

# NEUROPSYCHOLOGICAL CONSEQUENCES OF CHILD ABUSE AND NEGLECT

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## SUMMARY

*The most dangerous kind of abuse is family violence. It occurs in the context of a relationship of intimacy, kinship, trust and dependency, and may have physical, mental, or sexual forms. Family violence can take the form of active abuse or passive neglect. This article briefly presents some of the neuropsychological influences of being abused in early childhood, such as emotional disorders, adaptive problems, post-traumatic stress disorder (PTSD), effects on physical health, somatoform disturbances, and personality disorders. The results of using fMRI to look for specific changes and abnormalities in the brains of people who have been the victims of physical, mental, or sexual abuse in early childhood will be characterized in a more detailed way. Abused individuals often show pathological changes in the limbic system, impairment of the left cerebral hemisphere, neuroanatomical abnormalities in the corpus callosum, and biochemical changes of neurotransmitters. Finally, the impact of empirical research in neuroscience on the health of abused and neglected children will be discussed.*

## INTRODUCTION

Child abuse is a complicated psychological phenomenon because of its many forms, and also the many possibilities of masking and hiding its symptoms. The most dangerous kind of abuse is family violence. It is defined as a mental/emotional event occurring in the context of a relationship that should be based on intimacy, kinship, trust and dependency (Briere & Elliot 1994). It can have physical, mental and sexual forms (Browne & Herbert 1999). As emphasized by many authors (Stein et al. 1997, De Bellis et al.

1999, Glaser 2000, Martin & Mohr 2000), people who have experienced domestic violence can be divided into two groups:

- 1) those who have been the victims of abuse or neglect;
- 2) those who have been frequent observers and witnesses of violence in their families.

Each form of family violence can take the form of active abuse or passive neglect. For instance, as active abuse, physical violence occurs in physical hurting, forceable constraints, imprisonment. In passive neglect, it can be the lack of health and physical care or physical neglect. Mental or emotional violence in the form of active abuse means humiliation, emotional abuse and the lack of material support. As passive neglect, the mental form appears in not showing feelings, or neglecting emotional and material needs. Sexual violence is active when it has to do with incest, assault or rape. It can be passive when because of neglect of a child, he or she becomes a prostitute.

Many papers have been published on child abuse and its many psychological implications (DeBellis et al. 1999, Martin & Mohr 2000, Briere & Elliot 1994). Recently there has been rising interest in this problem, as well as more and more research in the neuropsychological field, trying to explain the brain mechanisms of abuse and its influence on development of this organ in childhood. There has been some interesting research with fMRI (Stein et al. 1997, Teicher 2000). Some of the results of both psychological analyses and neuroimaging research will be presented in what follows.

## **PSYCHOLOGICAL IMPLICATIONS OF CHILD ABUSE AND NEGLECT**

The negative effects of childhood abuse or neglect may manifest themselves in a variety of symptoms occurring at any age. Among the numerous psychological effects of being abused in early childhood on the further development of a child, and also on his or her adult life and functioning, we can identify several groups of complications:

- 1) emotional disorders;
- 2) adaptive problems;
- 3) PTSD;
- 4) direct effects on physical health;
- 5) somatoform disturbances;
- 6) personality and identity disorders.

Since the foregoing are more popular and frequently characterized in the literature, they will be briefly presented below.

### ***Emotional disorders in persons abused in childhood***

The main emotional problem occurring in persons who have been maltreated in childhood is depression. They are permanently at a higher level of anxiety, afraid of many things, even though they are not objectively danger-

ous. On the other hand, such persons have a tendency to look for a high level of adrenaline, so they may seem to be very brave and not afraid of anything. This could be one of the defensive mechanisms called by psychoanalysts "reaction formation," when a person may show a tendency to manifest behavior completely different from his or her real feelings.

### ***Adapting problems***

The victims of domestic violence rarely care for themselves as children and during their whole life. They do not eat properly, take medications regularly or visit doctors. They may withdraw from any kind of help and support, both emotional and financial. Not only children, but also adults, and especially young teenagers (adolescents) who have been abused or neglected may make many attempts at self-injury or even commit suicide. Their behavior indicates self-destructive and self-injuring tendencies. Such persons may also have much more serious accidents in their lives (Glaser 2000).

### ***Posttraumatic Stress Disorder***

As people living chronically in an extraordinarily difficult situation, abused children are at risk of the whole rich spectrum of symptoms of post-traumatic stress disorder. They complain of chronic pain, sleep disorders, chronic fatigue syndrome. As students, they may have problems at school, which take the form of learning difficulties and conflicts with their colleagues (Martin & Mohr 2000).

### ***Direct effects on physical health***

Children who are physically abused by their parents or caregivers are at high risk of serious physical injuries. They may have broken bones and teeth, bruises, scalds, burns, or cuts. Sexual abuse can result in infections, pelvic pain, urinary tract or pregnancy.

### ***Somatoform disturbances***

The results of research and anecdotal observations show that children who have been victims of family abuse are at risk for many diseases, such as diabetes, high blood pressure, heart diseases, lung, liver and thyroid problems (cf. Glaser 2000). Many adults who have been abused in childhood feel chronic pain, have asthma and hepatitis.

### ***Personality and identity disorders***

Family violence also results in many negative psychological effects. Children who have been abused or neglected usually present with low self-esteem and the lack of belief in their strengths. They prefer isolation from others or have negative relationships with their schoolmates, coming into conflict as a result of their aggressive behavior (Briere & Elliot 1994).

The most frequent personality disorder caused by child maltreatment is borderline personality, showing ambivalence towards a particular person. Borderline personality manifests opposite reactions, from strong attachment and love to hate a moment later. Other frequent disorders which may occur in abused children are serious problems with personal identity, especially in the sphere of sexual identity. Another personality disorder caused by child maltreatment is dissociative personality, which may manifest as many personalities in one person.

## **RESULTS OF NEUROIMAGING**

The intensive development of the neurosciences and related technologies has had a strong impact on many empirical fields of science, including psychology. The last decades have enabled researchers to use neuroimaging to carry out experiments in neuropsychology, and this is a big step on the way to explain the brain mechanisms of many mental disorders.

The results obtained by using fMRI to look for specific changes and abnormalities in the brains of people who have been victims of physical, mental or sexual abuse in early years of their lives seem to form four main groups of neuropsychological consequences:

- 1) changes in the limbic system;
- 2) impairment of left hemisphere functions;
- 3) neuroanatomical abnormalities in the corpus callosum;
- 4) biochemical changes of neurotransmitters in abused persons.

### ***Neurofunctional changes in limbic system***

According to M. Teicher (2000), borderline personality very often occurs in persons who have been maltreated in early childhood. Their impulsiveness, hyperarousal, ambivalent feelings, self-destruction and tendency to escape are some of the effects of changes in the limbic system caused by extreme exploitation. The limbic system is a set of structures which regulate emotional and monistic processing. The most important role in interpersonal disturbances is played by the hippocampus and the amygdala. The main hippocampal function is to store verbal facts and emotional experiences. The function of the amygdala is to filter and interpret sensory information in the context of their meaning for emotional needs and desires. The amygdala is especially active in cases of strong fright or anxiety.

The analysis of 115 EEG reports of patients abused in childhood showed abnormalities in the brain's electrical activity. These regular changes in brain waves occurred in the left frontal and temporal lobes. Twenty-seven percent of these patients manifest symptoms of temporal epilepsy.

J. Bremner and M. Narayan's research (1998) implementing functional magnetic resonance imaging (fMRI) indicates that both hippocampus and amygdala are changed when compared to the brains of healthy persons who

were not abused in their childhood. The results of Stein et al.'s (1997) clinical observations of 21 sexually abused women with neuroimaging technologies suggested anatomical and functional abnormalities in the hippocampus and amygdala. After being sexually abused in their childhood, these women manifest a full range of PTSD symptoms, and some of them had personality disorders (dissociative and borderline personalities). The results indicate that the reduction of hippocampus and amygdala volume in the brains of these women correlates positively with the depth of personality disorder.

#### ***Impairment of left hemisphere development***

The left hemisphere specializes in linguistic processing, its perception and expression. The right hemisphere specializes in perceptual processing and analyses of spatial information (Oszwa 1997). Another important function is emotional processing, especially of negative emotions and feelings. There is also a hypothesis that the left hemisphere may fulfill a role in the processing of positive emotions (Herzyk & Oszwa 1993, 1994).

M. Teicher and his colleagues (2000) compared 15 healthy volunteers and 15 adolescent psychiatric patients with a history of intense physical or sexual abuse in their lives. All of them were right-handed and left-dominant. The right hemispheres of abused subjects were significantly better developed than the left. Teicher points out that the right hemispheres of maltreated adolescents had developed as much as those of controls, but their left hemispheres functionally lagged behind. The effect was observed in the entire left hemisphere, although it is worth noting that the temporal regions of this hemisphere in maltreated patients were most affected by their abuse in childhood.

#### ***Child abuse and corpus callosum***

Other research with the use of fMRI (Andersen & Giedd, cited by Teicher 2000) implicates the corpus callosum, an important structure of the nervous system, which integrates information flowing from both hemisphere of the brain. The subjects in this research study were abused or neglected boys. As the results show, the middle parts of the corpus callosum were significantly smaller in the brains of subjects mistreated in early childhood compared to the size of the corpus callosum in the brains of control subjects.

The differences in the middle parts of this structure were even greater in girls who were sexually abused compared to the corpus callosum of the control group of healthy girls. Researchers explain that in girls, sexual abuse may be a more powerful factor, so the differences in its results are more serious even on the level of the structure and function of the nervous system. The changes in the size of the corpus callosum may have some influence on disturbances of integration between both hemispheres in persons mistreated in childhood, since this structure is involved in integrated processing on the whole-brain level. The results of fMRI studies show the clear negative influence of child abuse and neglect on the development of the corpus callosum.

### **Neurochemical disturbances after abuse in childhood**

Another neuropsychological consequence of family violence is observed on the biochemical level. There are more than thirty neurotransmitters in the central nervous system (Glaser 2000). Neurotransmitters are chemical substances in the brain which fulfill functions in activating or inhibiting the reactions of the organism. Some of them are particularly involved in regulating the interaction between the body and its environment. They have been studied in greater detail. Of particular importance are the biogenic amines, such as noradrenaline, dopamine, and serotonin. These amines are produced in the brainstem and midbrain. As Glaser's research (2000) indicates, there are some observable changes in biochemistry in the brains of abused persons. Most of these are connected with deregulation of the hypothalamic-pituitary-adrenal axis, and also the parasympathetic and catecholamine responses, especially strongly manifested under the influence of permanent stressors.

## **CONCLUSIONS**

There is strong empirical evidence for neuronal, structural and functional negative changes in the brain associated with abuse and neglect in early childhood. As family violence seems to act as permanent stress, these observed changes in the brain function may be reactions both to domestic abuse itself and to chronic stress generally. Since these changes are manifested in the brains of maltreated children, there is an opportunity here for a better and deeper understanding of the mechanisms of many negative symptoms observed in their behavior. Aggressive responses, hyperarousal, personality disorders, educational difficulties could be better explained if we possessed more knowledge about brain changes after childhood abuse. The neurobiological effects of family violence could also be helpful in finding the mechanisms of psychological and emotional disturbances often occurring in abused children. There is an opportunity to find medication for these neurochemical changes.

Better understanding of the motivation and mechanisms of behavior observed in persons abused or neglected as children should help them find a way to live better lives and stop the vicious cycle of family violence, which is often repeated in their adult lives.

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