THE FAMILY HABITAT GARDEN PROJECT:
NEW DIRECTIONS IN THE TREATMENT OF
CHILD TRAUMA

by

LINDA C. GRAY

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LINDA C. GRAY

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ABSTRACT

The purpose of the study was to describe an ecological treatment model which uses a garden and related therapeutic activities to promote adaptive coping in traumatized children. The Family Habitat treatment model extends the ecological analogy to include the individual’s relationship with nature as a source of reparative experiences and a resource for healing. The garden setting, interventions and therapeutic activities that comprise the model, were selected to enhance individual resiliency and reduce identified risk factors in the lives of traumatized children.

The study reviews the literature on child trauma with an emphasis on the neurodevelopmental impact of trauma and the developmental risk factors that contribute to long-term effects. Interventions which address the neurodevelopmental correlates of trauma, and which have been demonstrated to promote resiliency in at-risk children are discussed.

Descriptive methodology was used to document the development and implementation of the Family Habitat Garden Project. The findings of the study suggest that the garden setting and therapeutic activities were a source of reparative experiences for the children who participated regularly. The most striking finding was that the family-support component, based on the informal activities of the EarthSaver's Club, helped families heal in ways that traditional therapy had not.
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CHAPTER I

THE PROBLEM

Introduction

The Family Habitat Garden Project was developed as an ecological treatment model to address the special needs of traumatized children. The garden setting was selected as an environmental intervention to reduce hyperarousal and enhance sensory integration in children sensitized to stress. The therapeutic interventions and activities described in the accompanying treatment manual provide the clinician with a guide for sequencing interventions which will reduce the stress response and promote the integration of adaptive coping skills in traumatized children. Together, the garden environment, social interactions and therapeutic activities which comprise the model are designed to provide a range of reparative experiences which reduce the internal and environmental risk factors associated with childhood trauma. The conceptual premise for this model is emerging medical research on the neurodevelopmental effects of childhood trauma.

Research by Perry (1993a) indicates that the traumatized child’s template for brain development is the stress response. Children whose brain’s are sensitized to stress are at higher risk for being revictimized, or victimizing someone else, “The main culprit is stress. Many children are raised in violent abusive surroundings... The antidote is giving children a sense of self-worth and teaching them that they are not helpless.” (Kotulak, 1997). Perry’s premise highlights the importance of developing treatment strategies
which reduce physiological arousal in the sensitized child, assist the child to regain control and enhance healthy coping skills. The Family Habitat Garden Project reflects a practical response to the neurodevelopmental framework for treating childhood trauma which is outlined in Perry’s work.

Impetus for the project arose from this writer’s clinical work with traumatized children at domestic violence shelters, and at the Children’s Advocacy Center of Phoenix. The children who came for treatment represent the unflinching reality of the cycle of violence which plagues families, schools and communities across the nation. The everyday struggles which these children brought to therapy revealed two ongoing themes: 1) Although many of the children escaped the immediate violence in their homes, there seemed to be no refuge from the terror and chaos which erupted, apparently at random from within; and 2) the pervasive and persisting cognitive, behavioral, emotional, and social difficulties presented by these children were not adequately addressed by the available treatment modalities.

Development of the Problem

Treatment for traumatized children is not merely a matter of providing cognitive and verbal interventions, therapeutic parenting and community support, but must include interventions which are brain-region directed. Perry’s research (1993b) on the neurodevelopmental correlates of traumatic stress in children indicates that trauma produces permanent changes in the developing brain. The central feature of these changes is a chronic state of hyperarousal which overwhelms the traumatized child’s adaptive
resources and disrupts subsequent emotional, social, cognitive and behavioral functioning. The traumatized child is *at-risk* not only because of the physical, emotional and psychological impact of abuse and neglect, but due to the persisting physiological and developmental features of the traumatic stress response.

A child whose brain is sensitized to stress is a child whose adaptive coping is determined by the freeze, flight or fight response. The severely traumatized child, caught in a perpetual state of fear, is a child whose behavior is determined by primitive, reactive adaptations to stress which are mediated in the brainstem and midbrain. These primitive brain areas which regulate arousal, affect and sensory integration are not responsive to verbal and cognitive interventions which are the basis for psycho-educational and cognitive-behavioral treatment models (Perry, 1995a).

**Need for the Study**

Child trauma is a complex bio/psycho/social phenomenon which produces acute reactions and chronic changes in the child’s adaptive functioning. The cumulative and lifelong consequences of trauma are at the heart of the cycle of family violence. Reenactment of childhood victimization is a major cause of violence in society. And, violence in society is a major cause of traumatic stress in its most vulnerable members -- our children. It is therefore necessary to identify and develop interventions which address this complex array of intrapersonal, interpersonal and environmental factors.

New treatment models, based on current theory and research, are needed to integrate the complexity of information on child traumatic stress with practical
applications which will guide clinicians and invite further research. Many researchers agree that there is a need for models which are holistic, multidimensional, and developmentally sensitive (Cichetti & White, 1990 and Harvey, 1996). There is a growing recognition among clinicians that interventions must also address the neurodevelopmental correlates of trauma. (Perry, 1995b. and McFarlane & van der Kolk, 1996):

When a child is in a state of hyperarousal – a persisting fear state – this child will not easily be taught complex cognitive information, i.e., if the cortex is not active, it will not store information. Only when significantly ‘calmed’ will these children benefit from ‘words’ What we can expect from these children is their ‘catalogue’ of previous experiences – their non-verbal memories, many of which are characterized by unpredictability, threat, pain, assault. They will (re)act accordingly. It is the task of therapeutic interventions to begin to provide a set of consistent alternative memories based on trial after trial of neutral or positive interaction. Unfortunately, our interventions frequently mistarget the needs of a given child. (Perry, 1995b)

Environmental experience is the force which shapes the brain’s ability to respond and we must learn to use reparative environmental experiences to the fullest extent possible when intervening with traumatized children. According to Dr. Frederick Goodwin, former director of the National Institute of Mental Health, “The question is not only, ‘what’s wrong with the environment, and what we can do about it?’ but ‘What makes some kids more vulnerable than others and how can we develop ways to protect them?’ That’s the new direction we have to go in.” (Kotulak, 1997) Thus, the treatment of child trauma calls for a continuum of verbal and non-verbal interventions which are developmentally sensitive and which address hyperarousal.
Purpose of the Study

The purpose of this study was to describe an ecological treatment model which uses a garden setting and related therapeutic activities to promote adaptive coping in traumatized children.

Organization of the Remainder of the Study

The study is organized into four remaining chapters. Chapter Two contains a review of relevant literature on child trauma and development which substantiates the need for the model and defines the research question. The literature review also provides a synthesis of diverse perspectives from developmental biology, clinical, social and environmental psychology, ethnobotany and outdoor education which contribute to the design of the model. Chapter Three presents the rationale, method and criteria for the research design. Chapter Four describes the demonstration phase (initial implementation) of the treatment model. Conclusions and recommendations for future applications and research are presented in Chapter Five.
CHAPTER 2
THE LITERATURE REVIEW

Introduction

All children who are at-risk due to family and community violence, child abuse, poverty, neglect, substance abuse and gangs, will not face the same future. Hope for these children is defined in terms of the interplay of risk and protective factors inherent in the child and in the child’s environment. Children are vulnerable because of their developmental immaturity, but the developmental plasticity of childhood also offers unique opportunities for intervention and change. The greatest risk for children is that during the first six years of life the brain develops and organizes as a reflection of developmental experience:

The human brain, and all of the functions that this amazing organ mediates develop as a reflection of developmental experiences. This mirroring quality of the developing human brain has evolved as an extension of the primary mandate of the brain to perceive, process and act on information from the environment in order to maximize survival potential. If the child is raised in an unpredictable, chaotic, violent environment, it is highly adaptive to have a hypervigilant, hyper-reactive arousal system; if primary relationships are characterized by violence, neglect and unreliability, intimacy becomes maladaptive; if a young child is frequently assaulted, it becomes adaptive to over-interpret non-verbal cues, to act quickly on impulses, and to strike out before being struck. (Perry, 1993a).

The stress response, which functioned initially to protect the child, represents a neurophysiological minefield long after the traumatic incident is over and
"forgotten". The neurophysiological and psychological changes which allowed the child to adapt to trauma ultimately betray the child once the trauma is past. Traumatized children are further betrayed in a mental health system where the source of their developmental, cognitive, emotional and behavioral disorganization is not fully appreciated.

The proposed treatment model is based on the three related premises: 1) the traumatized child is sensitized to stress and may be in a persisting state of hyperarousal, 2) the traumatized child who is in a state of hyperarousal is actively engaged in defending against a perceived threat and is unable to attend to and integrate traditional cognitive-behavioral interventions 3) treatment for traumatized children must address hyperarousal and help the child re-establish safety and self-regulation. The purpose of the research is to identify the components of a treatment model to address these special needs. The significance of redefining current treatment strategies is discussed in the context of the personal, social and cultural costs of raising children who are ‘incubated in terror’ (Perry, 1995b and, Kotulak, 1997).

This review examines the literature on traumatic stress with an extended focus on the neurodevelopmental impact of trauma on children. Principles of treatment which are specific to neurodevelopmental correlates of child trauma are identified and methods of treatment are proposed. Research on risk and resiliency in children provides the framework for defining treatment goals and, the importance of the garden setting as source of individual, family and community healing is discussed.
Children and the Cycle of Violence

The United States is the most violent country in the industrialized world (Osofsky, 1995). Current statistics indicate that 5 million children in the United States were victims and/or witnesses to physical abuse, domestic violence or community violence in 1995 (Carnegie Council on Adolescent Development, 1995). The setting in which children in America are most frequently exposed to violence is their own home, and the majority of violence suffered by these children is intrafamilial abuse including sexual abuse, neglect and battering (Horowitz et. al., 1995 & Koop et. al., 1992). It is estimated that each year between 3.3 million and 10 million children witness domestic violence (Straus, 1991). In homes where domestic violence occurs, children are physically abused and neglected at a rate 15 times higher than the national average (Straus, 1993). Children who witness violence are also at increased risk for becoming violent themselves (Peled, et. al., 1995, Halperin et al.,1995 & Richters, 1993). According to van der Kolk and McFarlane (1996a) “re-enactment of victimization is a major cause of violence in society”.

This spiraling cycle of violence has profound implications for our children, communities and culture. Children who witness violence, and children who experience abuse and neglect suffer from the acute and long-term effects of traumatic stress. Research on the developmental impact of traumatic stress indicates that children are changed by trauma. Researchers agree that traumatized children form trauma-related expectations: traumatic experiences shape the child’s expectations about the world, relationships and themselves. Whether in the role of victim or victimizer, the child’s traumatic expectations are expressed through the re-enactment of trauma (Pynoos et. al.,
developmental biology and traumatic stress suggests that traumatic expectations may
have biological analogues (Pynoos 1990, Krystal et. al., 1989, Perry et. al, 1995a).
Perry’s findings indicate that exposure to violence alters brain development in children,
and that children exposed to chronic intrafamilial violence will develop a persisting fear-
response which predisposes them to violence toward others, revictimization and self-

Families, communities and our culture can provide a protective and supportive
system of values, lifestyles and beliefs which protect children and buffer the impact of
traumatic experiences. However, in a culture where violent behavior is modeled,
nurtured and glorified, traumatized children are more likely to carry their pain forward in
violent ways (Vachss, 1991 & Wright et. al., 1992). In order to adequately understand,
alter and ultimately prevent this cycle of violence, it is urgent for researchers and
clinicians to understand the fundamental interrelationship between trauma and
development. Neurodevelopmental research on the impact of violence on the developing
brain offers critical insights and an expanded theoretical framework for the treatment of
childhood trauma. Equally important is the contribution which parents, teachers,
clinicians and communities can make toward reducing risk-factors in the environment
and preventing children from acting-out the legacy of violence. In the context of the
growing culture of violence in America, the treatment of traumatized children is a public
health concern of profound importance to all.
Long-term Effects of Trauma

**Long-term adaptations and the psychobiology of trauma:** The DSM-IV field trials found that people who had been traumatized at an early age tended to have problems with core psychological functions (van der Kolk, 1996). The findings confirm that the impact of trauma is most profound and pervasive in the first decade of life. Adults who reported complex childhood trauma (fewer protective factors and longer duration) were most affected. The chronic and persisting symptoms of traumatic stress in adults are physiological hyper-arousal and emotional reactivity to internal and external cues, paired with avoidance of traumatic reminders and dissociation. Retrospective studies of adult survivors of trauma found that the areas of functioning most frequently impaired were:

1. **Self-regulation**
   - the ability to interpret and respond appropriately to body signals and emotions,
   - the regulation of feelings and impulses,

2. **Cognition and problem-solving**
   - the ability to think clearly about past and present events
   - cause and effect thinking
   - the ability to anticipate and plan for the future,

3. **Relationship**
   - the ability to form and maintain meaningful relationships,
   - sense of belonging
4. Self esteem/self-efficacy
   - the ability to maintain a stable sense of self as a competent, effective and worthy individual,

5. Meaning and future orientation
   - the ability to find meaning and purpose in life.


These broad-based "symptoms" are markedly similar to the effects of complex trauma in children (Friedrich, 1990 and, van der Kolk, 1996, Terr, 1991). Cole and Putnam (1992) propose that the ability to regulate internal states and form an effective response to external stressors is the foundation of the child’s developing self-concept. Children who develop as if the world were a chaotic and threatening place must make behavioral and cognitive adaptations to compensate for their inability to modulate physiological and affective arousal. The effects of hyper-arousal and dysregulation are believed to be more complex, pervasive and persisting in children because the primary biological and psychological mechanisms for self-regulation are established and integrated throughout early childhood.

The long-term effects outlined above may be explained as childhood adaptations to traumatic experiences which were appropriate to the developmental level of the child at the time that the trauma occurred, but which are no longer functional for the adult in the present-day world. Research indicates that these are not simply conditioned behaviors, but are based on neurohormonal and neuroanatomical changes which result
from chronic hyper-arousal in traumatized children (Van der Kolk, 1996 and, Perry, 1995a). This perspective is explored in detail below.

The Developmental Impact of Trauma

Hyperarousal and the loss of self-regulation: A father molests his four year-old daughter, while his two year-old daughter watches. He tells them that these are “loving touches” and then holds a gun to the two-year old’s head threatening to kill her and mommy if they tell. An eight year-old boy believes he will not live to see sixth grade. After school, he cares for two younger siblings while his mother works because his fourteen year-old brother was recently shot in an episode of gang violence while walking home from school. An eighteen month old witnesses his mother stab his father after months of violent arguments between them. He is left behind, while his mother takes his five month-old sister and flees. Few researchers and clinicians would deny that these events are potentially traumatic in the life of a child. However, the salient features of trauma will be different for each child and the immediate effects will vary according to the child’s age and relationship to the victim/perpetrator. The long-term effects of the trauma will reach beyond the immediate symptoms to change the child’s view of himself, others and the world. Preliminary findings indicate that the symptoms commonly observed in traumatized children (motor hyperactivity, anxiety, sleep problems, mood swings, difficulties with attention, cognition and sensory integration, disturbed self-concept and maladaptive patterns of social interaction) may have their roots in physiological hyper-arousal and loss of self-regulation (Perry, 1993b and, Kotulak, 1997).
Current definitions of child trauma recognize that the child’s biological status and developmental capabilities interact with environmental influences which buffer or intensify the impact of stress (Cichetti & Toth, 1994, Putnam, 1997). The single most important aspect of environmental experience for the young child is the relationship with a parent or caregiver. Attachment, defined as the lasting social and affective bond between parent and child, is the core of human survival and relationship (Bowlby, 1988, and Britton, 1996). The responsiveness and predictability of parental nurture serves to organize the infant’s developing nervous system by externally regulating physical and emotional arousal. The infant develops resources for self-soothing as well as the capacity to trust and to be comforted by others. Attachment is the foundation for later social relationships which will support the child in times of adversity and it is the source of the child’s emotional resilience:

The rising tide of abuse and neglect occurs during the critical period when children are developing... ‘moral emotions’. These are emotions that are rooted in brain chemistry and are established in the first three years of life...The chemical patterns that are established (by attachment and parenting,) tell a child how to react to his or her environment, whether the child sees the world as a hostile place that has to be fought, or a more peaceful one where social cooperation wins the day. (Kotulak, 1997.)

Thus, the caregiving environment serves as a buffer against arousal, and also develops the brain’s capacities social behavior and coping with stress. Both lack of critical nurturing experiences and excess exposure to traumatic stress may permanently alter the child’s sensitivity to stress and result in chronic hyperarousal. Children who fail to develop secure attachment due to neglect, abuse or abandonment face the perilous
challenge of a ‘hard-wired’ predisposition to impulsive/reactive, aggressive/avoidant and unattached behavior (Perry, 1995b).

Today, many children are raised in an atmosphere of violence which permeates every aspect of the child’s experience. Children in the inner-city may experience violence at home, in their neighborhood and at school; the places where children turn for refuge have become dangerous places. Research indicates that parents who want to protect their children from this atmosphere of violence may feel overwhelmed, frustrated and powerless:

When parents witness violence, or are themselves the victims of violence, they are likely to have difficulty being emotionally available, sensitive and responsive to their children. Parents must cope with their own trauma before they are able to deal with their children’s needs. When parents are living in constant fear, their children often lack the sense of basic trust and security that is the foundation of healthy emotional development. (Osofsky & Jackson, 1994)

When the protective barrier of emotional trust and physical safety provided by attachment to a primary caregiver is threatened, the child experiences terror and helplessness. Children who are direct victims of violence and children who witness violence are at-risk for PTSD (Jaffe, 1997 and, Kotulak, 1997). Specific characteristics of traumatic events are associated with the onset of Post-Traumatic Stress symptomology in children. Researchers consistently identify seven elements of the child’s experience which are potentially traumatizing:

1) helplessness and loss of control

2) threat to self or significant attachment figures

3) familiarity of the victim and/or perpetrator
4) suddenness, intensity and duration of threat

5) chronicity of traumatic experiences

6) the child’s negative attributions concerning the event, including negative attributions of self

7) the child’s developmental expectations with regard to attempts to predict, avoid, control or prevent the traumatic event,

8) the child’s perceived ability to manage their own physiological and emotional responses. (Carlson et. al., 1997, James, 1989, Terr, 1991, Briere, 1992)

Prolonged terror and helplessness are the seeds of complex trauma. Recurring or prolonged exposure to events which threaten the child’s psychological or physical integrity directly, or which threaten to harm a significant attachment figure, are associated with more severe and persisting symptoms of complex trauma (Zeahna & Scheeringa, 1996). Complex child trauma is defined as trauma which occurs during critical periods of a child’s early development and which may continue over a period of weeks, months or years resulting in hyper-arousal and loss of self-regulation. This definition assumes that children exposed to chronic trauma will have had fewer external protective factors to buffer them from the impact of extreme stress.

The rapid physical and psychological changes which occur throughout childhood interact with the underlying physiology of traumatic stress to produce diverse symptoms
associated with traumatic stress. The central features of the loss of self-regulation in children are symptom clusters which include:

**Re-experiencing** the traumatic event (postraumatic play and nightmares are especially prominent in young children).

**Avoidance** of reminders of the trauma and emergence of new fears which were not present prior to the trauma.

**Dissociation** and numbing of emotional responsiveness, social withdrawal.

**Hyper-arousal**: exaggerated startle response, hypervigilance, new-onset attention-deficit/hyperactive disorder, and aggressive behaviors not present prior to the trauma. (Terr, 1990, Perry, 1994)

Anyone who has worked with young children from chronically abusive, neglectful and violent environments has observed the sudden, seemingly unpredictable shifts in behavior, affect, arousal and responsiveness which are characteristic of traumatized children:

The symptoms of hypervigilance, cognitive distortion, physiological and behavioral hyper-reactivity, intimacy avoidance and dissociation commonly seen in traumatized children, were all, at some time in the lives of these children, necessary adaptive and appropriate responses to traumatic stress. (Perry, 1993a)

Perry’s theory proposes that if the child’s neurological foundation for self-regulation is disrupted by trauma, then the child’s emerging emotional and cognitive capabilities for coping with stress will be permanently altered.

**Neurodevelopmental changes:** The potential for the unfolding of all developmental processes lies within the brain; the awakening of these innate potentials depends on environmental experiences. Children under age six are uniquely dependent
on environmental experiences to help them develop, organize and use key areas of the brain:

Understanding the traumatized child requires recognition of a key principle of developmental neurobiology: the brain develops and organizes as a reflection of developmental experience, organizing in response to the pattern, intensity and nature sensory and perceptual experience. Therefore, the traumatized child’s template for brain development is the stress response. (Perry, 1993a, p.14.)

Young children, whose brains are still undergoing critical periods of development, are also least able to avoid exposure to family violence, a threat from which there is no immediate escape (Groves et al., 1993). These children carry the legacy of violence in the maturing neurological pathways which will regulate behavior, self-concept and relationships. Although a complete discussion of the neurodevelopmental impact of trauma is beyond the scope of this research, the fundamental principles of neurodevelopment lead to important insights for the treatment of trauma in children. Brain development is sequential (brainstem→midbrain→limbic→cortical) and use-dependent (the more a neural system is activated during development, the more that neural state becomes built-in). Perry (1995a) hypothesizes that early experiences of deprivation and abuse shape brain development differentially. According to Perry’s model, any disruption of development which ‘overdevelops’ the midbrain/brainstem areas (which control survival/arousal and mediate stress) or which ‘underdevelops’ the limbic/cortical areas (which control emotion, affiliation, inhibition and higher thought processes) can lead to permanent changes in the brain’s ability to modulate stress, arousal and aggression (Perry, 1995a).
The stress response, first described in 1914 by Walter B. Cannon as ‘the fight or flight’ reaction, is the mature adult’s reaction to perceived threat. The fight- or- flight response engages a series of interdependent neurophysiological reactions in the brain, the autonomic nervous system, the Hypothalamic-Pituitary Adrenocortical axis (HPA), and the immune system which prepare the body to protect or repair itself, and to restore balance to the affected systems as rapidly as possible. The survival value of the emergency response is that it is immediate and reversible. However, under conditions of prolonged exposure to overwhelming stress these changes are not reversible. Prolonged, inescapable stress causes a dysregulation of neurotransmitters in the brain which mediate stress and emotion. Adrenaline and noradrenaline are the chemical messengers which activate the alarm reaction in acute stress. When the stress is of sufficient duration, intensity or frequency, areas of the brainstem and midbrain become sensitized and overly reactive due to altered levels of cortisol, adrenaline and noradrenaline, the neurotransmitters which regulate the stress response. The dysregulation of the adrenergic/noradrenergic neurotransmitter systems of the Locus Coeruleus and the Ventral Tegmental Nucleus interferes with core functions such as physiological arousal, affect, attention, sleep and memory (Krystal, et. al., 1989 & Perry, 1994). Because of it’s diverse connections to nearly all major brain areas, the Locus Coeruleus is believed to play an orchestrating role in the mediation of prolonged stress:

Taking all of this in is the locus coerules, the brain’s alarm network. Sitting at the base of the brain, it sends out noradrenaline pathways to other brain centers that control heartbeat, breathing, blood-pressure, emotions, and motivation. When the loco coerules finds itself in an uncontrollable, threatening environment, it set its noradrenaline guage on high. Over the the pathways come surges of the stress hormone that keeps the body in a constant state of readiness—heart racing, blood
pressure high, easy to startle, quick to blow up. These are the PTSD children. (Kotulak, 1997, pp. 89).

In children, the neurophysiological changes which initially prepare the body for ‘fight or flight’ often fail to summon help or protect the child from assault. Family violence and abuse place young children in conditions of inescapable stress and prolonged exposure to violence. Traumatized children, unable to restore physical, emotional or psychological safety for themselves, become sensitized to stress. Perry’s research describes two distinct neural response patterns which characterize the child’s response to threat: 1) the hyperarousal continuum, 2) and the dissociative continuum (Perry et. al. 1995a). Children who are in a state of hyperarousal function along an alarm-fear-terror continuum and are easily moved from a state of mild anxiety, to feeling threatened, to a full-blown terror response.

For many children the “fight or flight” response may not even summon help, in which case a more adaptive response to threat is the “freeze or surrender” response. The freeze or surrender response disengages the child from sensory and emotional arousal. The neurochemicals which mediate the dissociative response belong to the endogenous opioid systems. The endogenous opioids function to alter the perception of pain, distort sensory processing and modulate affective arousal to reduce the immediate physical and psychological impact of pain and threat. During critical periods of brain development these acute responses to threat (hyperarousal or dissociation) may become internalized as an organizing neural patterns. Both categories of response to threat may be engaged at different developmental stages and in response to different types of trauma, but the traumatized child’s primary response pattern will tend dominate their behavior.
Traumatized children, who have formed an internal representation of the world as a chaotic and violent place and who are sensitized to arousal and dissociation, also become less able than other children to regulate their own responses (Perry, 1995a). The inability to tolerate stress and cope effectively places traumatized children at greater risk to re-enact the chaos and violence around them either in the role of victim or victimizer (Kotulak, 1997, Peled et. al., 1995 and, van der Kolk, 1996).

**Implications for Treatment**

The exact nature of the interaction between the developmental effects of neurochemical sensitization in specific brain areas and adaptive coping behavior in children is currently under research. However, the awareness that many traumatized children are in persisting state of fear may help clinicians identify more effective approaches to treatment. The behavioral problems found in traumatized children are rooted in their original adaptive response to trauma. Traumatized children develop emotional, cognitive and behavioral adaptations for controlling and discharging arousal which are based on changes in brain function and disrupted developmental capabilities. These adaptations usually fall somewhere along the alarm-fear-terror continuum and can be re-assessed in terms of freeze, flight or fight behaviors (Perry, 1993a). When viewed from this perspective it is obvious that the therapeutic issues of safety and control are paramount, both for the child and for the clinician. Care must be taken to avoid interventions which will move the child further along the alarm continuum. The sensitized child cannot recognize or interrupt the progression form anxiety to terror on
their own, so it is the responsibility of the clinician to provide interventions which do not potentiate helplessness, fear and terror. A child who feels out of control and who is actively engaged in defending against perceived threat, is also a child who is overwhelmed and unavailable for therapeutic work. The specific ways in which hyper-arousal and dissociation impact the emotional, cognitive and behavioral functioning of the traumatized child are summarized below.

**Emotion:** In response to uncontrollable levels of arousal, the traumatized child experiences current stressors with an emotional intensity that belongs to the past, and that interferes with the development of adaptive coping in the present. Avoidance of social interaction, dissociation and “shutting down” emotionally offer the child respite from their own emotional reactivity. Both over-reacting and shutting down emotionally are potential sources of retraumatization for the child, since the ability know what you are feeling, express your feelings appropriately and respond to the emotional cues of others are the basis for social behavior. Krystal (1978), and Horowitz (1986) have suggested that the loss of ability to attend to and identify emotional signals prevents the child from learning to either adjust their expectations to fit what is actually happening, or to take action to alter the situation to fit their expectations. For the traumatized child, feelings, which are a necessary component of social interaction, self-care and problem-solving, become yet another reminder of their inability to affect the outcome of their experiences.

**Cognition:** All aspects of cognition are impacted by trauma: the ability to know and understand self and others, the ability to identify, attend to and organize relevant information, the ability to adjust one’s behavior or expectations, and the ability to make
meaning out of one’s experiences and plan for the future are altered. Traumatized children, who are continually distracted and aroused by subtle cues in the environment, respond to these cues with impulsive, avoidant or dissociative behaviors and are often diagnosed with Attention-Deficit Disorder, (ADD/ ADHD), (Perry, 1994). The hypersensitivity and hypervigilance which accompany chronic hyperarousal interfere with the development of selective attention and discrimination. The hypervigilant child is focused on nonverbal cues, searching for threat and storing that information according to an internal cognitive schema, of thoughts, sensations, emotions and other non-verbal representations of the trauma.

In Piagetian terms, children assimilate information into an existing cognitive schema, and then adjust or accommodate their “cognitive map” to correct for discrepancies between the prior schema and new experiences. In this way, children learn to anticipate events and plan an organized response which contributes to their ability to “make sense” of the world (Horowitz, 1986 & Janoff-Bullman, 1992). Hyperarousal causes children to focus on cues associated with the trauma and to organize their perceptions according to the trauma-based schema. They miss important opportunities to attend to and integrate aspects of neutral or positive experiences, and thus maintain inflexible perceptions and expectations based on the original trauma. Hyperarousal and dissociation interfere with the child’s emerging ability to practice problem-solving in the face of stress and prevent the child from developing a sense of self-efficacy by learning to cope effectively with challenging situations (Lazarus, 1966). Even when children are taught cognitive problem-solving (such as conflict resolution skills), they are unable to
transfer learning to emotionally charged situations (Perry, 1995a). Hyperarousal also interferes with the child’s ability to adjust their own behavior and to put feelings into words, (Van der Kolk, 1996). Under stress, the traumatized child is unable to conceptualize and communicate what they are experiencing to others, and thus lacks the necessary means for negotiation and problem-solving. Terr (1990) found that the expectations of traumatized children were marked by a sense of hopelessness and futurelessness long after the traumatic event, and even into adulthood. It has been suggested that traumatic expectations have the power to shape personality, increase the child’s vulnerability to future stressors and change the course of development (Pynoos, Steinberg & Goenjian, 1996).

**Behavior:** The behavior of the traumatized child is often contradictory and difficult to assess. Like so many fragments of the child’s shattered beliefs about the world, the traumatized child’s behavior often does not present a coherent clinical picture until it is viewed in terms of the “freeze, flight or fight” response. Children, because of their immaturity and dependence on adults, have fewer options for fleeing or fighting when they are threatened. Their first line of defense is to freeze: “The adaptive advantage of this is clear. Freezing allows one to hear more clearly and observe more keenly, scanning your environment for potential threat. The psychological equivalent of freezing is indecision or ambivalence” (Perry, 1993b). The sensitized child becomes anxious in the presence of an evocative cue in the environment (such as a teacher’s raised voice or another child grabbing for a pencil across the table). Neither the child, nor the adult observers are aware of the evocative nature of the situation, but the child responds
to the perceived threat by psychologically or physically freezing. The child appears unresponsive, frozen in a repetitious pattern of meaningless activity or completely dissociated. The “freeze” response is sometimes misinterpreted by clinicians, teachers and parents as Attention Deficit/Hyperactive Disorder or Oppositional/Defiant Disorder. Typically, non-compliance on the part of the child only serves to escalate the frequency and intensity of adult directives, until actual threat is involved. As the adult gets closer, becomes louder or more agitated, the child becomes more anxious and fearful. In the event that the “freeze” adaptation does not bring relief from rising anxiety, or if the threat continues, the child moves along the alarm continuum toward terror. This movement is precipitous for the sensitized child, and all three adaptations may be observed in a single sequence of behavior.

Psychological “flight”, denial and dissociation may replace actual flight in children who have few opportunities to physically escape harm inflicted by adults. Denial and distortion are cognitive adaptations which help children avoid sensations and experiences that evoke anxiety. Fantasy is a common form of escape which combines elements of active coping through play, with denial and distortion. In this way, the power of “strongly visualized or otherwise repeated memories” of traumatic events is blunted and brought under the child’s cognitive control (Friedrich, 1990, Cole & Putnam, 1992). In the presence of acute threat, young children must often resort to psychological flight in order to escape. (Friedrich, 1990, and Kluft, 1987). Children younger than age twelve are not capable of the cognitive distractions which adults use to gain psychological distance from threatening circumstances. Also, very young children are unable to adequately
assess actual threat to life and limb, and a wide range of events may evoke terror and helplessness. For example, Janoff-Bullman (1992) refers to the particular survival value of the fear of being abandoned in children. Psychic numbing (loss of emotional responsiveness) and massive denial are generally seen as part of a continuum of dissociative events (Putnam, 1989). For the clinician, the importance of recognizing dissociative responses in children is twofold: 1) the child must be returned to present-oriented, active coping before therapeutic work can begin, 2) the child cannot learn alternative means of coping with stressful situations while dissociation is occurring. According to Perry, the clinician should “make every attempt to minimize anxiety-provoking content or techniques which will make the child unavailable for therapeutic work” (1993b). Desensitization and cognitive coping strategies cannot be learned by a child who has no alternative but dissociation for coping with anxiety-provoking stimuli.

Crying and vocalization are the young child’s equivalent of the “fight” response: “The child is unable to fight for himself, so the cry should bring attention to the adults to come and defend the child.” (Perry, 1993b, p.16). Frequently, the cry of the traumatized child does not bring assistance or relief, and the combination of fear and frustration leads to rage. The manifestations of rage include: tantrums; physically aggressive, assaultive or destructive behavior directed at self, others or the environment; and also, the negative manifestation of rage, extreme passivity. A child who begins having unpredictable and uncontrollable tantrums following a traumatic event, may be a terrorized child who is in need of physical containment and emotional reassurance in order to regain control. It is important for the clinician who is planning interventions to distinguish between
aggressive re-enactment behaviors which are purposeful, and more regressed or dis-integrated aggressive behaviors which result from fear.

Neurodevelopmental research redefines behaviors which are the focus of clinical attention in traumatized children and challenges the clinician to intervene on complex patterns of dissociation and hyperarousal. Perry suggests that treatment for traumatized children is not merely a matter of providing cognitive and verbal interventions, but must include ‘brain-region directed’ interventions designed to reduce physiological and emotional hyperarousal and dissociation:

Only when significantly ‘calmed’ will these children benefit from ‘words’ What we can expect from these children is their ‘catalogue’ of previous experiences – their non-verbal memories, many of which are characterized by unpredictability, threat, pain, assault. They will (re)act accordingly. It is the task of therapeutic interventions to begin to provide a set of consistent alternative memories based on trial after trial of neutral or positive interaction. Unfortunately, our interventions frequently mistarget the needs of a given child. (Perry, 1995b)

According to Perry’s trauma model, the focus of treatment for children who have been sensitized to hyperarousal and dissociation is to:

1) Restore safety and predictability;
2) Offer consistent nurturing and positive relationships;
3) Provide experiences which reduce arousal and foster self-mastery;
4) Repeat these experiences in a variety of settings, with a variety of positive role models.

These recommendations are consistent with current models of treatment for traumatic stress in children, but highlight the necessity for sequencing interventions according to the child’s ability to access verbal and cognitive coping skills. Non-verbal therapies
which reduce stress, provide sensory integration and enhance experiential learning are the basis for restoring self-regulation. As the child internalizes a sense of safety and regains self-control, cognitive-behavioral interventions are more readily integrated. Perry’s recommendations for treatment have not yet been tested, but prevention research supports the notion that early experiences are the key to helping children thrive despite adversity (Ososfsky, 1995; Kotulak, 1997).

**Prevention and Treatment of Trauma in Children**

The biopsychosocial model of child trauma highlights the interplay of internal and external factors which guide development and influence the child’s ability to adapt and survive in the face of traumatic experiences. The strength of this model is that it encompasses the biological, psychological and social processes which represent risk and protective factors in the lives of traumatized children. Identifying the strengths and resources which help children to overcome trauma are as important for designing effective treatments as understanding the source of their vulnerability.

Resiliency research seeks to explain why some children can survive a traumatic childhood and emerge emotionally healthy and stress-resistant (Shapiro, 1996; Luthar and Zigler, 1991; Masten, 1990; Werner and Smith, 1982). The idea that young children are resilient, that they can “bounce back”, or return to normal even after repeated exposure to abusive and neglectful experiences has been redefined by neurodevelopmental research: After age five, brain changes may be irreversible. However research with at-risk children, including those in Perry’s study of children
sensitized to stress, indicates that reparative experiences during the critical early years of
development and afterwards can buffer the effects of trauma (Brownlee, 1996; Gunnar,
1997; Rak & Patterson, 1996). Preliminary findings suggest that the skills which help
stress-resistant children to cope successfully may also benefit those who are sensitized to
stress. (Shapiro, 1996; The Search Institute). Longitudinal studies, which examine the
phenomenon of resiliency in at-risk children, show that resiliency is a relative concept
which depends, at any stage of development, on the interplay of risk and protective
factors in the child, and in the rearing environment. (Werner, 1990; Horowitz, 1987; and
Rutter, 1985).

**Risk and protective factors:** Risk factors in the environment such as perinatal
stress, poverty, substance abuse, violence, parental psychopathology, involvement with
the legal system and disruptions to the family unit are conditions which are associated
with negative developmental outcomes. Risk factors in the child (biological risk factors)
include physical or emotional handicap, serious learning disabilities and chronic mental
health conditions such as PTSD. Research on resiliency in at-risk children suggests that
the developmental outcome of biological risk factors is largely dependent on the quality
of the rearing environment (Werner, 1994; Masten et. al. 1991).

Early intervention programs have long recognized the importance of
environmental experiences in the development of children under the age of three
(Osofsky, 1994). Currently there is a nationwide initiative to provide parents, educators
and politicians with crucial information on the importance of early experiences in shaping
children’s brains (Friedman; National Institute of Child Health and Human
Development, 1997). Brain research shows that early developmental experience is the single most powerful force in shaping the child’s potential:

The environment plays on the brain like a computer keyboard, inputting good experiences as well as bad ones, and, often, no experience at all. All of this is dutifully laid down in the trillions of connections between brain cells that make learning and memory possible. What happens to children’s brains when the buttons are pushed, or not pushed, can determine their IQ and whether they will become mentally retarded, sick, aggressive, violent, and even if they will live or die. (Kotulak, 1997)

Traumatized children are among those at highest risk because they are biologically more vulnerable to stress and have developed maladaptive techniques for coping responses (Brownlee, 1996).

In spite of these findings, it is well known that some children sustain severe, long-term effects from violence, abuse and neglect, while others emerge hardy, hopeful and psychologically intact. Resiliency research offers evidence that as long as the balance between stressful events and protective factors is favorable, successful adaptation is possible (Werner, 1994). According to child psychologist Emmy Werner (1994), the term resilience describes three kinds of phenomena in children:

1) good outcomes despite high-risk status
2) sustained competence under stress
3) recovery from trauma

Werner and her colleagues, who pioneered the research on resilience in children, followed 200 high-risk children in Hawaii from birth to their mid-thirties. The results of their research documented the effects of perinatal stress, chronic poverty, disorganized or abusive family environments, and lack of education and parenting skills as risk factors in
the early lives of the original cohort. The second phase of the study examined the roots of learning disorder, mental health problems and antisocial behavior displayed by high-risk children when they reached their teens. One out of three in the high-risk cohort had, despite an uneven track-record, developed into a competent, confident and caring young adult by age 18 (Werner, 1994). A third investigation contrasted the behavior and caregiving environments of resilient children with that of high-risk peers who developed serious coping problems. The key findings of Werner’s research are summarized below:

To the extent that the young men and women in this study were able to elicit predominantly positive responses from their environments, they were found to be stress-resistant, even when living in chronic poverty, or in disorganized homes with disturbed parents. To the extent that they elicited negative responses from their environments, they were found to be vulnerable, even in the absence of biological stress or financial constraints. As disadvantages and cumulative number of stressful life events increased, more protective factors in the children and their caregiving environment were needed to counterbalance the negative factors and to ensure positive developmental outcomes (italics added), (Werner, 1994).

The results of Werner’s Hawaiian study have been corroborated by researchers in the U.S. and England who found that specific protective factors act as buffer against trauma (Werner 1992; Wallerstein and Blakeslee, 1989; Garmezy et. al., 1984). Each of the studies identified links between protective factors and successful adult adaptation. Protective factors included sources of internal and external support:

I. Personal characteristics

- the ability to gain positive attention from others
- an active approach to solving life’s problems
- positive self-concept and internal locus of control
• a tendency to perceive their experiences constructively, despite suffering
• the ability to maintain a positive vision of a meaningful life

II. Characteristics of the family environment:
• consistent nurturing and care in the first year of life
• availability of caring adults and alternative caretakers
• positive high expectations and firm limits
• a sense of belonging, participation in family and community activities
• meaningful work, opportunities to contribute to the welfare of the family

II. Characteristics of the community environment:
• the presence of supportive adults who foster trust and act as positive role models and gatekeepers for the future
• opportunities to participate in extracurricular activities in a variety of community settings, including church, school and youth groups
• opportunities to perform work which contributes in a meaningful way to the welfare of others
• opportunities to experience peer support and peer leadership

(Werner, 1994; The Search Institute)

Among the most important conclusions offered by Werner’s research is that experiences which foster self-esteem and self-efficacy are the resources which tip the balance in favor of success for at-risk children (Werner, 1994). Stress-resistant children are children who have dispositions which lead them to select or construct environments that reinforce their natural talents and reward their competencies. Although some at-risk children may not
possess these characteristics, intervention seeks to shift the balance from vulnerability to resilience, either by decreasing exposure to risk factors and stressful life events or by increasing the number of protective factors (eg. building competencies and sources of support).

These findings have been incorporated into successful prevention-intervention projects throughout the United States. Recently, the idea that resiliency and social competency can be molded through role modeling and skill-based learning has become the focus of community efforts to prevent violence and promote healthy coping among at-risk youth. The Search Institute, which conducts nationwide research and develops community-based programs to promote resiliency in children, has identified 30 resiliency-building factors which have been demonstrated to help at-risk children avoid school difficulties, drug and alcohol use, depression, gang-involvement and violent behavior (Shapiro, 1996). These ‘developmental assets’ include peer leadership, mentoring, community service and a broad range of skill-based, hands-on activities which teach empathy, problem-solving, self-efficacy and positive self-concept. The programs provide regular opportunities for children to interact with adult mentors and involve parents, schools and communities in the effort to build resiliency.

Although there are no statistics available on how many of the children served by these programs are clinically “traumatized children”, the concept of resiliency-building has been extremely effective with at-risk children in the most stressed and violent inner-city neighborhoods where poverty, substance abuse, and neglect contribute to the atmosphere of violence (Burns, 1995; Perry, 1995b; and Shapiro, 1996). It is unknown
exactly which children face too many risks with too few assets, but a study of 250,000 children conducted by Benson (1993) examined specific assets and deficits in the lives of children which are associated with risk and resiliency. According to Benson, assets are those internal and external factors which promote positive development in children. External assets, such as positive, nurturing relationships developed at home, at school and in the community provide support for the growth of strong internal assets. The development of internal assets such as pro-social behavior, positive self-concept and a pro-active approach to solving problems, serve to guide children to adulthood. Deficits are those factors which inhibit healthy development and prevent children from reaching their emotional, intellectual, economic, vocational and spiritual potential. Deficits cited in the study included physical abuse, sexual abuse, parental addiction, social isolation, more than two hours spent alone at home per day and sustained stress at home or school. According to Benson’s findings the presence of each additional asset in a child’s life, reduced their over-all risk by half.

Resiliency research underscores the role of families, schools and communities in promoting healthy development in at-risk children. For traumatized children suffering from complex PTSD a combination of focused, trauma-specific interventions, group work to develop coping skills and family/community support provides the greatest opportunity for healing. Outlined below is a summary the findings of current outcome research concerning effective treatment for traumatized children, and an overview of models which incorporate various levels of individual, family and community intervention.
**Models of treatment:** The models of treatment reviewed below reflect the current trend toward providing community-based multidimensional treatment programs. These programs rely on a prevention-intervention conceptualization of treatment to address the complex array of problems associated with child trauma. Outcome research shows that effective treatments for traumatized children must provide abuse-focused therapy and address the environmental influences which contribute to the cycle of violence. Effective treatment must be individualized and sensitive to the social and cultural context in which the trauma occurred. Neurodevelopmental research shows that early experiences shape the child’s brain and the child’s capacity for coping with stress. Intervention is thus conceptualized in terms of providing a range of reparative and supportive experiences which not only promote recovery but increase resiliency in traumatized children.

A 1996 review of treatment outcome research indicates that fewer than a dozen empirically-based child-trauma treatment articles are published yearly (Friedrich, 1996). However the scant research available reflects the consensus that good therapy for traumatized children is abuse-specific, but that treatment must also consider non-abuse issues (potential risk factors) which amplify the impact of trauma. The focus of treatment (e.g. reduction of anxiety-based symptoms, PTSD, sexual acting-out behaviors, dissociation or aggression) is more important than the treatment modality in designing treatment for traumatized children. Outcome research by Kolko (1996) and Deblinger et. al. (1996) cited in the review indicates that more positive treatment outcomes were obtained when protective caregivers were involved in the therapeutic process. The studies
employed a variety of modalities to involve caregivers, including individual therapy, family therapy, parent-child dyads and psycho-educational support groups. Involvement in routine community services was also associated with over-all improvements in family functioning. The review concludes that treatment manual-based therapy is a useful framework for treatment and provides a basis for outcome research, but that effective treatment for traumatized children must always be individualized and flexible. Finally, Friedrich’s article suggests that while selecting a narrow focus of treatment may be helpful in designing outcome research, effective treatment for child trauma must encompass many dimensions of functioning.

Because of the large number of risk factors associated with the effects of trauma in children, effective treatment is increasingly understood in terms of prevention-intervention strategies (Pynoos, et al. 1996a). Multidimensional treatment models seek to address the complex nature of child trauma by utilizing a combination of treatments including developmental, abuse-specific, cognitive-behavioral, psychodynamic, psychoeducational, and pharmacological interventions, as well as educational assistance and remedial interventions to address developmental disturbances (Pynoos, et. al., 1996a). Therapeutically oriented prevention-intervention models seek to improve the traumatized child’s chances for success by reducing risk factors and increasing protective factors in the child and in the environment. Prevention-intervention approaches such as the Yale Child Study Center’s Program on Child Development and Community Policing (Marans & Cohen, 1993) recognize the interdependence among environmental and individual risk factors. The Yale program trains community-based police officers in traumatic stress and
child development in order to improve their ability to respond to traumatized children and reduce the risk of secondary trauma to the child. The Charles Drew University Center for the Study of Violence and Social Change - UCLA Trauma Psychiatry Program provides systematic school-based screening for elementary school children. This program screens children for behavioral and academic disturbances, as well as exposure to intra- and extra-familial violence, traumatic injury and loss. The program’s three-stage intervention model utilizes individual therapy, group therapy and mentoring to treat child trauma and to prevent long-term negative consequences. These models provide evidence that therapeutic prevention-intervention strategies to reduce risk factors and increase protective factors in the child and in the environment are increasingly used in the treatment child trauma.

Ecological models of treatment have adopted the ‘ecological analogy’ to place an even greater emphasis on the interrelationship between the individual and the community from which they derive a sense of identity, belongingness and meaning:

Applied to the realm of psychological trauma the ecological analogy understands violent and traumatic events as ecological threats not only to the adaptive capacities of individuals but also to the ability of human communities to foster health and resiliency among affected community members. (Koss & Harvey, 1991; Harvey, 1996)

In the context of child trauma the ecological perspective affirms the importance of designing interventions which are individualized to reflect the needs of the specific child within the caregiving environment with which the child is familiar. Equally important is the recognition that some traumatized children will not obtain clinical services, but may recover nonetheless. According to the ecological view, recovery may be supported and
enhanced by strengths and resources which exist beyond the focus of clinical intervention (family, church, school, community, ethnic traditions etc.). Harvey's ecological model of trauma recovery suggests that for those families who are least likely to participate in traditional therapy, interventions which establish safety, reduce isolation and promote positive coping in a familiar environment are most likely to succeed (Harvey, 1996).

Thus, efforts to promote resiliency and reduce risk for traumatized children must enlist resources within the child, within the family and within the child’s environment in order to be both meaningful and effective. Community psychology recognizes resources in the family and the community which promote recovery. These resources should be enlisted to support children and families at risk, regardless of their access to formal treatment. Harvey’s research invites a more holistic and participatory approach to healing. The ecological view highlights the concept of resiliency, the role of the larger environment, the availability of natural supports and the relevance of community-based interventions as multiple pathways to recovery (Pynoos et al. 1996a; Harvey, 1996).

**Healing and the nature:** The Family Habitat treatment model extends the ecological analogy to include the individual’s relationship with nature as a source of reparative experiences and a resource for healing. Trauma disrupts the child’s relationship with self, other and the world. According to the research cited previously in this chapter, child trauma has the power to disrupt the development of every aspect of human relationship including self-regulation, self-worth, identity, attachment, family, social interaction, community, and the ability to find meaning and purpose in life. Thus, in the broadest sense, the healing of relationship is the most basic definition of recovery
from trauma. Holistic medicine defines healing as a dynamic process of restoring “wholeness” or “right relationship” to body-mind-and-spirit: “When true healing occurs, relationship is reestablished – relationship to and within the self, to others and with one’s purpose.” (Quinn, 1993, pp. 554). A holistic approach to the treatment of child trauma is based on the recognition that the healing process is individual and innate; it can be stimulated and supported by appropriate therapeutic intervention, but relies on complex relationships among resources within the child, the community and the larger environment.

The Family Habitat model embraces the neurodevelopmental theory of trauma as a bisopsychosocial phenomenon and turns to the natural world as the most fundamental and deeply familiar relationship in human experience to guide the healing process. The garden, a child-sized microhabitat, is a living metaphor for healing, relationship and community which draws it’s symbolic meaning from the very survival of humans as a species. Until the advent of the modern age people lived in close relationship - in community- with the earth, rock, air, water, plants and animals. Our human relationship with the natural world was, and among indigenous peoples still is, our first relationship, our community and the cradle of survival. It is based on adaptation, cooperation and survival - the same biological responses which serve children terrorized by violence are part of our adaptive response to natural threat.

The adaptive features of the freeze-fight-or-flight response discussed previously in this chapter represent only one side of our relationship with the environment. Under normal circumstances (in which threat is immediate and rapidly resolved) the stress
response is countered by the relaxation response through which psychophysiological balance is restored. The relaxation response is the physiological opposite of the fight-or-flight response. Biofeedback research has shown that the relaxation response can be elicited by sensory cues and consciously learned. The same types of sensory stimulation which produce alpha brainwaves (a state of relaxed focus) during relaxation training, occur regularly in the natural environment and in spiritual practices such as prayer and meditation (Henry & Stephens, 1977). The sensory experiences involved in contemplating nature, watching clouds form and reform against an expanse of blue sky, listening to the rhythm of the surf and the call of seagulls at the shore, walking in a field of wildflowers, resting against a tall tree in the deep quiet of the forest, gardening or even watching fish wander tranquilly back and forth in a fish tank can restore the body and the emotions to a state of calm (Orenstein & Sobel 1989). The colors, sights, sounds, smells and even the rhythms of nature have the power to enliven and heal the body, mind and spirit.

The lessons of nature which can be observed and experienced in a therapeutic garden encompass the principles set forth in Perry’s recommendations for treatment of traumatized children and develop resiliency:

1. The sights, sounds, smells and rhythms of the garden reduce stress and promote sensory integration.

2. As the relaxation response is restored, senses are enlivened and children become less dissociative or hypervigilant and more able to process stimuli at a cognitive level.

3. Observing, tending and exploring the garden draws children into relationship with nature, encourages empathy and respect for life, and provides children with a sense of accomplishment.
4. Nurturing, cooperation and caring are a constant theme as the child plants the garden and enjoys the results with peers, adult mentors and therapists.

5. The cycles of life observed and experienced in the garden provide metaphors for healing which access both conscious and unconscious resources in the child.

6. Self-regulation is a principle of all life and all ecosystems which can be observed in the garden and experienced on a sensory, emotional and cognitive level.

7. The hands-on learning which takes place in the garden provides opportunities for problem-solving in a safe setting where the child is in control of the discovery process.

8. Self-efficacy and the ability to make sense of one’s world are an intrinsic part of the informal education which occurs as the child is guided to observe, tend, explore, experiment and express their natural curiosity in the garden.

The garden is not only an environmental intervention to reduce stress and a source of therapeutic activities, but also a microhabitat where the child gains a sense of safety and belonging. Environmental psychologist Mary Ann Kirkby observes that very young children seek out enclosed, natural places or “nests” for their play (Nabhan & Trimble, 1994). Children extend their map of the world to include child-sized territories in which they discover a child’s perspective on the natural world, experience nature intimately, establish boundaries and make meaning through play. Robert Coles, child psychologist and naturalist, writes that there is a developmental basis for the microhabitat of the garden as an instinctive refuge and a safe place for children:

Over time I’ve come to realize that a few intimate places mean more to my children, and to others, than all the glorious panoramas I could ever show them. Because I sense their comfort there, their tiny hand-shaped shelter has come to epitomize true intimacy for me…In retrospect, it is amusing to me that when I
wished my children to have contact with wildness. I sent them ‘out’ to climb high upon ridges and to absorb the grand vistas. Yet when they wished to gain a sense of wildness, of animal comfort, they chose not the large, but the small. In doing so, they may have been selecting a primordial connection with the earth and it’s verdant cover. (Nabhan & Trimble, 1994)

As children define and develop their connection with nature, they begin to redefine their view of themselves and the world. Traumatic expectations do not melt away simply because the child is in contact with nature, but because the traumatized child experiences safety, belonging and self-mastery on multiple levels at once. The hyperaroused child who is not initially able to process information on a cognitive level is accumulating reparative experiences which will reduce arousal and restore self-regulation. Emotional and cognitive mastery of traumatic events is only possible when the child consistently feels safe and calm.
CHAPTER 3

METHODOLOGY

Introduction

The purpose of the study was to describe an ecological treatment model which uses a garden setting and related therapeutic activities to promote adaptive coping in traumatized children. The model is based on the premise that the earliest focus of treatment is to reduce the stress response in traumatized children.

Research Design

The design used in this study is descriptive insofar as the research seeks to “describe systematically the facts and characteristics of a given population or area of interest. The description may include … identification of problems or justification of current conditions and practice” (Merriam & Simpson, 1989). Elements of action research methodology were employed to establish and implement the Family Habitat Garden Project with children and families at the Children’s Advocacy Center of Phoenix, Arizona. The interactive method permitted the researcher to develop and revise the model according to the immediate, practical needs of the population it was intended to serve.

Source of the Data

Data for the research was collected in three phases. In the initial phase data was gathered informally during outpatient therapy sessions with child and adult survivors of
severe childhood trauma. During the second phase, the researcher identified a theoretical framework for the project through a careful examination of the literature on stress, trauma, risk and resiliency in children. In the third phase of the project, the garden was established. Information was gathered from experts in the community, educators, existing garden projects and outdoor education programs to develop the necessary physical components of the garden. The therapeutic activities were developed from the interactive process of establishing a garden habitat with children and families.

**Phase I:** In order to gain insight into the strengths and resources which enable clients to survive childhood trauma, the researcher asked adult survivors, “When were the good times?” or “What helped you get through it?” Consistently, their responses reflected two themes: 1) the presence of a “special person” at some point in the child’s life who acted as friend, mentor and guide and, 2) experiences in nature -playing by a river, gardening, exploring nearby woods, climbing a favorite tree or even taming the mystery of an overgrown field. These clients described their childhood connection with nature not merely as refuge, but as a predictable source of peace, comfort, curiosity, exploration, learning, mastery and delight. The “wild places” they claimed were sometimes shared by others (both human and animal), but always “safe” and forever remembered as “their own”. They described a connection, a sense of belonging, a *relationship* with nature which gave them hope and helped them feel good about themselves. These conversations were the inspiration for a therapeutic garden project.

**Phase II:** The second phase was conducted as a search of the professional literature and popular media. No sources were identified which specifically discussed
the use of gardening as a therapeutic intervention for traumatized children. Therefore, two broad subject areas were examined to establish the treatment principles, techniques and applications which contributed to the design of the model:

- Sources were reviewed for their relevance to the treatment of child trauma, and to the specific recommendations contained in Perry's research:
  1. Definitions of child trauma
  2. Etiology of trauma in children
  3. Incidence
  4. Immediate and long-term impact of trauma
  5. Traumatic stress in children and adults
     a. psychobiology of traumatic stress
     b. neurodevelopmental impact of trauma
  6. Prevention and treatment of traumatic stress in children
     a. treatment models
     b. risk and resiliency research
     c. prevention models
     d. outcome research
- Existing applications for school gardens, outdoor education, horticultural and wilderness therapy provided guidance for establishing the garden, as well as materials and activities which were adapted for therapeutic use.
Phase III: The implementation phase of the project, which took place between August, 1996 and May 1997, provided practical experience using the model with children and families. A garden journal was maintained to track the physical development of the garden site and to record important events. The therapeutic components of the project were implemented during individual and group therapy sessions. Some components of the project developed spontaneously or in unexpected ways. Early in the project it was discovered that by offering a weekend Earthsaver’s Club (a children’s ecology club co-sponsored by Target stores and the National Wildlife Federation), entire families were able to participate in therapeutic activities. The “unexpected” was an important source of informal data which resulted in changes to the original design.

Case studies of three children who participated in all components of the Family Habitat Garden Project over the course of one year provided perspective on the viability of the therapeutic model. The case studies also revealed specific skills which were or were not generalized from therapy to everyday life. The children themselves were the best source of feedback concerning their experiences in the garden. Their verbal and non-verbal communications were used to redefine the focus and timing of therapeutic interventions and activities. Additional feedback about the project and participants came from parents, teachers and therapists.
Rationale For the Model

The research emerged over the course of ten years of clinical work with children and families traumatized by interpersonal violence. The researcher observed many children who, after receiving a combination of trauma-focused and cognitive behavioral therapies, continued to suffer from hyper-reactivity, dissociation and inability to trust. These problems hampered positive adjustment in important areas of their lives and interfered with their emotional, social and cognitive development. Existing theories of trauma did not adequately account for the long-term changes observed in these children. The researcher sought a conceptual model which would provide new directions for the treatment of traumatized children, and was introduced to the neurodevelopmental theory of trauma proposed by Bruce Perry, M.D. Perry’s research became the conceptual foundation for the project.

Research on the neurodevelopmental impact of traumatic stress indicates that trauma produces permanent changes in the developing brain (Perry, 1993a). The central feature of these changes is a chronic state of hyper-arousal. The traumatized child, caught in a perpetual state of fear, is a child whose behavior is dominated by primitive, reactive adaptations to stress. According to the Perry’s trauma theory, the most important principle for treating traumatized children is the recognition that they are sensitized to stress and function in a persisting state of fear (Perry, 1993a). Without specific interventions which help to restore the child’s sense of safety and self-control, the traumatized child either over-reacts or dissociates in response to stress. The primitive brain regions which
regulate arousal, affect and sensory integration are not responsive to verbal and cognitive interventions.

The child who feels out of control and is actively engaged in defending against perceived threat, is a child who is overwhelmed and unavailable for therapeutic work. Psycho-educational and cognitive-behavioral approaches are effective only after the child regains a sense of control (Perry, 1995b). Until the child is calmed, words and complex cognitive information are not helpful. Therefore, the earliest focus of treatment is to recognize and intervene on the stress response. The garden setting is an environmental intervention which was selected to reduce stress and promote sensory integration in traumatized children. The garden setting offers a wealth of non-verbal experiences which reduce physiological stress, engage the child’s sensory pathways in a non-threatening environment and introduce inter-relationship among all living things as a foundation for trust.

Health professionals have long recognized that exposure to the sights, sounds, smells, tastes and textures of nature can improve immune function and promote the relaxation response in humans (Orenstein & Sobel, 1989). Gardening engages all of the senses in ways which are both pleasurable and rewarding. The movements associated with gardening also stimulate the vestibular system. Sensory and vestibular stimulation have been shown to promote creativity and enhance learning in children (Hannaford, 1995). Children whose brains are sensitized to stress, whose bodies are charged with anxiety, and whose senses have become accustomed to scanning for danger, are especially
in need of safe opportunities to use their senses and their bodies to integrate new, positive experiences (Kotulak, 1997, Perry, 1995a).

The garden is an environmental intervention and a living metaphor for growth, change and relationship. The therapeutically facilitated experience of gardening provides the traumatized child with many opportunities for physical and cognitive mastery of the environment and affirms the child’s sense of being in control. The themes and metaphors of the garden are matched to therapeutic objectives in each of the activities described in the How does Your Garden Grow? treatment manual which is being developed to accompany the model. Together, the garden and the therapeutic activities associated with the garden, comprise the treatment model.

Assumptions and Limitations

The proposed model is based on the assumption that Perry’s research findings on the neurodevelopmental correlates of child trauma are sufficient foundation for the development of a therapeutic treatment model. Although the implications of these findings for clinical work are untested, there is substantial research to support treatments which target the symptoms of anxiety and arousal in child trauma survivors (Briere, 1996, Berliner & Saunders, 1996, and Deblinger, et. al., 1997). It is further assumed that the garden setting will decrease physiological symptoms of stress in sensitized children and that the garden environment will provide an ongoing, interactive opportunity for learning and healing.
The theoretical limitations of the study are inherent in the effort to develop clinical treatment applications from biosocial theory. Practical experience and clinical intuition are the creative forces which drive new applications. The utility and effectiveness of the specific applications contained in the model are largely a matter of subjective assessment until outcome research can be conducted. The flexible and multi-modal approach to treatment which is inherent in the design of the model poses a number of difficulties for outcome research. The greatest practical limitation of the model concerns the time, space, material resources and intensive collaboration needed to create a garden project such as the one described in the model. The exigencies of managed care may also limit the implementation of a model which is based, in part, on multi-modal, experiential treatments which are timed according to the child’s ability and desire to participate.
CHAPTER 4

PRESENTATION AND ANALYSIS OF THE DATA

Location

In August of 1996, the physical site for The Family Habitat Garden Project was established at the Children’s Advocacy Center in Phoenix, Arizona. Participants in the project were clients at The Children’s Advocacy Center (CAC) which provides forensic interviewing and treatment for children who have been abused, or who have witnessed a violent crime. The project was open to child victims and non-offending family members on a voluntary basis. The only requirement was that the families were clients at the CAC.

Participants

The project served approximately forty at-risk families (86 children) over the first 10 months. Participation was limited by many factors, including problems with transportation, inadequate staffing and termination of therapy. Twelve families participated regularly for at least six months. Of those, four families (11 children) have participated in all components of the project (individual and group therapy, as well as Earthsaver’s Club) regularly for the full ten months.

The participants came from middle and low-income, urban families in the greater Phoenix area. The children ranged in age from two to seventeen years, but most were under ten years old. Many of the children were diagnosed with learning disabilities or developmental delay, in addition to clinical diagnoses of PTSD, depression, anxiety or
attachment disorder. All of the children who were referred for individual therapy had been neglected, physically, or sexually abused, or had witnessed family violence. Siblings and other family members who participated in garden activities were not necessarily seen individually as clients at the CAC, but became involved in the family support component of Family Habitat Garden Project. Approximately half of the families who participated were ethnic minorities, including Native American, Black, Hispanic and Asian. Over half of the families were single-parent, blended or foster families. All of the families were considered at-risk because they had experienced ongoing environmental or social stressors including involvement with the legal system (domestic relations, juvenile and criminal court proceedings), loss of contact with spouse, child or other family, attempted suicide or death of a family member, unemployment, poverty, homelessness, substance abuse, domestic violence, chronic physical or mental illness and lack of social support systems.

**Project Components and Staffing**

The project was comprised of: 1) A formal clinical component which included individual and group therapy conducted by a therapist using garden activities and metaphors, and 2) The EarthSaver’s Club, facilitated by adult volunteers and open to all children who have been treated at the CAC and their extended family members. (The EarthSaver’s Club is a nationwide ecology club for children co-sponsored by Target Stores and the National Wildlife Federation. Each club determines it’s own membership, organization and mission statement based on the interests of its members, and the needs
of the community.) Staff for the project was limited to one full-time therapist and one (volunteer) part-time outdoor education consultant. Additional facilitation was provided by an adult client, “K”, who acted as the president of the EarthSaver’s Club and garden supervisor. “K” is a survivor of severe childhood trauma and her participation in the project was defined as part of her treatment goals (to reduce isolation, improve social skills and self-esteem, reduce dissociative episodes, gain independence, and prepare to return to college as a botany major).

Findings

The Family Habitat Garden Project was originally developed with the idea that trauma, and recovery from trauma, are the result of complex interactions among person, event, and environment. The ecological model of trauma recovery highlights the inter-relationship among individuals, families and the communities as the source of experiences which ultimately foster or impede healing. The Family Habitat model was founded on the belief that effective treatment for traumatized children must simultaneously reduce risk factors in the environment and engage protective factors both in the environment and in the child. The components of the project, the Family Habitat Garden and the Earthsaver’s Club, were created to join children, families and community in the healing process and to strengthen those relationships.

Community Collaboration: The garden area was prepared with help from a high school biology teacher and at-risk -teens from Buckeye Union High School, and Target Stores volunteers. The teens later commented that it was the first work project they had
been involved in that was “really worthwhile” and that it made them feel important to be able to help others in the community. This early experience underscored the importance of empowering at-risk youth to become healers and helpers in their own community.

From the outset of the project area businesses, schools and agencies were contacted seeking a collaboration to establish the garden site. The project easily gained partnerships because most of the people who were contacted for support recognized the value of gardening and natural habitat restoration, especially in the inner-city urban environment where the project was located. Supporters felt that creating a natural habitat would help to heal the community environment, while providing a positive focus for at-risk children and families. In contacting potential donors we never used the words “need”, “problems” or “donations”. Instead, the caller offered a vision and invited them to take part in making it happen. Calls were always followed by a letter of confirmation and thanks. To date, the project has established a continuing collaboration with the following community members:

- The Family School
- ASU Disability Resources
- Southwest Center for Education on Nature and the Environment (SCENE).
- Buckeye Union High School JTPA
- The National Wildlife Federation
- Maricopa County Cooperative Extension Master Gardener’s
- Native Seed Search
- Desert Botanical Gardens
- Target Stores
- Home Depot
- Home Base
- Harper’s Nursery
- Peak Restoration
- Kerr Dairy Farms
- Duncan Sunfresh Farms
Community collaboration provided not only materials and expertise in gardening, but positive role models for children and social support for families. Continuing collaboration was hampered by lack of an organized volunteer program which would have permitted us to follow-up and maintain contacts.

**The Therapeutic Garden:** The promise of the envisioned garden, was for traumatized children to create a child’s landscape, a place where they could begin to conquer fear and sow the seeds of trust and hope. In the presence of a caring adult -- at first the therapist, but later a parent, grandparent or volunteer -- the child could become the seed, the gardener and the dream. The goals of the program were to help traumatized children develop resiliency, adaptive coping responses and social competency through direct hands-on learning in an outdoor setting. With the assistance of trained staff, family members and peers, the children planted the first seeds, tended and studied a small garden habitat. Over the course of ten months the garden became a child’s landscape and the children refer to it today as “their garden”.

The researcher found that gardening activities, based on the principles of outdoor education, could be sequenced to meet the child’s stage in therapy. The primary goal of all therapy which took place in and around the garden was for the child to reestablish a sense of personal safety and equilibrium. The child’s introduction to the garden was viewed as an extension of the therapeutic relationship. “Getting to know the garden” presented an opportunity for the children to reclaim control over themselves and claim the garden (and the therapeutic relationship) as their safe place. When the children were ready for the next stage of therapy, the activities of observing and studying the garden
helped them develop sensory awareness, communication and problem-solving skills which became the foundation for cognitive-behavioral interventions. For example, one child who was paralyzed with anxiety when asked to create a fear scale related to her specific fears about the abuse, was willing to create a scale of the initial fears she felt related to things in the garden. As we re-created the experiences which had helped her master those fears, the child was engaged in a pro-active approach to anxiety which had already been integrated through sensory experiences in the garden. Near the end of the session, the child noted that her heart was no longer pounding and she did not feel scared anymore. The child was then able to return to the original task, empowered by the positive experience of mastering her fears about the garden and reducing the physical symptoms of anxiety she had felt at the beginning of the session. The metaphors of the garden, which are already present in the sensory experiences of the child, are available to be used in a variety of verbal and nonverbal interventions. At times, when abuse-focused therapy arouses extreme anxiety, the child can return to non-verbal, sensory integrative activities, which help them to discharge stress, regulate their emotions and regain control.

Academic problems were a significant source of low self-esteem and acting-out behaviors for many of the children who participated in the study. Traumatized children who have problems with attention and memory are frequently diagnosed with attention deficit disorder and learning disabilities. The hands-on, integrated learning offered by the garden activities provided an opportunity for the therapist to work with the child’s school to improve school performance. Although some children were not stable enough
emotionally to focus on school issues, those who were stable showed improvement in their academic skills with planned intervention.

An additional advantage to the garden setting was that family members, who were not initially supportive of therapy (particularly fathers, teen-age siblings and sometimes grandparents), were eager to participate in garden activities. The garden seemed to provide a neutral ground, where the therapist was not viewed as the “expert”. Those who joined us in the garden seemed to feel that they had an “equal opportunity” to lead or to follow, to learn and to teach, and most of all to share something of value for everyone. Children whose family members were unable or unwilling to join them in garden activities, nevertheless found many safe and caring adults (and peers) to act as mentors and guides in the garden.

The children, who were already familiar with the garden, were delighted to be in charge of introducing others to the garden. One particular child, who was painfully shy and socially isolated by her fearful, over-protective mother, blossomed as our unofficial “garden guide”. After several months in the program, she took it upon herself to introduce all new members of the EarthSaver’s club to the garden. Her mother, observing the change in her child, became less protective and began to involve the family in social activities once again. At the beginning of the new school year, the child’s teachers reported that she was a “different child”, outgoing, self-assured and eager to participate. We found that peer facilitation was one of the most powerful ways for children to gain self-confidence and social skills.
The children were both exuberant and respectful as they ran through the garden or explored its “wild” places. They guided parents and others to step carefully, to discover and care for plants and flowers, and to appreciate the birds, butterflies, insects, worms and lizards who shared the Family Habitat. For some families, planting their own garden at home marked a return to normal. For others, the garden sowed seeds of their very first effort to share “quality time” together since the disclosure of the abuse.

**The EarthSaver’s Club:** The Earthsaver’s Club is an informal extension of the Family Habitat Garden Project. The EarthSaver’s Club met every other Saturday for 3 hours and was open to children, extended family members of all ages and friends who wish to give back to the community through activities which help the environment. Club activities included informal science education activities related to the garden, weather and the natural ecosystems of the desert. They participated in group story-telling, crafts, potluck picnics and field trips. The club celebrated birthdays and created a spiritual focus for the group through ceremonies of healing, respect and thanks which arose spontaneously while planting a tree or harvesting carrots. The club created a backyard habitat for birds, butterflies and small animals in the yard behind the Children’s Advocacy Center (for which they won a habitat restoration award from the National Wildlife Federation) and planted Native heirloom seeds and tree species.

Through the activities of the EarthSaver’s club, healing became a community activity. The club helped to reduce the isolation and stigma of abuse for families, and brought families and community together in a common purpose: respect for all life.
Although non-violence education was not an explicit component of the club, children and families experienced and modeled safety and respect for all living things. Parents learned new, positive ways to interact with and talk to their children by watching other parents, therapists and volunteers. Substitute parents were on hand for children whose own parents were unavailable. Parents also supported and encouraged one another. Several families of those children who had been abused by a babysitter or friend, had not allowed themselves or their children to participate in any social activity since the disclosure of abuse. These families began to learn to trust again. Many parents commented that the club helped to restore fun and relaxation to their lives. One mother, who was frequently critical and impatient with her children, commented that she always felt like a different person after EarthSaver’s Club. She noted that she felt calmer and enjoyed the time spent with her children. Her children, who had been withdrawn and whining during the first club meetings they attended, became more outgoing and self-confident after several weeks.

For children and families whose lives have been shattered by abuse, relief from stress, a safe, peaceful environment, positive role models and a sense of belonging help to build competence and self-confidence. Social competency and empowerment were nurtured by the cooperative, informal learning activities that took place at the EarthSaver’s Club meetings. Children were empowered to explore, ask questions and solve problems with the help of peers and adults. The children improved their communication skills and their knowledge of themselves and their world. The children developed empathy for others, and for all living things through their cooperative
observations and exploration of nature. Peer-facilitation provided the children with many opportunities to contribute to the group, and the group as a whole contributed to the community. In this way, the children (and families) moved from viewing themselves as helpless victims, to experiencing themselves as healers of the earth and helpers in the community.

The volunteers who facilitated the club were trained to recognize the special needs of traumatized children and maintained a safe and predictable environment. They used safety language, modeled good boundaries and expressed positive expectations and encouragement for all children. Individual attention was always available to children who needed extra help, and parents received guidance and support for positive parenting. Therapeutic issues that came up during meetings were communicated to the therapist to be addressed in therapy or with the parents. The club was conducted as an extension of the therapeutic environment, and although the activities were always fun and informal, the approach was therapeutically structured.

**Case Study:** Perhaps the most fitting summary for these findings on the Family Habitat Garden Project was written by a six year-old participant named Angel. When Angel entered the project she was a withdrawn and terrified 1½ year-old who had uncontrollable tantrums, refused to talk and dissociated so severely that she sometimes appeared psychotic. Angel had been sexually abused by three adults in her family over the course of at least one year. She had been retraumatized by the investigation process, and removed from her mother’s care because it was impossible to determine the source of the allegations of abuse. It was discovered in the course of therapy that Angel had been
told by her abusers to say that it was her mother who molested her, or she would never see her mother again. Confused, Angel had done what she was told, and was taken from her mother for her own protection. The greater part of Angel’s therapy took place in and around the garden. Angel attended weekly therapy sessions and group therapy every other week. Angel, attended EarthSaver’s club with her grandmother, and eventually when she returned to her mother’s care, attended EarthSaver’s club with her mother and brother.

Today Angel is an outgoing, confident and expressive child who is aware of her special needs for safety and who understands how to calm herself, and ask for help when she feels frightened or out of control. For the most part, Angel appears to be just like other children. She also has a special love for nature, and a special connection with other children who come to the garden to heal. Angel refers to the garden as “my safe place”, and this is what she wrote:

**The People and the Garden**

People help gardens, and gardens will help people if they take care. Gardens are important for growing food. You don’t even have to leave your home to do the job of getting food if you have a garden. You don’t need a boss. In a garden you and the weather are the boss.

If you need help, you have lots of helpers who don’t need to be told to help. Not only worms help gardens, bugs help them too. The earthworm makes castings to help the dirt stay alive. Microbes and bacteria and earthworms help the earth which grows the plants. Flies, butterflies and bees pollinate plants. If there are bad bugs that hurt plants, ladybugs eat them. So do praying mantises.
Spiders might catch bugs in their webs. A caterpillar helps by eating aphids and becoming a grown-up.

Gardens have plenty of fruits and vegetables to help kids grow. Smells help people too. Smelling a flower in your garden makes you feel good inside. Manure stinks, but the plants like it. Sunflowers are yellow, they guard the other flowers. Poppies are all different colors. The colors make you feel very happy. Wildflowers are special and need special care because they grow only in the spring. Sun helps the plants make food for themselves and helps the garden grow. So does water.

I think we do the most to help the garden. A garden starts from just dirt, then seeds, sun, water, earthworms, bacteria, microbes and bugs. People dig and pull weeds. That makes the garden feel good. It makes me feel good too. I know a lot about growing and working in the garden.

You make a garden grow carefully and plant it just right. The garden cannot take care of you, if you don’t take care of it. Like the Three Sisters, corn squash and beans - they help each other grow. I needed special help when I came to the garden. I was scared all the time. It made me feel good inside. The garden is a safe place. It even protects us from pollution. It gives back all the love that you put into it. That is the best part!! How does your garden grow?

Angel
Summary

Children who participated in the Family Habitat Garden Project had access to a variety of reparative experiences which were adapted by the therapist to reflect the current needs of the child. Children who had been unresponsive to traditional therapy (especially those with limited verbal abilities and attention problems) became engaged in the therapeutic garden activities and were able to successfully transition from the garden back to the traditional office setting as needed after a few garden sessions. The cooperative activity of gardening consistently provided the children with positive role models and an opportunity to see themselves not as victims, but as explorers, helpers and nurturers. The garden became a safe place where children regained control of themselves and their surroundings. The experience of community, sharing and relationship proved to be a powerful antidote for children and families who had experienced the world as a terrifying and unpredictable place. The therapeutically facilitated activities of tending and studying the garden provided the children with many opportunities for physical, emotional and cognitive mastery over their own traumatic expectations. The sensory, hands-on "learning" which took place in the garden helped hyper-reactive children to "calm down" and encouraged dissociative children to "stay present". The researcher found that the "informal" experiences offered by The Family Habitat Garden Project and the Earthsaver's Club (which focused on the values of community, relationship and belonging) were powerful resources for healing traumatized children and their families.
Summary

The purpose of the study was to describe the development and implementation of an ecological treatment model which uses a garden setting and related therapeutic activities to promote adaptive coping in traumatized children. The treatment model, referred to as the Family Habitat Garden Project, was implemented with traumatized children and their families at the Children’s Advocacy Center in Phoenix, Arizona.

The Family Habitat Garden Project was founded on the ecological premise that the interrelationship among individuals, families and communities is the source of experiences which ultimately foster or impede healing. The components of the treatment model, The Family Habitat Garden and the EarthSaver’s club, were created to join children, families and community in the healing process, and to strengthen those relationships. Although it is impossible to obtain reliable results without carefully constructed outcome research, the findings of the study suggest that the garden setting, social interactions and therapeutic activities which comprise the model were a source of reparative experiences for the children and families who participated in Family Habitat Garden Project.

The methodology used in the study was primarily descriptive and included two sources of descriptive data. The first source of data was the literature review which provided a theoretical framework and scientific support for the design of the model. The
second source of data was gathered during the implementation phase of the project. During this phase the garden site was established, the clinical component of the model was implemented, and the family support component (the EarthSaver’s Club) was initiated. The implementation phase provided immediate feedback which assisted the researcher in adapting the model to the needs of the population served.

The conceptual foundation for the study was drawn from neurodevelopmental research conducted by Bruce Perry, M.D. which indicates that exposure to violence and neglect alters brain development in young children. Perry’s trauma model suggests that traumatized children are permanently sensitized to stress, and that effective treatment for these children must:

1) Restore safety and predictability;

2) Offer consistent nurturing and positive relationships

3) Provide experiences which reduce arousal and foster self-mastery

4) Repeat these experiences in a variety of settings, with a variety of positive role models.

Perry’s theory and recommendations were examined in the context of the literature review which focused on research concerning the etiology, treatment and prevention of traumatic stress in children.

The literature review provided a rationale for the design of the model. Outcome research on effective treatments for traumatized children was reviewed for data on the strengths and weaknesses of current models. The clinical component of the treatment model was developed from the researcher’s own clinical experience and the findings of
the literature review. It was found that effective treatment models provide multidimensional treatment which includes: 1) trauma-focused therapy; 2) cognitive/behavioral interventions to reduce the symptoms of traumatic stress; 3) individual or group sessions to develop healthy coping skills and social competency; and, 4) family support. No preferred treatment modality was identified. Multidimensional approaches offered a combination of individual, group and family therapy. The research literature provided substantial support for the multidimensional design of the model and corroborated Perry’s recommendations for treatment. The sequence, timing and ecological fit of interventions were also cited as important variables in designing effective treatment for traumatized children. The age of the child, phase in therapy, physiological status, cognitive status, degree of family support, cultural background and natural preferences were considered in developing therapeutic garden activities which were flexible and easily adapted to the child’s needs.

The treatment setting and the components of the model were important considerations in designing an ecological treatment model. The model was designed not only to provide clinical intervention, but also to offer a community-based habitat for healing beyond the direct focus of therapy. The clinical and family support components of the model share the premise that environmental experiences which support the child’s strengths and buffer the impact of trauma can powerfully influence the child’s prospects for recovery. Prevention research on the vulnerability and resilience of at-risk children was reviewed to determine which factors have been consistently associated with resilience in children and with long-term recovery from trauma. Characteristics of the
child, family and community which have been demonstrated to promote healthy coping and bolster children against the negative impact of trauma were incorporated into treatment model at every level. The garden setting, therapeutic activities and Earthsaver’s Club reflect the nurturing and protective factors which contribute to positive outcomes for children. Together, the components of the program were designed to provide safety, predictability and positive role models, and to develop social competency, self-efficacy and adaptive coping skills in traumatized children. Information on stress and health, outdoor education, horticultural and wilderness therapy was also examined for additional guidance in establishing the garden, and developing materials and activities for therapeutic use.

The preliminary findings of the study were informal and based on case examples. The project served approximately forty at-risk families (86 children) over a ten month period. All of the children who participated had been neglected, physically or sexually abused, or had witnessed family violence. The children in the study had documented clinical diagnoses of PTSD, depression, anxiety and attachment disorder; approximately 25% of the children carried additional diagnoses of ADHD or developmental delay. The social histories of participating families reflected the range of complex individual, family and community factors which impact the healing process in traumatized children. All of the families who participated in the project were considered at-risk because they had experienced one or more additional ongoing social or environmental stressors.

Participation in the project was limited by many factors, including problems with transportation, inadequate staffing and termination of therapy. Participation in family
support component (the EarthSaver’s Club) and individual therapeutic garden activities was not mandatory and it was expected that many children who started in the project would lose interest in gardening. The study found that children and families who participated consistently, were self-selected. According to the self-report families of participating families, they chose to participate in all components of the project because: 1) it represented an opportunity for extended family members to enjoy quality time in a safe and supportive environment, or 2) the enthusiasm, cooperative spirit and love of nature expressed by individual children helped to draw others to the garden and sustain their participation.

The flexibility of the model permitted the therapist to adapt therapeutic garden activities needs of the individual child, and to sequence interventions to reflect the child’s stage in therapy. Although individual children received different levels and combinations of treatment, the principles of treatment remained constant. Individual therapy and small group therapy included a combination of traditional and garden-based therapeutic activities. A consistent approach was used to introduce children to the garden which was viewed as an extension of the therapeutic relationship. All therapeutic garden activities emphasized safety, predictability, self-mastery, relationship and cooperation.

Some of the children in the study sought out the garden as a private refuge and a safe place during times of stress. With regard to the goal of reducing hyperarousal and restoring self-regulation, it was found that five children who participated consistently in all components of the project, including group, evidenced fewer anxiety based symptoms, tantrums and episodes of dissociation as reported by parents and therapists. The children
themselves learned to recognize and intervene on their own stress response in the controlled setting of the garden, and two children reported that they had used these skills at school when they were feeling upset or scared.

The children who were selected to participate in group therapy evidenced poor social adjustment at home and at school, despite ongoing individual treatment for abuse issues. Group sessions focused on developing empathy, communication and social competency. The group activities were structured around cooperative skill-based learning activities in the garden, story-telling based on themes in the natural world and a talking circle. Parents, teachers and therapists consistently reported a reduction in behaviors characterized by social conflict or withdrawal, and an improvement in communication, cooperation and self-esteem in children who participated in the six-week group. Parents requested that the group be continued.

Anecdotal and case study reports indicate that the therapeutic goals of the project were met for individual children and families to varying degrees. It was noted that the children consistently referred to the garden as their own, and appeared to regard their membership in the natural community of the garden habitat as a positive and rewarding experience which they enjoyed sharing with peers, adult volunteers and family members. Children who evidenced poor impulse control and attention problems became actively involved hands-on activities that engaged their senses and helped them to focus attention on observing, exploring and problem-solving in the garden. Volunteers, who knew nothing of the children's individual histories, reported that many of the participants appeared more outgoing, cooperative and self-confident after participating in the project
for several months. Parents and teachers informally reported that children were less aggressive or withdrawn, and had begun to verbalize their feelings more frequently instead of acting-out. An additional outcome, reported by parents, was increased parental involvement at the children’s schools. Some parents reported advocating for their children’s special needs or problem-solving with teachers to help make their children more successful in school. This may have been an indirect outcome of the parent support component of the project, in which parents were encouraged to become resources for their children and other parents. It may also have been an indirect result of the parents’ proactive involvement in their children’s therapy through participation in the garden project. A third possibility is that the therapist adapted garden activities to help remediate school skills for at-risk children; this additional support may have encouraged parents to become more involved in their children’s education.

The most striking finding of the study was that the informal, community-based garden activities which were part of the family support component of the project (the EarthSaver’s Club) seemed to support recovery in ways which individual and family therapy had not. The goals of the family support component were to provide positive role models and mentors for parents and children, develop healthy relationships and encourage community support. It was found that family members who had been opposed to participating in therapy for personal or cultural reasons were eager to participate in the EarthSaver’s Club. Parents reported that the EarthSaver’s club restored fun and relaxation to their lives and provided an opportunity for quality time with their children. The personal social and financial repercussions of abuse frequently isolate families from
sources of community support. Several parents who reported that they had withdrawn themselves and their families from social activities following the disclosure of abuse were moved to say that it was through the EarthSaver’s club that they had begun to trust again. Others noted that the club provided a feeling of security because they knew it would continue, even when they were unable to attend. Seven of the participating families initiated family gardening projects at home and continued the activities begun at the Family Habitat on their own.

The advantages of the project were the over-all flexibility and ecological design, which promoted formal and informal participation in the goals of therapy. The family support component, which provided a nurturing environment for children and families, was perceived to be positive and rewarding. The therapeutic garden activities were readily adapted to the needs of the individual child by an experienced therapist (but also required a high degree of flexibility and creative endeavor on the part of the therapist). The garden setting was a peaceful and accessible environment which was a rich source of therapeutic metaphors and activities. The hands-on, sensory experiences in the garden provided alternatives to traditional therapy for children who require a range of non-verbal interventions (including very young children, children with ADHD, highly disorganized, aggressive children and children who dissociate). In addition to the planned activities which were part of the treatment model, the garden was used by families and children individually, to suit their own needs and interests. In keeping with the ecological design of the model, families who sought out the garden on their own expressed a personal connection with the earth, nurtured themselves through their appreciation for nature and
visited a place of strength and healing which reflected resources within the family and the community.

There were practical draw-backs to the outdoor setting in the desert climate. Some children experienced allergies or sensitivity to the sun. The scope of the project exceeded the available resources in several areas. The physical size of the garden and variety of plants required a drip or irrigation system to maintain the garden through the dry season without wasting water. A more efficient approach would have been to restrict the garden area and limit the variety of non-desert plant species, or to install an irrigation system at the outset. Also, the garden required more care than could be provided by the project participants and occasional volunteers. The initial plan for the garden included a corps of trained volunteer docents to help maintain the garden habitat, to provide positive role models and act as mentors for the children. The docent program was not developed because of the lack of a volunteer coordinator, and the shortage of trained staff to oversee this area of the project. The docent program will be a priority for the future development of the Family Habitat. These were minor problems, but point to the need for careful planning and design of the physical setting in order to support and not overwhelm the therapeutic component of the garden.

Although it is impossible to quantify the descriptive findings of the study without outcome research, it is the opinion of the researcher that good therapy for traumatized children is grounded in theory, but flexible in approach. The implementation phase of the project demonstrated it’s flexibility and yielded observations which although informal,
were compelling enough to encourage the writing of a treatment manual which will be used as the basis for conducting future outcome research.

**Recommendations**

Future priorities for the project include designing outcome research to assess the effectiveness of the treatment model. General methodological considerations include the need to identify reliable, valid measures which are relevant to the goals of treatment, to assure random assignment of participants to treatment and control groups, and to obtain data which can be generalized to the real world of clinical practice. The wide range of childhood adaptations to abuse, including the factors which contribute to resilience, call for research methods which measure multiple dimensions of recovery. Specifically, the ecological design of the Family Habitat treatment model calls for multiple measures of distress, adaptation and recovery. Outcome research for the project should include measures of biologically-based reactions (traumatic stress, stress-susceptibility and physiological arousal) as well as measures of psychological and affective responses to traumatic events. Additional variables which should be considered include individual vulnerabilities and strengths which have been shown to impact the recovery process such as the child’s temperament, developmental level at the time of the abuse, relationship to the victim and/or perpetrator, type of trauma and duration of exposure, previous traumatic experiences, the availability of supportive caregivers for the child, and the family, social and cultural context in which the events occurred.
The multidimensional design of the garden project lends itself to many possible applications, including use with a wide range of at-risk populations such as, residential treatment facilities, group homes, domestic violence shelters, juvenile detention centers, programs for emotionally handicapped children, community prevention programs for at-risk children, early-intervention and parent-support programs.

The challenges posed by the design of the model are inherent in the effort to develop clinical applications from biosocial theory. Further research is needed to examine how trauma alters brain development, and to define the relationship between these biological changes and post-traumatic adaptation and recovery in children. Perry’s trauma model, which provided the conceptual foundation for this project, suggests an expanded framework for treating child trauma: Outcome research to determine the utility of Perry’s recommendations for this and other treatment models must be conducted. Equally important, is the need for further research in the area of childhood resilience and the role family, community and culture in protecting children from the negative effects of violence. The researcher believes that it is important to have a sound theoretical basis for treating traumatized children. The Family Habitat Garden Project represents a preliminary effort to integrate the neurodevelopmental conceptualization of trauma with a practical and theoretically sound approach to treatment.
REFERENCES


Perry, B.D. (1995a). Childhood trauma, the neurobiology of adaptation, and “use-dependent” development of the brain: How “states” become “traits”. Infant Mental Health Journal, 16 (4) (pp. 271-286).


