to the sense of smell as well. Cruse suggests the use of essential oils such as chamomile, lavender, geranium, and sandalwood to calm, organize, or relieve anxiety. What better place to find fragrances than in the garden. Numerous varieties of herbs, flowers, vines, trees, and fruits may be incorporated strategically and carefully into the garden to be used in sensory integration strategies. Tactile exercises are also easily incorporated into a therapeutic garden. Sand boxes, water tables, and drawers filled with any number of objects that have varying textures are all great outdoor exercises. Messy activities such as finger painting, or drawing with the fingers in pudding, sand, shaving cream, or color spray foam are all better suited to the outdoors. Afterwards, just pick up a hose and wash everything off. Many of the sensory integration strategies are well suited to the therapeutic garden. Perhaps the outdoors is a more appropriate place for these activities to take place.

### **Applied Behavior Analysis**

Applied Behavior Analysis is directed toward the behavioral excesses and deficits that characterize autism. Again environment is of the utmost importance in this type of intervention. An assessment is taken of the environment to determine what effect it has on behavior. Then the environment is carefully designed to elicit or eliminate certain responses or behaviors. Antecedents are important as well as consequences. These

strategies could be just as easily applied to the outdoor environment as to the indoor environment. For example, if the therapist is trying to encourage a certain behavior, the outdoor therapeutic garden could be used as a reinforcer or reward for the child when an appropriate behavior is exhibited. For instance, Lorenzo has trouble staying on task and completing his assignments without considerable prompting. The special educator knows that Lorenzo loves to swing on the garden swing. She gives Lorenzo an additional five to ten minutes on the swing for completing his work without prompting.

To prevent aggressive behavior, physical exercise could be incorporated into the child's schedule as a way of preventing physical outbursts such as running in spurts or hitting. By foreseeing the child's need to release pent-up energy or frustration, the therapist/special educator may avert inappropriate behaviors later on in the day. The following example is from the author's own teaching experiences:

The special educator began to notice that Stephen would begin running in spurts and flapping his hands in the early afternoon. When Stephen was not allowed to release this energy in a more appropriate way, his actions often escalated into more aggressive behaviors. Therefore, the team scheduled a short period of outside activity for Stephen at different intervals during the day to help him cope and to ensure that the day go more smoothly.

Self stimulating behaviors are another type of behavior that can be addressed in an outdoor environment. A child who may crave stimulation due to an under aroused vestibular or proprioceptive system may engage in various stereotypical behaviors. The following example is from the author's teaching experiences:

Stephen would spin himself around and around at any chance he could get and no matter where he was. A merry-go-round or swing (that allows for him to be spun around) would be a more appropriate avenue for the vestibular input that he craved.

For most children the outdoor environment means fun! Therefore, children are usually more cooperative and compliant when we use the outdoors as motivation for accomplishing learning tasks and goals.

### **Play Therapy**

Children with autism have difficulties with play. While the impulse to play is not entirely absent, it is notably subdued in children with autism. They encounter many struggles in play. For example, individuals with autism may focus on an object and manipulate it over and over for hours on end. They also have communication problems that may limit them in play. They usually play in a literal way and have trouble adopting a non-literal orientation in pretend play. Also, they lack the social skills needed to relate to their peers and therefore are often excluded. If they get caught in a cycle of peer rejection they are then deprived of opportunities to learn to play in more conventional and socially acceptable ways. For this reason, Play Therapy is an important part of the therapeutic and educational process.

After studying the different methods of play therapy, two principle ideas became apparent. First, to remediate problems of generalization and an artificial role of peers, many play interactions now focus on promoting social skills in contexts where peer interaction naturally occurs. A natural setting is a location where, if given the opportunity, children would choose to play. What more natural a setting exists for children to play and interact than nature and the outdoors. Children love to play on playgrounds, in sandboxes, on swings, and bicycles. In addition, they also enjoy interacting with nature, climbing on rocks, collecting bugs, looking under a decaying log,

or digging in the dirt for an earthworm. Therefore, it makes sense to extend the therapeutic/educational environment outdoors, especially for Play Therapy.

Also, contact with nature brings abstract concepts like the seasons to life. When the child feels the chill in the air and jumps in the pile of leaves on the ground, the play leader can show the child in a concrete way what autumn means. Secondly, play therapy often requires the expertise of a play leader. A trained play leader and staff can extend the range, challenge, and creativity of the indoor and outdoor environment. They help to engage children with each other and with their environment to support growth and development of communication and social skills.

Play therapy may be easily incorporated into a therapeutic garden. Play spaces should comfortably accommodate approximately five children. They should have clearly defined boundaries and an explicit organization. Play materials should be accessible, visible, clearly labeled, and logically arranged. Playmates should include other children with autism as well as typically developing peers.

### **Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) Program**

Individuals with autism are “visual thinkers”. They understand new information best when it is presented visually. Landscape architects are visual thinkers, too. They are trained to conceptualize outdoor environments. Each decision that a landscape architect makes (no matter how small) ensures clarity of his design intent. The landscape architect speaks the language of individuals with autism and could create a visual map of the outdoor environment (therapeutic garden) to help the individual with autism make sense of his/her world.

The strategies used in the TEACCH method are similar to the design strategies that are used by the landscape architect. For example, the therapist/special educator uses tape on the floor around the child's desk to create a space for that child. The landscape architect changes paving patterns to signify movement from one space to another. Furniture such as shelves, desks, and bulletin boards are used to divide spaces and/or create boundaries. Landscape architects use shrubbery or other types of vegetation, garden furniture, a trellis, an arbor and other strategies to divide spaces and/or create boundaries. The special educator used cutout footprints to indicate where the child should line-up. The landscape architect could use a leaf motif in the paving pattern to serve the same purpose outside. The therapist/special educator uses a beanbag chair, soft music, and an indoor water feature to create the atmosphere for a quiet "Corner of the World". The landscape architect uses vegetation, the gurgling of an outdoor water feature, and bird song to create an escape outdoors.

Just as the therapist/special educator creates numerous activity spaces within the classroom environment, the landscape architect is able to do so outdoors. Color, materials, vegetation, fragrance, fences, gates, arbors, trellises, garden furniture, lighting, land forms, and spatial arrangement are all tools used by the landscape architect to clarify the design intent. Therefore, TEACCH activities may easily be transferred from the indoor environment to the outdoors. And what better person to communicate with the individual with autism than the landscape architect who speaks a similar visual language.

### **Guidelines for Designing a Therapeutic Garden for Autistic Children**

The following guidelines are based on data from several sources: (1) Research on nature viewing and stress reduction, (2) published works on design and use of public outdoor



spaces, (3) published works on design of outdoor spaces in hospital and other healthcare settings, (4) research on autism, (5) informal interviews with professionals who work with children with autism, (6) Case Study of the Chartwell Center in New Orleans, and (7) my previous experiences teaching children with autism. The guidelines are merely suggestions or recommendations. They are not yet tested and are not to be considered hard and fast rules.

Following is a list of invaluable sources for creating outdoor environments for children: *Healing Gardens* by Clare Cooper Marcus and Marni Barnes, *People Places: Design Guidelines for Urban Open Space* by Clare Cooper Marcus and Carolyn Francis, *Restorative Gardens* by Nancy Gerlach-Spriggs, Richard Enoch Kaufman, and Sam Bass Warner, Jr., and *Play for All Guidelines* by Robin Moore, Susan M. Goltsman, and Daniel S. Iacofano. Each of these sources is filled with valuable information for those interested in creating healing gardens or spaces for children.

Before attempting to create a therapeutic garden for autistic children it is important to fully understand the disorder of autism. Preliminary work should include research of autistic spectrum disorder, observation of (or interaction with) the individuals for whom the space is to be created, collaboration with the team of therapists, special educators, caretakers, staff members, and physicians that administer care, and reading of published works by higher functioning individuals with autism to fully understand what it means to be autistic. After this preliminary work a questionnaire should be administered to determine the users of the space and each groups needs. In addition, it is important to identify the mission of the hospital, clinic, school, assisted living facility, or group home to determine its message, purpose, and goals. There is still much to learn with regards to

designing a therapeutic garden for autistic children. These guidelines are presented to encourage alternative environments for children with autism and to add another resource for those who live, work, or play with this population.

#### 1. Design for Security, Safety, and Supervision

Locate the therapeutic garden so that it can be fully enclosed on all four sides. Children with autism may become curious or confused and wander through an open gate or nearby doorway. Design of the outdoor environment should enable the staff and administrators to secure the therapeutic garden to keep the children from wandering off and to prevent unwanted intrusions from passersby.

“Mrs. Brown”, the paraprofessional took the children outside on the yard after lunch for playtime with their typically developing peers. When another paraprofessional began talking with “Mrs. Brown”, her attention was diverted from the children for a couple of minutes. When she glanced around, she saw all of the children but Stephen. In a blink of an eye, he had opened a nearby door off the cafeteria (the janitor’s closet) and wandered inside. The paraprofessional was shaken up a bit but relieved to find Stephen only a few feet away and unharmed (From the author’s personal teaching experience).

In designing any space for children, safety is an important goal. Elements of the outdoor environment can and should offer differing degrees of challenge for the child, such as balancing on a curb, climbing a ladder, or swinging from a pair of rings. This builds accomplishment and self-esteem. However, it is important that the outdoor environment not include hazardous conditions for the child. Good planning and regular maintenance can eliminate many such conditions before they occur. For instance, a generous amount of space should be planned around swings so that a child does not have to walk through the swinging area to get to another destination. Children with autism do not understand cause-and-effect relationships and may not see the danger posed by

children swinging on the swings. This is another reason why the therapeutic garden should be enclosed on all four sides. Some autistic children may not see the danger of wandering through an open gate and out onto a busy street.

Many activities that children with autism engage in require one-on-one interaction with a special educator, therapist, paraprofessional, trained play leader, or staff member.

When they participate in small and large group activities there is supervision as well.

Therefore, supervision is an all day on-going activity. Lucas Garden, a healing garden for children mentioned earlier was an example of best practices with regards to Supervision.

## 2. Provide a “Corner of the World”

Controlling sensory input and avoiding sensory overload are important goals of many therapeutic/educational programs for children with autism. Choose design elements to help the child maintain a baseline level of arousal and to avoid sensory overload. Use vegetation and other elements for screening to reduce or eliminate excessive visual or auditory stimuli. Mask unwanted sounds with the soothing sounds of water. Use design elements to keep distractions to a minimum. Use spatial arrangement to create a private space (a “Corner of the World”) where the child can take a “sensory break” and get away from the demands of the world.

## 3. Create A Variety of Specialized Spaces

To accommodate the demands of a wide variety of therapeutic activities and the needs of a variety of users (special educator, therapists, trained play leaders, administrators, staff, and children), a variety of spaces should be incorporated into the therapeutic garden. An example of this type of interactive garden is the Lucas Gardens. Spaces

should be created for the following activities: sensory integration activities, physical activities that stimulate the vestibular and proprioceptive systems, gross and fine motor skills, and provide a release for pent-up energy and stress, self-help activities, and directed and free play activities. Spaces should be designed to allow for alone time, one-on-one work with a therapist, small group work, and large group work. Also, spaces should be designed to allow staff a break from the daily routine and work stresses, and/or for special programs or fund raising activities. Due to the constraints of space and budget, it may not be possible to create separate spaces for all of these activities. However, these needs could be met by carefully programming and scheduling the use of the space so conflicts do not arise.

#### 4. Design Space for Sensory Integration Activities

Use design elements that could be incorporated into sensory integration activities. Elements that stimulate or soothe the visual, tactile, olfactory, auditory and other systems could be made available to the therapist for use in SI activities. A variety of surfaces (brick, concrete, slate, bark, pea gravel, sand, grass, asphalt, and others) could be used to indicate transition from one space to another. Vegetation has a variety of leaf textures, colors, shapes, and sizes that could be used in SI activities. Plants (such as flowers, herbs, vines and trees) also offer a variety of fragrances. The earth also varies in its textural consistency. Sand, clay, loam and mud each have a different texture and feel. The bark of trees offers a variety of visual and tactile differences. Structures and furniture can be built in a variety of materials (wood, bamboo, rough cut logs, brick, stone, wrought iron, and synthetics such as plastic) and styles.

Other items that might be found in a garden and used for SI activities include: sticks, pebbles, boulders, dried leaves and flowers, acorns, nuts, seeds, bulbs, corms, fruits, and vegetables. Sand tables, water tables, water features, a bird bath, sprinklers or watering system, drawers containing any number of objects that have differing sensory characteristics, wind socks, pinwheels, wind chimes all offer opportunities to engage the senses. However, it is not desirable to use all of these simultaneously as sensory overload would then occur. A number of these items could be stored so that they are available to the therapist when engaging the child in sensory integration activities. Include an outdoor table for SI activities that has a smooth surface for finger painting and other activities, can stand up to the weather, and is easily hosed off after use.

#### 5. Stimulate Gross Motor Activities

A number of opportunities could be provided in a therapeutic garden to develop gross motor skills or large muscle groups. Challenges can be created through activities that require balance. Children can climb on stumps, boulders, nets, ladders, or more that offer differing degrees of challenge. Equipment that requires coordination and judgement, such as horizontal ladders, stepping logs, and tunnels, might be incorporated into the therapeutic garden. Another type of equipment to include is that which develops upper body strength, such as a swinging rope, rings, or horizontal bar. Therapists, special educators, and caregivers should be consulted early on in the design process to ensure that the activities planned into the garden are age appropriate and safe.

#### 6. Stimulate Fine Motor Skills

Opportunities for manipulating small objects occur naturally in an outdoor environment. I can remember when my own son was a few years younger. He loved to take a walk

with me across the street and around the corner where he would pick up dozens of acorns with his small fingers and put them in a pail to take home. Next to that oak tree is a Japanese plum. His dad or I would lift him up high into the branches so that he could pick a plum or two to take home. How he enjoyed those juicy fruits. And the fact that he had done it all himself made it much more satisfying. A few years later when he was a cub scout, he enjoyed picking blueberries until he filled his small blue pail. Then he would have them with his pancakes or muffins the next morning.

My youngest niece enjoys gathering leaves of all shapes, colors, and textures, and petals from different flowers in my backyard to make her own version of potpourri. It is also fun to wear a sticky bracelet and put petals and leaves on it as you walk through the garden thus creating a nature bracelet. Other activities that strengthen fine motor skills include picking up sticks, shells, pebbles and other items to be used in an art project and gardening activities such as pulling weeds, planting seeds or bulbs. An art wall or other vertical plane could be used to develop small muscle groups and proper positioning that are needed in handwriting.

#### 7. Provide Spaces with Loose Parts for Manipulation

Landscape Architect Simon Nicholson wrote an article entitled “The Theory of Loose Parts,” which was originally published in *Landscape Architecture Quarterly* in 1971. His theory states, “In any environment, both the degree of inventiveness and creativity and the possibility of discovery are directly proportional to the number and kind of variables in it.” The idea is to provide loose parts for the child to manipulate so that he/she can take part in the design of their environment. At the Chartwell Center, one of the special educators spoke of providing materials such as lightweight plastic piping (large enough to

climb through), wood planks, moveable ramps, bricks, discarded tires, and other items that the child and therapist might manipulate into an obstacle course. This activity would serve two purposes. It strengthens large muscle groups and develops planning ability. For children with dyspraxia, the obstacle course would teach the child how to plan and execute a series of actions.

## **8. Provide Activities for Physical Exertion**

In her book, Donna Williams (1992) explained that she would engage in certain behaviors to release pent-up frustration, anxiety, stress, or energy.

Rocking, hand flapping, flicking objects, and chin tapping all provided release and would thereby decrease built up anxiety and tension, thereby decreasing fear. The more extreme the movement, the greater the feeling that I was trying to combat (213).

Temple Grandin (1992) and others also report that strenuous exercise can reduce anxiety. One young woman, when asked about her experiences in high school, reported that she was a member of the track team and loved to run. She asked that her high school schedule be arranged so that she could take physical education fourth period to run and calm herself down at mid-day. She knew that this would make it possible for her to get through the rest of the school day. But her request was seen as being too rigid and asking for special privileges. She knew what she needed but she did not have the communication skills to defend her reasons to persuade the adults involved (Fullerton et al, 1996).

The therapeutic garden could provide a physical outlet for the release of these unwanted feelings. Raking, digging, sweeping, swinging, running, jumping, etc. are all acceptable ways to do this.

## 9. Design Spaces for Directed Play Therapy or Self-Help Skills

Areas can be set aside for play therapy or self-help skills. These should contain storage space for props and toys or tools, such as rakes, brooms, garbage bags, picnic supplies etc. Storage benches, a table or picnic bench, or shelf unit with baskets or drawers would be a convenient addition to this type of space. Input from the special educator or therapist would give the designer a more precise idea of what is needed for these spaces.

## 10. Provide Visual Cues for Orientation

Much of the stress of autism is a result of the anxiety of not knowing or not understanding what to do. Since the individual with autism is a visual thinker, it is helpful to communicate information to him using visual cues. The tools available to the landscape architect are readily adapted to this purpose. Paving patterns, water, vegetation, furniture (materials and style), structures, spatial characteristics are all used to convey the landscape architect's intent for a particular space. For example, spatial characteristics give cues as to how a space should be used and the behavior that is appropriate for that space. A small space (in a remote corner of the property) enclosed on three sides with vegetation might suggest a quiet space meant for alone time or private conversation. A wide-open grassy field encourages group interaction such as games of tag or touch football. A grassy knoll provides the opportunity to safely look down and observe the activities below or the option to let loose and run or roll freely down the hill.

In the literature on healing gardens for Alzheimer's patients, reference was made to Kevin Lynch's book, *The Image of the City*. In this book, Kevin Lynch identifies five elements that help people cognitively organize the city. These elements, paths, places, landmarks, nodes, and edges, are used in designing outdoor environments for persons



with Alzheimer's disease. These organizing elements help with way finding and orientation, and thus improve well-being. These elements could be used for individuals with autism as well to help them make sense of their world.

#### 11. Design with Special Lighting Conditions in Mind

Due to the acute or hypersensitive nature of their sensory systems, care should be taken to provide visual relief from the glare of the sun. Patios, porches, vine-covered arbors, trellises, gazebos, shade trees and other methods could be used to create spaces with filtered sun, dappled shade, and to reduce the effect of the bright rays of the sun.

#### 12. Provide a Safe and Nurturing Entry

The entry to the therapeutic garden should convey the mission and purpose of the place where it is instituted. For the parents, a home-like atmosphere is comforting. It makes the parents feel that their child will receive warmth, love, compassion, and understanding and will be safe while they work and play. To the staff, the entry should send the message that this is a fun, happy, caring place to work. To the children, the entry should send the message that this is a fun, interesting, safe place to come everyday.

#### 13. Design for Future Spatial Flexibility

Because the needs of the children change as they learn and grow and because the needs of the special educator/therapist change as new ideas and therapies are discovered, the therapeutic garden should allow for flexibility. The space should allow for some change without costly or time-consuming renovations. Physical elements that can be changed and moved around should be included in the garden. Play leaders could be trained to handle flexible space management. Addition or removal of special equipment could make the space flexible for more than one activity. Modular systems and lightweight

mobile equipment (water tables, sand tables, collapsible tables, inflatables, lawn furniture, watering cans, hoses, buckets, pulleys, ropes, hammocks, tree swings, natural objects, garden accessories) are all methods of supporting flexibility.

#### 14. Design to Accommodate all Children

The therapeutic garden must be accessible to all children. Wheelchair ramps, smooth surfaces, planters and tables at wheelchair height are all examples of barrier-free design. Because inclusion is required and a desirable goal for children with autism, the therapeutic garden should be inviting to all children. The garden should encourage typically developing children to enjoy the space as much as children with autism do.

#### 15. Provide Organizational/Informational Feature

Locate a kiosk or information board in a strategic place to encourage organization and conflict-free use of the space. This information board is a great place to post a master schedule of the activities that are to take place in the space, individual student schedules, visual instructions for clean-up, and visual rules for play time and use of the space. Children with autism can access their schedules when they use the space so that they will know what is expected of them. This helps them to organize and encourages independence.

#### 16. Choose Appropriate Site Furniture

Furniture should be chosen for durability, ease of care, function, safety, and design intent. It should be lightweight, moveable, and multi-purpose.

#### 17. Design for Maximum Nature Interaction

Provide opportunities for the child to experience nature. Rocks, a decaying log, bushes, and branches of trees all provide habitats for wildlife (lizards, earthworms, bugs,

spiders, lady bugs, doodle bugs and beetles, honey bees, frogs, snails, butterflies, birds, and squirrels). Choose plants for seasonal variety such as leaf color and flower, fruit and nut production and for their ability to attract wildlife. Water features, bird houses, bird baths, and bird feeders all encourage wildlife to visit and stay. Provide places to experience the sun, shade, wind, and rain. Provide opportunities for planting and harvesting. The child with autism benefits little from auditory descriptions of nature, the seasons, and earth processes. He learns more quickly and clearly from concrete experiences and from hands-on activities out in the environment where these things take place.

#### 18. Choose Appropriate and Stimulating Plants

Planting is one of the tools specific to the creation of an outdoor environment.

“Because of their interactive properties, plants provide intrinsically interesting, open-ended settings, that stimulate exploration and discovery, dramatic play and imagination...children use vegetation as a basic resource for playing and learning” (Moore, 1993, 4).

Plants can be used for a number of purposes and can serve more than one purpose at a time. For example they may be used to stimulate the senses, provide definition, reduce the effects of climate, provide learning experiences, and accommodate other activities such as exploring or hiding. Choose plants for the therapeutic garden carefully and place them strategically. Avoid poisonous plants, plants with points or thorns, plants with sticky sap, and plants whose seeds are spread by the wind as these often aggravate sinus and allergy conditions. Robin Moore’s book, *Plants for Play: A Plant Selection Guide for Children’s Outdoor Play Environments* (1993), is a great resource when choosing plants for the therapeutic garden.

#### 19. Provide Adequate Storage

Storage is often overlooked but one of the most important elements of a garden for children. A special educator, therapist, or staff member is less likely to use the outdoor space over time if the materials he/she needs must be carried outside and then in again after each activity. Organization and location of materials is important. The child with autism needs an orderly, logical place for equipment to assist in understanding, reduce confusion, and promote independence. Plenty of storage space encourages diversity of activities and ensures that the spaces will be successful and used for their intended purpose.

#### 20. Establish Strong Indoor/Outdoor Connection

To encourage use of the therapeutic garden by the staff, special educator, and therapists, locate it close to the children's indoor environment. Windows with a view to the outdoor environment are usually encouraged in the design of most healing gardens. However, it may be wise to get the opinion of the administrator, staff, therapists, and special educators, for this view may provide too much of a distraction to the child with autism when doing indoor work and tasks. Perhaps shades, curtains, blinds, or other window treatments could be provided to remedy this problem.

#### 21. Create Clear and Unambiguous Layout (Design Intent)

For a therapeutic garden for autistic children to be successful, the design must be clear, logical, orderly, and structured. Design spaces so that they flow easily and logically from one to another. Create visual boundaries. Avoid ambiguity and extraneous elements that might confuse and frustrate the child. The layout should make sense and should be easy to use. The design elements should send the child visual messages so that he/she can

easily determine where to go, how to get there, and what to do. Use Kevin Lynch's five elements (paths, places, landmarks, edges, and nodes) to make a visual map of the child's world.

## 22. Design for Ease of Maintenance

Special Educators, therapists, and caregivers should not be expected to maintain the therapeutic garden. Design the therapeutic garden so that it is a low maintenance, easy care environment. Install sprinkler systems during the build phase. Choose plants that require a minimum of attention. Choose materials, paving pattern, structures, and furnishings for durability and ease of care. Create a budget (an account or trust fund) for maintenance at the onset of the project. Decide who will do the maintenance (volunteers, community members, local garden club, boy scout troupe, or 4-H club, nearby botanical garden, paid gardener or maintenance crew, horticultural therapist, or other), and how often. It will not matter how effective the design for the therapeutic garden was if it falls into disrepair.

## **CHAPTER 6**

### **CONCLUSIONS**

As with any project of this nature, the researcher starts out with an idea that is somewhat undefined. Initially, questions are raised and many doubts surface that cloud thinking and impede progress. Having worked with autistic children first hand several questions came to mind at the outset of this project. Since there is no cure for autism, how can I create a “healing” garden for them? And, if all of the literature encourages inclusion and least restrictive environment, is it appropriate to create a healing garden for the autistic child? These questions nagged at me as I perused the ever-widening body of literature on healing gardens.

I was relieved to discover that the emphasis of a healing garden was on relieving the stress associated with an illness, reducing awareness of the symptoms of the disease, and increasing overall well-being. In addition, when studying articles about gardens that had already been implemented, I learned that these gardens were designed for a variety of users, patients, staff, and visitors alike. Therefore, I realized that the garden that I proposed could be created for all children with the needs of the autistic child kept in mind. The turning point came while reading the article “The Therapeutic Garden: A Collaboration of Professions” in January 2002 from the Therapeutic Gardens Professional Interest Group at Land Online ([www.asla.org](http://www.asla.org)). In this article, Nancy Gerlach-Spriggs and Ann Wiesen explain that a therapeutic garden suggests a place where therapies could be provided and goals worked on. Finally, the fog lifted and my path became more defined and clear.

Teachers and therapists are constantly improving and revising their methods and strategies. And I wanted to provide another environment where these strategies could be worked on and refined. Once I clarified my research topic, finding the relevant background material was not difficult. Several published works exist on the topics of design and healing gardens, children's outdoor environments, autism, and treatment strategies (such as applied behavior analysis and sensory integration). The problem would be in synthesizing all of the pertinent information.

In further assessing my experiences, methodology, and approach, I turn to the interviews of the professionals. Although, I arrived armed with a list of questions to ask each professional, I found that by letting the experts speak freely about their experiences, strategies, and children I gathered much more information than I expected to. This open-ended approach led to discussions of treatment strategies and approaches of which I was not aware. As a result, I returned to the literature to get more information. Since then I have revised my list of interview questions to include topics of which I had not previously thought. These interview questions can be found in the appendix.

Even though I feel that these interviews were very successful, one limitation of this study is the number of interviews that took place. For future study, a larger number of professionals should be interviewed. Also, a written survey could be devised and mailed out to a large number of professionals across the country. However, it is important that the purpose of the study and a thorough definition of a therapeutic garden and its purpose be included with this survey.

The field study was also an invaluable addition to this thesis. My visits to the Chartwell Center were both productive and enjoyable. The director, teachers, therapists, and staff

were all hospitable, enthusiastic, informative, and open to new ideas and possibilities. This professional staff was eager to offer assistance and often contributed ideas of their own. Because of the nature of autism, some programs may not be as eager to have intrusions or disruptions of their day. Therefore, it was my intent to observe and absorb as much information as I could on my visits without being disruptive. One advantage was my twenty years of experience teaching and counseling typical students and experience teaching autistic children as well. I had been trained to observe and identify student strengths, deficits, and behaviors as well as teacher methods, tools, materials, and techniques. Therefore, I was able to absorb a great deal of information quickly. This was indeed a positive experience. My intention is to complete the initial phases of the design process so that the director is able to use that information in securing a grant for the project.

One limitation of my process was in revising the questionnaire that I adapted from Martha Tyson's *The Healing Landscape*. This questionnaire, while very helpful in and of itself, was not written for projects of this nature. I omitted parts of the questionnaire that were not appropriate for this population and slightly reworded others. However, when I reviewed the results, I found that they could be misleading. Therefore, a future study could create a questionnaire for design projects of this nature. The revised questionnaire that I used at the Chartwell Center can be found in the appendix.

Frequently, in addition to answering questions, a study of this nature raises new questions for future study. The following research topics uncovered during the thesis would be useful for those interested in pursuing this topic further.

First, it would be extremely beneficial to complete a therapeutic garden for autistic



children to test the guidelines that have been established in this study. Further, it is important that a post occupancy study be completed on the project to determine its success in meeting the needs of students, parents, teachers, therapists, and staff. From this post occupancy evaluation, further recommendations could be made regarding the design of future therapeutic gardens for autistic children.

Future studies could also address the effect of exposure to nature on children with autism and the effect of scheduled exercise on the behavior of children with autism. In addition, if a therapeutic garden is beneficial to autistic children is it also an appropriate outdoor therapeutic environment for adults with autism?

Within the field of Landscape Architecture, the area of healing garden design is continually growing and changing. New questions and challenges will continue to be raised. Hospital administrators will raise questions of accountability, such as “Do patients, physicians, nurses, and staff receive enough benefit from healing gardens to justify the costs of construction? A therapeutic garden designed to accommodate the therapies that caregivers provide is one way to respond to the question of accountability.

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**APPENDIX A**  
**INTERVIEW QUESTIONS**

1. What type of practice do you have? (Clinic, hospital, school, other)
2. What is the philosophy or mission of your program?
3. What professionals or staff work with the children with autism? What is the ratio of caregivers to children? What is their training?
4. How many years have you worked with individuals with autism?
5. What are the ages of the individuals with autism?
6. What types of therapy or educational strategies do you employ?

Developmental	Play Therapy
	Sensory Integration
Perceptual/Cognitive	TEACCH
Behavioral	Applied Behavior Analysis
Medical	Vitamin Therapy, Special Diet, Medications, Other
Other	Augmentative Devices
7. What characteristics of autism do your children exhibit?
8. What do you work on with the individuals with autism?

Cognitive Skills	Expressive and Receptive Language
Sensory Skills	Social Skills
Fine Motor Skills	Self-Help Skills
Gross Motor Skills	Functional Academics
9. What additional therapies do your children receive?
10. How do you structure their day? How do you structure their environment?
11. How do you deal with inappropriate behaviors and/or stereotypical behaviors?
12. What type of methods of inclusion do you employ?
13. Where could I go for more information?
14. What therapeutic/educational activities could take place outside? In planning an outdoor environment, what needs could be met outdoors...staff needs, children's needs, administrative needs, caregiver or family needs?

## APPENDIX B

### GARDEN USE QUESTIONNAIRE

(This questionnaire was adapted from *The Healing Landscape* by Martha M. Tyson. It was rewritten to meet the needs of this project.)

1. How successful do you feel your existing outdoor space is for the following?

	Very Successful			Not Successful	
Staff surveillance from inside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security for children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Observing nature/birds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allowing children to wander safely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy access to outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visiting with family/friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organized group activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helping students feel independent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How often is your outdoor space used for the following?

	Often			Never	
Family visits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planned group activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Celebrations/Picnics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quiet visiting with other students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other activities _____					

3. If students and staff do not use the outdoor space, how likely are these possible reactions?

	Very Likely			Not likely	
The area is not enclosed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The area is exposed to sun, wind, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is nothing to do outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students are not allowed outside alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doors are not accessible to students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entrances are locked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Area is perceived as unsafe by staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Students feel insecure when outdoors ☐ ☐ ☐ ☐ ☐

Other reasons \_\_\_\_\_

4. When students do use the outdoor space, how often do you observe them engaged in the following activities?

	Very Often			Never	
Sitting in the shade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sitting in the sun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Observing nature/birds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Watching activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wandering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doing garden-related activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visiting with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organized activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other observations _____					
_____					

5. How capable do you feel most of your students would be for the following activities?

	Very Capable			Not Capable	
Repotting plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planting seedlings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bird/Animal/Insect Watching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Light gardening activities (sweeping, raking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Watching garden activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Watering flowers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filling a bird feeder or bird bath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. How much does your existing outdoor space encourage the following responses from students?

	Very Much				Not at all
Increase in general awareness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintaining daily life skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Support Abilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Challenge or provide practice for new abilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Respite from indoor stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Freedom to go outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sense of ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Independent use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security for family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff respite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Encouragement of typical social roles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____					

7. When responding to students' restless, aggressive, or acting out behaviors, how often do you use these calming techniques?

	Very Often				Never
Soothing discussion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking with student indoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking with student outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suggesting a change of activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Giving them time alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Techniques _____					

## DESIGNING OUTDOOR SPACE

Please rank the following features on a scale from 1-10, 1 being the most important and 10 being the least important for your students.

### 1. Possible Features

- ☐ Patio for Group Gathering
  - ☐ Open lawn area for games
  - ☐ Quiet conversation Areas/ or Private Areas for alone time
  - ☐ Pathway with loops
  - ☐ Divided areas
  - ☐ Garden visible from Indoors
  - ☐ Tables for eating and activities
  - ☐ Bulletin Board for Schedules or Story Cards
  - ☐ Area screened from noise and distractions
  - ☐ Storage Areas
  - ☐ Other needs \_\_\_\_\_
- 

### 2. Activity Areas

- ☐ Sand box or table
- ☐ Water/splash table
- ☐ Texture boxes
- ☐ Curbs for balancing, ramps for pushing and pulling
- ☐ Climbing structure, slide, swings, or hammock
- ☐ Path for riding toys, wagons, doll strollers, wheelbarrows
- ☐ Easel or art wall for writing, painting, coloring
- ☐ Planting area
- ☐ Self-help areas
- ☐ Areas for playing house, dolls, or other activities
- ☐ Other \_\_\_\_\_

### 3. Safety and Security

- ☐ Total area visible by staff from indoors
- ☐ Places for staff to sit and supervise outdoors
- ☐ Security fence (No view out)
- ☐ Security fence (Views out)
- ☐ Non-toxic plants
- ☐ Soft Residential Lighting for Night Use
- ☐ Pathways that lead back to the beginning for way finding
- ☐ Level Pathways (for wheel chairs or any other disability)
- ☐ Other \_\_\_\_\_

#### 4. Furnishings

- ☐ Benches with backs and arms
- ☐ Lightweight movable seating and tables
- ☐ Bird Feeder
- ☐ Bird Bath
- ☐ Fountain/Pond
- ☐ Porch/yard swing
- ☐ Yard art (statues, mobiles, flags, banners, wind socks, windmills, weather vanes)
- ☐ Arbor
- ☐ Trellis
- ☐ Other \_\_\_\_\_

#### 5. Vegetation

- ☐ Shade Tree
- ☐ Shrubs
- ☐ Flowers
- ☐ Butterfly/Bird Garden
- ☐ Fragrant Plants
- ☐ Vegetable Garden
- ☐ Container Garden
- ☐ Garden Plots
- ☐ Tool storage
- ☐ Small greenhouse
- ☐ Work area/ potting shed
- ☐ Other \_\_\_\_\_

Please list any other features or activities that you would like to include in the garden.  
[Sensory activities, Physical activities (gross motor, fine motor), Social Activities, etc.]  
You know your children and their needs. Let me know what these might be.

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What are your staff needs?

Spaces for supervision, staff breaks, sitting, shade, flexibility, privacy or other needs.

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What are the Administrator's needs?

Do you need spaces for community outreach activities, family gatherings, fund raisers, a pleasant place for students to learn and staff to work?

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## **APPENDIX C**

### **THE DESIGN PROCESS**

In her book, *The Healing Landscape*, Martha Tyson outlines the steps of the Design Process to create a healing garden for the elderly or those suffering with Alzheimer's disease. These steps could be applied to the design of a therapeutic garden for autistic children as well as I have done below.

#### **I INVESTIGATE**

- A) Conduct a literature review on the following topics:
  - Healing Gardens,
  - Nature Viewing and Stress Reduction,
  - Design of public outdoor environments,
  - Design of hospital outdoor environments,
  - Design of children's environments,
  - The Nature of Autism Spectrum Disorder,
  - Therapeutic/educational treatments, and
  - Published works by higher functioning individuals with autism.
- B) Observe the individuals with autism for whom the space is to be created.
  - Determine characteristic behaviors,
  - Define individual needs.
- C) Invite multi-disciplinary cooperation of therapists, special educators, physicians, staff, caregivers, and family members. (Interview professionals.)
  - Formulate Therapeutic Goals for individuals with autism, staff, and family members.
- D) Choose the Site
  - Administer a questionnaire to determine the users of the space and their needs.
  - Conduct a site inventory.
  - Document existing conditions.

#### **II DESIGN**

- A) Use the information gathered from the investigative stage to create a conceptual master plan.
- B) Refine the plan.
- C) Create Site Designs
- D) Provide drawings/sketches, photographs to illustrate ideas.

### III BUILD

- A) Cultivate Community Support
- B) Estimate Costs
- C) Fund Raising and Public Relations
- D) Installation
- E) Construction
- F) Develop a Maintenance Program

### IV EVALUATE

- A) Observations of Garden Use
- B) Post Occupancy Evaluation
- C) Apply improvements
- D) Recommendations for Future Design Projects

## **APPENDIX D RESOURCES**

Association for Behavioral Analysis (ABA)  
258 Wood Hall, Western Michigan University  
Kalamazoo, MI 49008-5052  
<http://www.wmich.edu/aba/index.html>

The Association for Severe Handicaps (TASH)  
29 West Susquehanna Avenue  
Suite 210  
Baltimore, MD 21204  
<http://web.syr.edu/-thechp/subtash.htm>

Autism Network International (ANI)  
Our Voice: The Newsletter of the Autism International Network  
Jim Sinclair, Editor  
P.O. Box 1545  
Lawrence, Kansas 66044

Autism Research Institute  
4182 Adams Avenue  
San Diego, CA 92116  
<http://www.autism.com/ari/>

Autism Society of America  
7910 Woodmont Avenue, Suite 650  
Bethesda, MD 20814-3015  
Fax on-demand: 800-329-0899  
<http://www.autism-society.org>

Carol Gray/The Morning News  
2140 Bauer Road  
Jenison, Michigan 49428  
Phone: (616)457-8955  
Fax:(616)457-4070

Council for Exceptional Children  
1110 North Glebe Road  
Suite 300  
Arlington, VA 22201-5704  
<http://www.cec.sped.org>



Division TEACCH  
Eric Schopler, Ph.D., Director  
Division TEACCH Administration and Research  
CB 7180, 310 Medical School Wing E at Chapel Hill  
Chapel Hill, North Carolina 27599-7180

Or

Gary B. Mesibov, Ph.D., Co-Director  
Division TEACCH Administration and Research

Families for Early Autism Treatment (FEAT)  
P.O. Box 255722  
Sacramento, CA 95865-5722  
916-843-1536  
<http://www.feat.org>

MAAP Services, Inc. (More Advanced Autistic People)  
P.O. Box 524  
Crown Point, IN 46307  
219-662-1311  
<http://www.stepstn.com/nord/org>

National Alliance for Autism Research (NAAR)  
414 WALLSTREET, Research Park  
Princeton, NJ 08540  
888-777-NAAR  
<http://babydoc.home.pipeline.com/naar.htm>

The Center for Health Design  
Publishes The Journal of Healthcare Design  
<http://www.healthdesign.org>

\*\*\*Authors with Autism

Temple Grandin  
Paul McDonnell  
Thomas McKean  
Beth Moreno  
Donna Williams

## VITA

Bonnie Barnes Hebert resides in a suburb outside New Orleans, Louisiana. She graduated from Loyola University of the South in 1978 with a bachelor's degree of music education. After teaching elementary education for ten years in the New Orleans area, she pursued a Master of Education in counseling from the University of New Orleans. She has counseled high school students for ten years since receiving that degree. Her deep respect and affection for art and nature inspired her interest in landscape architecture. She is currently a candidate for the degree of Master of Landscape Architecture to be awarded by the Louisiana State University College of Art and Design in May 2003.