

# The Impact of Trauma on Child Development

BY FRANK W. PUTNAM

## ABSTRACT

### The Scope, Costs, and Consequences of Child Abuse and Neglect

Every year approximately 1 million infants, children, and adolescents are officially substantiated as victims of child abuse and neglect in the United States (U.S. Department of Health and Human Services Administration on Children, Youth and Families, 2005). Scientific surveys of the general population indicate, however, that the actual rate of child abuse and neglect is much higher than is reflected in official reports. Indeed, one recent study found that mother-reported cases meeting North Carolina state statute definitions of physical abuse were 40 times higher than official cases for the same period, and sexual abuse cases were 15 times higher (Theodore et al., 2005). Research indicates that many, perhaps most, maltreated children will have substantial problems that will affect their social, emotional, and physical development (Putnam, 2003). As adults, they will experience far greater problems with mental illness, substance abuse, and poor physical health than their non-abused peers. In addition, they will be considerably less likely to complete their education or to be gainfully employed and far more likely to have serious legal problems.

Depression, which is rapidly becoming the second most costly illness in the world (The World Health Report,

A growing body of research links childhood experiences of abuse and neglect with serious life-long problems including depression, suicide, alcoholism and drug abuse, and major medical problems such as heart disease, cancer, and diabetes. Two basic processes, neurodevelopment and psychosocial development, are affected by early abuse and neglect. Scientists have begun to understand the mechanisms through which these adverse experiences alter child development and produce pernicious mental, medical, and social outcomes. These insights have opened opportunities to intervene to prevent maltreatment and to mitigate its effects. Future success depends on the greater dissemination and refinement of these interventions.

2001), is at least 3 to 5 times more common in individuals with histories of child maltreatment (Edwards, Holden, Felitti, & Anda, 2003). Indeed, victims of child abuse are about 12 times more likely to attempt suicide than non-abused individuals (Dube et al., 2001). Physically abused adolescents are 6 to 12 times more likely to have alcohol and drug problems, and sexually abused adolescents are 18 to 21 times more likely to become substance abusers (Dube et al., 2005). According to the National Institute on Drug Abuse, as many as two-thirds of people in drug treatment programs report being abused as children (Engels, Moisan, & Harris, 1994). In an important series of studies conducted by the Centers for Disease Control and Kaiser Permanente in San Diego, histories of adverse childhood experiences, known as ACEs, were strongly associated with the leading causes of death including heart disease, cancer, diabetes, liver disease, and emphysema (Felitti et al., 1998). The more ACEs an individual experienced (e.g., physical abuse, sexual abuse, exposure to domestic violence, and a substance-abusing parent), the greater the individual's risk of having one or more of these medical conditions and the more likely that individual will die at a younger age than someone without these adverse experiences. The medical conditions are not a

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direct result of the abuse but are rather a result of the dysfunctional and addictive behaviors in which many child abuse survivors engage.

The social and educational consequences of maltreatment start early in childhood and often continue for the rest of a person's life. At least half of all child maltreatment victims will experience serious school problems, especially conduct issues. There is increasing evidence that maltreatment and exposure to domestic violence actually lower children's IQs. In one study, IQs decreased approximately 8 points, which is about twice the effect measured for significant exposure to environmental lead (Koenen, Moffitt, Caspi, Taylor, & Purcell, 2003). Aggression, increased sexualization, and other deviant social behaviors commonly seen in maltreatment victims, coupled with traumatic effects on intelligence, attention, and learning, lead to increased school dropout and expulsion rates for maltreated children compared to non-abused children. As adults, they are twice as likely to be unemployed. In addition, they are significantly more likely to be arrested for serious crimes as juveniles and as adults (Holowka, King, Saheb, Pukall, & Brunet, 2003). A history of childhood sexual abuse is highly correlated with an increased number of sexual partners and consequently much higher rates of sexually transmitted diseases, including HIV, and unintended pregnancy. The rate of teen pregnancy among sexually abused girls is approximately 4 times higher than non-abused girls (Kellogg, Hoffman, & Taylor, 1999; Lee & Goerge, 1999; Thornberry, Ireland, & Smith, 2001; Walker, 1999; Weinman, Smith, Geva, & Buzi, 1998). In addition, sexually abused girls are significantly more likely to have another ("rapid-repeat") pregnancy than non-abused girls, which interferes with their ability to parent their children (Flitter, Elhai, & Gold, 2003). When considered in aggregate, the societal costs of child abuse and neglect are staggering.

A study by the National Institute of Justice estimated that sexual abuse cost \$125,000 per victim in 1993 dollars. Physical abuse was estimated to cost \$77,000 per victim (Miller, Cohen, & Wiersema, 1996). The average cost across all forms of child abuse was estimated at \$70,000 per victim for an average annual cost of approximately \$70 billion per year in 1993 dollars. Another study by the Edna McConnell Clark Foundation

for Prevent Child Abuse America estimated the annual cost of child abuse and neglect to be approximately \$94 billion per year or \$258 million per day in 2001 dollars (Fromm, 2001). Neither of these studies fully included indirect medical costs, now known to be extremely high for victims of child maltreatment. Indeed, if all of the direct and indirect costs could be determined, it is likely that child maltreatment would become the single most costly public health problem in the United States.

### Why and How does Child Maltreatment Cause these Effects?

Our growing awareness of the pernicious effects of child abuse and neglect across a person's lifespan has led scientists to ask why and how these early experiences produce such extraordinary negative impacts. Understanding the mechanisms through which child maltreatment acts on the growing child can help us develop better treatments for victims and better prevention programs to protect children from these experiences. Researchers have approached these questions from a variety of perspectives, examining psychological, social, and biological factors in adults who were victims in childhood and similarly in children and adolescents who were more recent victims. Some studies have followed abused and non-abused children into adulthood and evaluated their children. As a result of these studies, answers are beginning to emerge that will help us reduce the incidence of child maltreatment and provide services to identified victims that should substantially improve their chances to become healthy and productive citizens.

First, it is important to understand that most definitions of child abuse and neglect encompass an enormous variety of experiences and range from single, limited incidents to prolonged experiences with multiple types of injurious, painful, degrading, and exploitative acts. For example, definitions of sexual abuse include intercourse, attempted intercourse, oral-genital contact, fondling of genitals directly or through clothing, exhibitionism or exposing children to adult sexual activity or pornography, and the use of the child for prostitution or pornography. In addition, research indicates that what is nominally the same maltreatment experience may have different effects depending upon the child's age and gender, and the duration of the experience (Putnam,

2003). Individual differences in temperament and intelligence, coupled with the presence or absence of supportive adults or institutions, also contribute to the final outcome. Some children will recover from abusive experiences and have no lasting impairment. However, the generalization can be made that many individuals who were abused and neglected as children will experience serious and lasting consequences that will shape their lives and likely affect the lives of their offspring.

Two fundamental developmental processes appear to be negatively affected by child abuse and neglect: neurodevelopment (the physical and biological growth of the brain, nervous, and endocrine systems) and psychosocial development (personality formation including morals, values, social conduct, capacity for relationships with other individuals, and respect for social institutions and mores). At some level, neurodevelopment and psychosocial development are inextricably linked in that the brain is the source of an individual's psychological and social behavior. But the effects of maltreatment are most easily understood if these two processes are first considered separately.

### **Neurodevelopment**

The brain, like the body, is continuously changing in response to time and experience. We are born with over 100 billion neurons, more than we will ever have again. Although a few parts of the brain are capable of making new neurons, in most brain regions growth and development occur through the selective loss or "pruning" of neurons based on their amount of use. Neurons that play important roles and are frequently activated are preserved, while those that are not used or are duplicative of other neurons tend to die. This natural process, known as apoptosis, allows the developing brain many potential developmental pathways which become increasingly determined by life experience. The dramatic growth in the brain's size is instead a result of the formation of connections between neurons and the maturation of those neurons with the growth of axons, dendrites, and the myelination (or insulation) of the axons. By age 3, a child's brain has grown to 90% of its adult size, although the child's body is less than 20% of its adult stature (Shore, 1997).

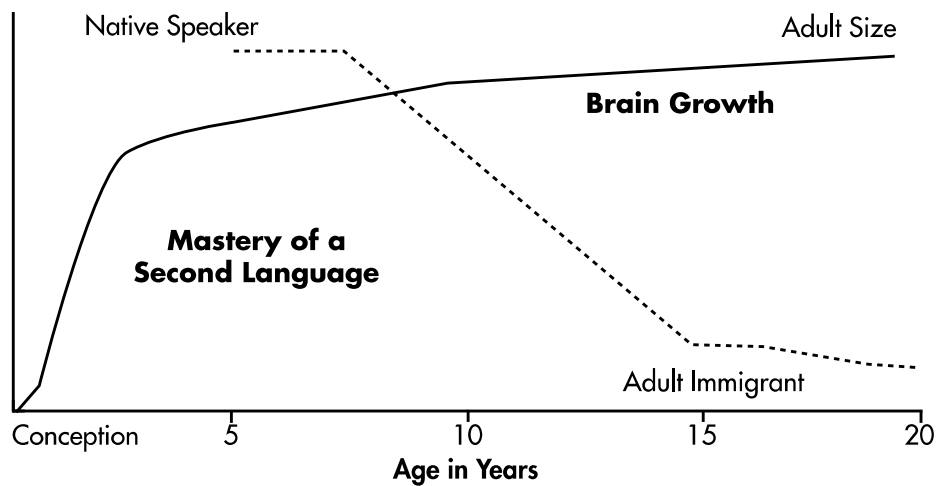
This "use it or lose it" shaping process gives rise to what scientists refer to as "sensitive" or "critical" peri-

ods. A sensitive period is a span of time during brain development when a function or capacity is most easily acquired and after which it is difficult or impossible to achieve normal functioning of that capacity if it has not already occurred. The classic example is the experiment done by Hubel and Wiesel for which they received the Nobel Prize (Hubel & Wiesel, 1970). They sewed the eyes of newborn kittens shut so that they were unable to open their eyes when they normally do (at 5-8 days for short-haired kittens and 10-14 days for long-haired kittens). Long after the kittens would have normally started to see and thus stimulate their developing visual systems, they cut the sutures allowing the kittens to first open their eyes. The kittens were essentially blind as a result of not being able to stimulate their eyes and brain during this sensitive period. The scientists found that it is absolutely critical that kittens' eyes be open and visually stimulated at the usual time if this function of the brain is to develop normally.

We find evidence for sensitive periods for a number of important human capacities. One of the best documented is the relatively short developmental window during which children can learn a second language equally as well as their native language. Figure 1, located on page 4, summarizes these data. The dashed line represents scores on a standardized English test given to immigrants who came to the United States at different ages. At approximately 7 years of age the English proficiency scores begin to fall precipitously leveling out at about age 17 to 20. The solid line represents the brain's size beginning shortly after conception. By about age 7, when the window of opportunity to speak a second language with the same facility as a native-born speaker begins to close, the brain is within 5% to 8% of its final weight. Thus, the developmental window for the ability to speak a second language with the same fluency as one's native language closes at about the time that the brain reaches its adult size. Our brains will continue to make new connections and to modify old ones commensurate with our ability to learn new things, but never again will we have quite the same capacity to fluently acquire a second language.

Research with impoverished preschoolers has shown that early exposure to enriched and stimulating environments results in higher IQ scores (Gottlieb & Blair, 2004). A number of other examples could also

**FIGURE 1**  
Sensitive developmental period for acquiring fluency in a second language compared with the growth of the brain.



be cited, all pointing to the fact that in normal human development there are sensitive periods during which certain experiences are necessary to fully develop an individual's physical, mental, and social capacities. If these experiences do not occur, then the individual loses some of his or her native capacity for this function. Although this does not mean that the individual is totally devoid of that capacity, the individual will perform at a lower level than was potentially possible. In other words, we can all learn to speak Chinese, but as we get older our ability to become fluent will diminish and even diligent study can only partially compensate for this decline.

**Effects of Maltreatment on Neurodevelopment**

Child maltreatment comes in many forms and, as yet, science has only identified a few of the unique effects of different types of childhood trauma. The neurodevelopmental effects of neglect, however, have been recently highlighted as a result of the tragic cases found in Romanian orphanages. Studies of children who were warehoused in large orphanages with only minimal care and social interactions have found that many of these orphans have significantly smaller brains

than normal children of the same age. Not surprisingly, they also have significant developmental delays in language and fine and large motor coordination, high levels of impulsivity, and learning and attention problems (Zeanah & Smyke, 2005).

However, when these children are removed from these neglectful environments and receive healthy stimulation and affection, they generally improve to some degree. The earlier that they are adopted, the greater the expectable improvement, which is also associated with increases in brain size. One study found that unadopted adolescents in institutions at age 16 had a mean IQ of approximately 50, which is classified as moderate to severe mental retardation. Children adopted between ages 2 and 6 had a mean IQ of 80, which is a borderline normal IQ. Children adopted before age 2 had a mean IQ of 100, which is average for the general population (Dennis, 1973). Other studies of adopted orphans and foster children with histories of severe early neglect replicate these findings that the longer the child lives in a neglectful environment, the greater the intellectual and social deficits (Zeanah & Smyke, 2005). The younger the age at which a child is removed from adversity and placed in a nurturing, safe, and stimulating home, the greater the expectable improvement.

Studies of physically and sexually abused children have identified a number of important brain regions that are smaller in size than in age- and gender-matched non-abused children. To date, three studies have found that children with abuse histories have smaller brains than normal children and that these effects are greater in males than in females (De Bellis et al., 1999). These studies also show that the earlier the abuse occurred and the longer the abuse lasted, the greater was the negative effect on brain size (De Bellis & Thomas, 2003). Several specific brain regions appeared to be most affected, including the corpus callosum, a large bundle of nerve fibers that link the left and right hemispheres together. Certain areas of the frontal lobes, which are important in planning and exercising judgment, were also significantly decreased. The decreases in brain size were correlated with increases in post-traumatic and behavioral symptoms. Another important brain region, the anterior cingulate gyrus (which is important in rapid decision making), was found to have lower levels of a particular chemical, N-acetyl-aspartate (NAA), which is associated with neuron health. Thus, the neurons in the anterior cingulate region of some maltreated children resemble those seen in late stage alcoholics and adult PTSD cases.

At present, we cannot scientifically prove that the changes in brain size and function seen in abused and neglected children are the cause of their intellectual, social, and behavioral problems, but most authorities believe they are significantly related. The decrease in brain size is likely the result of the neurons' failure to make an appropriate number of connections. We know from animal studies that the differences in brain size seen between animals raised in impoverished environments and those raised in enriched environments is that the former have significantly fewer connections among their neurons. It is also likely that maltreated children have an increased number of inappropriate or dysfunctional connections between their neurons. For example, when abused children are shown a series of computer-manipulated photographs of facial expressions that range from anger to fear, they continue to report seeing anger long after non-abused children identify fear (Pollak, Cicchetti, Hornung, & Reed, 2000). Thus, as a result of their experiences of abuse and neglect, maltreated children perceive the world differently and

consequently will react differently to situations than their non-abused peers.

### **Psychosocial Development**

Our scientific understanding of the bonding between a parent and child dates back to the seminal observations of John Bowlby over 50 years ago. He postulated that humans, like other species, are predisposed to seek and sustain relationships that satisfy an intrinsic need for security and perform the important biological function of ensuring the child's protection and survival; he labeled this process attachment (Bretherton, 1992). In the last two decades, attachment research has explored the psychosocial and biological dimensions of attachment, and numerous interventions have been designed to enhance attachment when it seemed impaired. Many other psychosocial processes (e.g., emotional regulation, impulse control, the capacity to develop healthy relationships with others, the consolidation of a stable, positive sense of self, and identification with social norms and values) appear to depend on the development of a healthy attachment relationship during the first year of an infant's life. The failure to develop a secure attachment in infancy appears to reverberate throughout an individual's life in the form of difficulties with relationships and regulation of emotions and impulses.

The attachment bond has three key elements: First, it is an enduring emotional relationship with a specific person; second, the presence of that person provides a sense of safety, comfort, and pleasure; and finally, the loss or threat of loss of that person evokes intense distress (Perry, 2002). The quintessential example of attachment is the mother-child relationship, which can be assessed in the clinic or laboratory using standardized mother-child interactions with children and questionnaires with adolescents and adults. The classic assessment paradigm, known as the Strange Situation, classifies the child's response to being reunited with his or her mother after a period of separation during which a stranger (usually a researcher) is present. Scoring systems classify the child's behavior in response to the mother's return according to secure or insecure and organized or disorganized criteria. These categorizations have proven predictive of later problems and psychopathology. Indeed, in infancy and early childhood, attachment is the single

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most important factor that can be measured to predict problems later in life.

### Effects of Maltreatment on Psychosocial Development

Disturbances in attachment have been linked to maltreatment for the past 20 years. One particular type of attachment disturbance, known as type D attachment, is highly associated with histories of maltreatment and severe deprivation. Type D attachment, also called disorganized/disoriented attachment, is associated with very negative behavioral outcomes, especially violence and aggression, in maltreated children (Perry, 2001). In one study, for example, 85% of maltreated preschoolers exhibited type D attachment (Carlson, Cicchetti, Barnett, & Braunwald, 1989). Children reared in minimal care institutions and orphanages also show high levels of type D attachment. In one study, 65% of young children in a Greek orphanage showed disorganized attachment, compared with 25% for family-raised orphans (Zeanah & Smyke, 2005). In Romanian orphanages, Zeanah and colleagues found that 78% of young children had disorganized attachments with their caregivers compared with 22% of children in a family-raised comparison group (Zeanah & Smyke, 2005).

Children classified as type D have poorer outcomes across many domains, including lower academic attainment, lower self-esteem, poor peer interactions, unusual or bizarre classroom behaviors, cognitive immaturity, and externalizing behavior problems (Green & Goldwyn, 2002; Lyons-Ruth, Alpern, & Repacholi, 1993). Type D attachment is also predictive of subsequent increased levels of dissociation, a psychological process that often involves tuning out reality (Carlson, 1998; Ogawa, Sroufe, Weinfield, Carson, & Egeland, 1997).

Several features of caretaker behavior have been shown to be associated with type D attachments. Both frightening and frightened behavior by a caretaker have been found to increase disorganized attachment in young children. High levels of parental negativity, criticism, and emotionally disturbed communications have also been implicated (Zeanah & Smyke, 2005). Mothers who score high on a measure of dissociation are also more likely to have infants classified as having disorganized attachments, who are, in turn, more likely to have increased dissociation when they reach late adolescence.

In response to these observations and clinical research on disorganized attachments, a formal psychiatric diagnosis of Reactive Attachment Disorder (RAD) was defined as the child's response to "pathogenic care." Two basic clinical patterns of RAD have been described. In the first, the child shows an emotionally withdrawn/inhibited pattern, in which the child exhibits limited or absent initiation or response to social interactions with caregivers, and a variety of aberrant social behaviors such as inhibited, hypervigilant, or highly ambivalent reactions. In the second, the child shows an indiscriminant social/disinhibited pattern manifested by an indiscriminant manner of seeking comfort, support, and nurturance from any available adult and a lack of normal social reticence with unfamiliar adults including a willingness to "go off" with strangers (Zeanah & Smyke, 2005).

### The Interaction of Psychosocial and Neurodevelopmental Maltreatment Effects

Understanding the critical interactions of neurodevelopmental and psychosocial developmental processes is the current scientific frontier for researchers seeking to intervene in the effects of child maltreatment. Perhaps the most developed example is the understanding of the effects of maltreatment on the critical stress response system known as the hypothalamic-pituitary-adrenal axis, commonly referred to as the HPA axis. The HPA axis is a hormonal system that reacts to stress and trauma by secreting the potent hormone cortisol. Research, initially with Vietnam combat veterans with post-traumatic stress disorder (PTSD) and later with other traumatized populations, found that the HPA axis is often seriously dysregulated as a result of prior traumatic experiences. Although there are some differences in the type of dysregulation seen in traumatized children compared with adults, subsequent research with sexually abused and maltreated children replicated these findings (De Bellis & Thomas, 2003).

Experiences of abuse and neglect act to increase levels of cortisol in maltreated children (De Bellis & Thomas, 2003). Increased cortisol levels, which may be lifesaving in an emergency, are nonetheless toxic to neurons in certain regions of the brain. The regions of the brain affected by stress-increased cortisol levels are also among those areas significantly decreased in size in trauma victims. Current theory postulates that the

repeated stress and trauma associated with maltreatment increases levels of circulating cortisol, which, in turn, damages or kills neurons in critical brain regions. The loss of these neurons and their connections contributes to the psychosocial problems with emotional regulation, impulse control, logical thinking, and social behavior seen in maltreated children. Potential treatments are available including commonly prescribed antidepressant medications which act to lower Corticotrophin Releasing Hormone (CRH), which initially stimulates the production of cortisol. Treatment trials are under way in an effort to determine if early intervention can reduce the detrimental biological effects of maltreatment.

For some time, we have known from animal research that stressing the mother leads to increased stress in the infant as manifested by levels of stress hormones such as cortisol. In some instances, the degree of stress manifested by the infant was two or more times that seen in the mother. Now, research is showing similar effects in children. Studies of emotionally exhausted working or depressed mothers have also shown increased levels of cortisol in their young children (Chryssanthopoulou, Turner-Cobb, Lucas, & Jessop, 2005). Thus, the attachment bond between mother and child has an important biological component, such that stresses experienced by the mother affect the child's biological systems in ways that we believe to be detrimental to the long-term health of the child. Maltreated and neglected children are also less able to experience positive interactions with a caretaker. A study led by Seth Pollak at the University of Wisconsin used a computer game to get mothers or caretakers to physically interact with their children by whispering to each other, patting each other on the head, or tickling each other (Wisner Fries, Ziegler, Kurian, Jacoris, & Pollak, 2005). The family-raised children showed increases in two hormones, vasopressin and oxytocin, that are associated with affiliation and strong interpersonal relationships. The orphaned children did not show these normal increases.

### **Implications of Current Research on the Impact of Maltreatment on Child Development**

The first and foremost recommendation that emerges from reviews of the effects of maltreatment on child development is for more and better preven-

tion programs. Successful prevention of child abuse and neglect will do more to eliminate its pernicious effects than any combination of treatments. Indeed, the mainstay of public health efforts is that the prevention of disease is the most cost-effective intervention. Basic public health measures such as clean water and adequate sanitation have eliminated more illness than all of the modern medications and surgical procedures combined. Echoing this view, the Surgeon General of the United States, Richard Carmona, has called for a public health approach to child abuse and neglect as part of 21st century efforts to improve the health and well-being of the American public (Carmona, 2005).

To prevent child abuse and neglect and to ensure optimum psychosocial development, it is critical to help families provide three basic components for their children. The first is adequate nutrition to ensure healthy physical development and resistance to illness. Sadly, many children in the United States either go to bed hungry or subsist primarily on high calorie, low nutrition "junk food" which does not provide the necessary building blocks for optimal brain development. The second factor is a stimulating early environment. During the critical years of 0 to 3, children especially need to be stimulated and challenged to see and think, to explore and solve problems, in order to fully develop the basic mental processes they will rely upon for the rest of their lives. The third component is a healthy, secure, and loving relationship with a primary caregiver. It is the moment-to-moment daily interactions between the child and the primary caregiver that shape the child's ability to manage his/her emotions, control impulses, and develop healthy relationships.

### **Child Abuse Prevention and Treatment Works!**

Policy makers and the general public often do not realize that there are proven child abuse prevention programs that are very effective in reducing rates of maltreatment and in improving family life. This failure to appreciate the success of these programs means that they are not as widely available as they should be. Some of these programs are highly cost effective, saving at least three dollars for every dollar of program cost (Karoly et al., 1998). Perhaps the best documented of these programs is the Nurse-Family Partnership (NFP)

### General Recommendations for Judges

- For dependency courts, it is crucial to intervene early on behalf of children (0-7) in ACE-ridden environments; doing so will benefit not only the children but also society by decreasing crime rates, addictions, and a host of other expensive public health problems.
- For custody evaluators and family court magistrates, it is important to assess domestic violence allegations in the context of research that children exposed in early life to battering have lower IQs and a host of psychological and behavioral difficulties.
- For juvenile courts that deal with offenders, it is essential to conduct full trauma histories and make TF-CBT or other evidence-based trauma treatments available to those young offenders who could benefit.
- Support and community leadership by judges and magistrates for large scale prevention programs such as the Nurse-Family Partnership, a home visiting program.
- Judges and magistrates can play an important role in public education about the social costs and consequences of child maltreatment.

developed by David Olds over the past three decades (Olds, 2005). Directed at first-time mothers, NFP nurses make home visits to help new mothers get off to a good start raising their child. Mothers enter the program during pregnancy and are helped to stop smoking and drinking and to get appropriate prenatal care. When the child is born, the nurse visits the mother weekly or as needed until the child is two years old. During these visits, the nurse helps the mother learn to be the best parent that she can be as well as ensures that the child receives appropriate medical and dental care and any additional services that may be necessary.

A series of research studies at three sites (Elmira, New York; Memphis, Tennessee; and Denver, Colorado) have established that mothers enrolled in the NFP program do significantly better than control women who received typical services in their communities. Mothers in the NFP program were less likely to smoke during pregnancy as measured by urine levels of a nicotine metabolite, cotinine. They had 75% fewer pre-term births and a significantly lower rate of pregnancy-induced hypertension. There was an 80% reduction in verified cases of child abuse and neglect compared with the control group and a 56% reduction in accidental injuries. These effects were greatest for low-income women. Mothers in the NFP program also had a greater spacing of their second

pregnancy, which gave the mother more time to care for the first child and more time to finish school or work. As a result, mothers in the NFP program were better able to improve their financial situation and, on follow-up, were significantly less likely to be receiving welfare or food stamps than comparison mothers. Children from the Elmira study have now reached late adolescence or early adulthood. Children whose mothers were enrolled in the NFP program had significantly fewer instances of running away, fewer arrests, fewer convictions, fewer lifetime sexual partners, smoked and drank less, and had fewer problems with drugs (Olds, 2005).

Studies of child abuse prevention programs, such as the “good touch-bad touch” sexual abuse prevention programs offered by many schools, have also been shown to be effective. One study found that college students who had been through a school-based sexual abuse prevention program in elementary school were significantly less likely to have been subsequently sexually abused (Gibson & Leitenberg, 2000). Other studies have also found that child abuse prevention programs do work (Davis & Gidycz, 2000; Rispen, Aleman, & Goudena, 1997). Indeed, research shows that child abuse prevention programs are easily twice as effective as drug abuse prevention programs based on comparison of effect sizes (Davis & Gidycz, 2000). Features associated with



the most effective prevention programs include longer durations and providing greater opportunities to practice the skills taught in the program.

In cases where we are unable to prevent child maltreatment, effective treatments are becoming available. Many of these treatments use a well-established psychotherapy model known as Cognitive Behavioral Therapy (CBT). The best established of these treatment models is Trauma-Focused CBT (TF-CBT) (Saywitz, Mannarino, Berliner, & Cohen, 2000). Variations of TF-CBT exist for all age groups and usually focus on the child but also involve non-abusing caregivers for some sessions. These treatments typically last about 12-20 sessions depending on the child's needs and abilities. At present, relatively few child therapists have been trained in TF-CBT, but that is changing. Another well-respected and proven treatment is Parent-Child Interaction Therapy (PCIT), which has been shown to reduce episodes of re-abuse in physically abusive families (Timmer, Urquiza, Zebell, & McGrath, 2005). In PCIT, the therapist coaches the caregiver (often from behind a one-way mirror) in how to interact with the child in a positive way both to join in the child's activities and to set limits or discipline the child if necessary. PCIT appears to greatly improve parent-child attachments. Child-Parent Psychotherapy, a treatment model developed by Alicia Lieberman and colleagues, has been shown to actually increase IQ scores in preschoolers who have been exposed to domestic violence (National Child Traumatic Stress Network, 2004). A number of other treatments are in

the process of being validated and will soon become available. However, therapists must be trained in these treatments, and health insurance or Medicaid must cover their costs if they are to make a difference in the lives of the millions of children who have been abused or neglected.

### Summary

At the very least, a million children are abused or neglected every year in the United States. The human, social, and fiscal costs are enormous. Two basic child developmental processes appear to be significantly affected by experiences of abuse and neglect. Neurodevelopment is often impaired and is manifested by decreases in brain size and function including lower IQ and poorer performance in school. Psychosocial development is negatively impacted, especially regulation of emotions, control of impulses, and ability to have healthy and happy relationships. Consequently, abuse of drugs and alcohol is much higher in victims of child abuse and they are more likely to have legal problems and social difficulties. Physical and mental health are also negatively affected with increased medical problems, typically related to poor health habits, and much higher rates of depression and suicide. Prevention programs can be highly effective in reducing the incidence of child abuse and neglect. However, until policy makers and the general public demand better services for maltreated children and their families, this tragic legacy will continue across future generations.

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### REFERENCES

- Bretherton, I. (1992). The origins of attachment theory: John Bowlby and Mary Ainsworth. *Developmental Psychology*, 28, 759-775.
- Carlson, E. A. (1998). A prospective longitudinal study of attachment disorganization/disorientation. *Child Development*, 69, 1107-1128.
- Carlson, V., Cicchetti, D., Barnett, D., & Braunwald, K. (1989). Disorganized/disoriented attachment relationships in maltreated infants. *Developmental Psychology*, 25, 525-531.
- Carmona, R. H. (March 30, 2005). *Keynote Address*. Paper presented at the Surgeon General's Workshop, Making Prevention of Child Maltreatment a National Priority: Implementing Innovations of a Public Health Approach. Available from URL: <http://videocast.nih.gov>.
- Chryssanthopoulou, C. C., Turner-Cobb, J. M., Lucas, A., & Jessop, D. (2005). Childcare as a stabilizing influence on HPA axis functioning: A reevaluation of maternal occupational patterns and familial relations. *Developmental Psychobiology*, 47(4), 354-368.
- Davis, M., & Gidycz, C. (2000). Child sexual abuse prevention programs: A meta-analysis. *Journal of Clinical Child Psychology*, 29(2), 257-265.
- De Bellis, M., & Thomas, L. (2003). Biologic findings of post-traumatic stress disorder and child maltreatment. *Current Psychiatry Reports*, 5, 108-117.
- De Bellis, M. D., Keshavan, M. S., Clark, D. B., Casey, B. J., Giedd, J. N., Boring, A. M., & Ryan, N. D. (1999). Developmental traumatology part II: Brain development. *Biological Psychiatry*, 45, 1271-1284.
- Dennis, W. (1973). *Children of the Creche*. New York: Appleton-Century-Crofts.
- Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *Journal of the American Medical Association*, 286, 3089-3096.
- Dube, S. R., Anda, R. F., Whitfield, C. L., Brown, D. W., Felitti, V. J., Dong, M., & Giles, W. H. (2005). Long-term consequences of childhood sexual abuse by gender of victim. *American Journal of Preventive Medicine*, 28(5), 430-438.
- Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *American Journal of Psychiatry*, 160, 1453-1460.
- Engels, M.-L., Moisan, D., & Harris, R. (1994). MMPI indices of childhood trauma among 110 female outpatients. *Journal of Personality Assessment*, 63(1), 135-147.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V. J., Koss, M. P., et al. (1998). The relationship of adult health status to childhood abuse and household dysfunction. *American Journal of Preventive Medicine*, 14, 245-258.
- Flitter, J. M. K., Elhai, J. D., & Gold, S. N. (2003). MMPI-2 F scale elevations in adult victims of child sexual abuse. *Journal of Traumatic Stress*, 16(3), 269-274.
- Fromm, S. (2001). *Total estimated cost of child abuse and neglect in the United States—statistical evidence*. Chicago: Prevent Child Abuse America (PCAA). Available from URL: [www.preventchildabuse.org/learn\\_more/research\\_docs/cost\\_analysis.pdf](http://www.preventchildabuse.org/learn_more/research_docs/cost_analysis.pdf).
- Gibson, L. E., & Leitenberg, H. (2000). Child sexual abuse prevention programs: Do they decrease the occurrence of child sexual abuse? *Child Abuse & Neglect*, 24(9), 1115-1124.
- Gottlieb, G., & Blair, C. (2004). How early experience matters in intellectual development in the case of poverty. *Prevention Science*, 5, 245-252.
- Green, J., & Goldwyn, R. (2002). Annotation: Attachment disorganization and psychopathology: New findings in attachment research and their potential implications for developmental psychopathology in childhood. *Journal of Child Psychology and Psychiatry*, 43, 835-846.
- Holowka, D. W., King, S., Saheb, D., Pukall, M., & Brunet, A. (2003). Childhood abuse and dissociative symptoms in adult schizophrenia. *Schizophrenia Research*, 60(1), 87-90.
- Hubel, D., & Wiesel, T. (1970). The period of susceptibility to the physiological effects of unilateral eye closure in kittens. *Journal of Physiology*, 206, 419-436.
- Karoly, L., Greenwood, P., Everingham, S., Houe, J., Kilburn, M., & Rydell, C. (1998). *Investing in our children: What we know and don't know about the costs and benefits of early childhood interventions*. Santa Monica, CA: RAND Corporation.
- Kellogg, N. D., Hoffman, T. J., & Taylor, E. R. (1999). Early sexual experiences among pregnant and parenting adolescents. *Adolescence*, 34(134), 293-303.
- Koenen, K., Moffitt, T., Caspi, A., Taylor, A., & Purcell, S. (2003). Domestic violence is associated with environmental suppression of IQ in young children. *Development and Psychopathology*, 15, 297-311.

## REFERENCES

- Lee, B. J., & Goerge, R. M. (1999). Poverty, early childbearing and child maltreatment: A multinomial analysis. *Children & Youth Services Review, 21*(9-10), 755-780.
- Lyons-Ruth, K., Alpern, L., & Repacholi, B. (1993). Disorganized infant attachment classification and maternal psychological problems as predictors of hostile-aggressive behavior in the preschool classroom. *Child Development, 64*, 572-585.
- Miller, T., Cohen, M., & Wiersema, B. (1996). *Victim costs and consequences: A new look*. Washington, DC: U.S. Department of Justice, National Institute of Justice.
- National Child Traumatic Stress Network. (2004). Children and trauma in America: A progress report of the National Child Traumatic Stress Network.
- Ogawa, J. R., Sroufe, A., Weinfield, N. S., Carson, E. A., & Egeland, B. (1997). Development and the fragmented self: Longitudinal study of dissociative symptomatology in a nonclinical sample. *Development and Psychopathology, 9*, 855-879.
- Olds, D. (2005). The nurse-family partnership. In L. Berlin, Y. Ziv, L. Amaya-Jackson, & M. Greenberg (Eds.), *Enhancing early attachments* (pp. 217-249). New York: Guilford.
- Perry, B. (2001). The neurodevelopmental impact of violence in childhood. In D. Schetky & E. Benedek (Eds.), *Textbook of child and adolescent psychiatry* (pp. 221-238). Washington, DC: American Psychiatric Press, Inc.
- Perry, B. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain and Mind, 3*, 79-100.
- Pollak, S., Cicchetti, D., Hornung, K., & Reed, A. (2000). Recognizing emotion in faces: Developmental effects of child abuse and neglect. *Developmental Psychology, 36*, 679-688.
- Putnam, F. W. (2003). Ten-year research update review: Child sexual abuse. *Journal of the American Academy of Child and Adolescent Psychiatry, 42*(3), 269-278.
- Rispens, J., Aleman, A., & Goudena, P. P. (1997). Prevention of child sexual abuse victimization: A meta-analysis of school programs. *Child Abuse & Neglect, 21*, 975-987.
- Saywitz, K., Mannarino, A., Berliner, L., & Cohen, J. (2000). Treatment for sexually abused children and adolescents. *American Psychologist, 55*, 1040-1049.
- Shore, R. (1997). *Rethinking the brain: New insights into early development*. New York: Families and Work Institute.
- The World Health Report. (2001). *Mental health: New understanding, new hope*.
- Theodore, A., Chang, J., Runyan, D., Hunter, W., Shrikant, I., & Agans, R. (2005). Epidemiological features of physical and sexual maltreatment of children in the Carolinas. *Pediatrics, 115*, 331-337.
- Thornberry, T. P., Ireland, T. O., & Smith, C. A. (2001). The importance of timing: The varying impact of childhood and adolescent maltreatment on multiple problem outcomes. *Development & Psychopathology, 13*(4), 957-979.
- Timmer, S. G., Urquiza, A. J., Zebell, N. M., & McGrath, J. M. (2005). Parent-Child Interaction Therapy: Application to maltreating parent-child dyads. *Child Abuse & Neglect, 29*, 825-842.
- U.S. Department of Health and Human Services Administration on Children, Youth and Families. (2005). *Child Maltreatment 2003*. Washington, DC: U.S. Government Printing Office. Available from URL: <http://www.acf.hhs.gov/programs/cb/pubs/cm03/cm2003.pdf>.
- Walker, M. (1999). The inter-generational transmission of trauma: The effects of abuse on the survivor's relationship with their children and on the children themselves. *European Journal of Psychotherapy, Counseling & Health, 2*(3), 281-296.
- Weinman, M. L., Smith, P. B., Geva, J., & Buzi, R. S. (1998). Pregnant and postpartum adolescents' perceptions of the consequences of child abuse. *Child & Adolescent Social Work Journal, 15*(4), 287-301.
- Wisner Fries, A. B., Ziegler, T. E., Kurian, J. R., Jacoris, S., & Pollak, S. D. (2005). Early experience in humans is associated with changes in neuropeptides critical for regulating social behavior. *Proceedings of the National Academy of Sciences of the United States of America, 102*(47), 17237-17240.
- Zeanah, C., & Smyke, A. (2005). Building attachment relationships following maltreatment and severe deprivation. In L. Berlin, Y. Ziv, L. Amaya-Jackson, & M. Greenberg (Eds.), *Enhancing early attachments* (pp. 195-216). New York: Guilford Press.