
This article is based on a verbal presentation given to the Quality of Childhood Group in the European Parliament. Notes taken during the presentation were formulated into the article below, which has been checked and approved by Professor Boris Cyrulnik.

What approach to take to improve the quality of childhood in the European Union?

by *Professor Dr. Boris Cyrulnik*
from the University of Toulon, France.

SUMMARY

In this article Boris Cyrulnik describes a number of interesting experiments that have been made. Based on the results of these experiments his key messages are as follows:

- *The loving and affectionate environment into which a baby is born is of crucial importance for the biological, emotional, social and cultural development of the child. If this environment is not available to the child then the child will be severely damaged, especially in his /her brain development. The quality of a loving and affectionate environment is influenced by the following elements:*
 - *The ability of the mother / parent to offer to the child a secure attachment bond.*
 - *The mother / parent creates the social and emotional environment for the child in which he/she can explore and interact with the world. The same stairs will have a completely different meaning for the child depending on how the mother or attachment person thinks and feels about the stairs.*
 - *The images of the stairs, or any other phenomenon, stored in the brain of the child will simultaneously store the social and emotional context of the mother or attachment person who was with the child at the time it was experienced.*
- *Maltreated children are damaged in many ways, including, among others :*
 - *their length/height,*
 - *their weight development,*
 - *their language capabilities,*
 - *attachment style,*
 - *way of talking and kissing,*
 - *way of approaching other people and seeking help when the child is distressed.*
 - *brain atrophy / black 'holes' on the brain scan*
 - *the paradoxical sleep will be different and for this reason fewer growth hormones and fewer sexual hormones will be excreted, which in turn will hamper the normal development of the child.*
 - *the ability of empathy is less developed in abused children*
- *children and adolescents have several critical periods regarding their biological development. If these critical periods are not made use of in an optimal way the child will be severely damaged. For example, two of the critical periods are: the time we build an*

attachment bond with the parent during infancy, and puberty.

- *the way we speak about and with newly born babies has an impact on the biological structure of the brain.*
- *Boris Cyrulnik spoke about research in Israel: pregnant women who suffered from post traumatic syndrome gave birth to babies with many disadvantages, which would last a life time if not properly addressed.*
- *The damage that was inflicted upon children could be repaired when the maltreated children were placed in loving and affectionate foster families. In many cases the damage could be undone and the children could resume normal development. However, the later it is addressed the more difficult it becomes.*

The general message of Boris Cyrulnik is therefore:

- *Policy makers should be aware of the great importance of the social, emotional and affectionate environment of children.*
- *With relatively little means many problems can be avoided. Much of the damage to the people in question and to the society in which they grow up can be avoided.*

In my work I follow a systemic approach, the opposite of systematic. By 'systemic' I mean that all the parts of the whole are connected. If you take away or change one piece, it will affect the whole. I would like to begin by referring to the work of Niko Tinbergen, the Dutch ethologist, who was awarded the Nobel Prize in 1973. Niko Tinbergen studied the behaviour of a certain type of fish. It was found that the female fish could change colour, and when this happened the male fish would change his behaviour vis-à-vis the female fish. In this way conception would take place.

On the basis of the description of a number of experiments I would like to illustrate and explain my core messages:

Research Experiment: Little kittens climb a ladder

An exercise is done with little kittens. Little kittens of 4 to 5 months old will, however, first look at the mother cat, the attachment figure, to see if it is OK to climb the ladder and to participate in the experiment.

Research Experiment: a baby crawls on the stairs

A comparable experiment was done with young children. Here a baby of several months old would be with the mother and the mother was asked to mimic the facial expressions of a psychologist researcher.

When the psychologist would look afraid or angry, then the mother would mimic this and they found that the baby would become cautious and stay quiet, and not crawl on the stairs.

However, when the psychologist would smile, mimicked by the mother, then it was found that the baby was encouraged to crawl on the stairs. The stairs were in both cases exactly the same, but the facial expression of the mother, the attachment figure was different, and for this reason the stairs were different for the baby. The meaning of the stairs is in the mind of the attachment figure. If the mind of the attachment figure is depressed then the child will attribute a different meaning to the stairs then when the attachment figure looks happy.

Research Experiment: pregnant rats

Two boxes containing pregnant rats were brought into the laboratory. The researchers kicked against box 1, while they caressed the rats in box 2.

When the little rats were born the researchers looked at how the baby rats reacted to a whistle. The baby rats, whose mothers were in box 1, would be startled, even if the sound of the whistle was very soft.

On the other hand, the baby rats, whose mother was caressed during pregnancy, were only startled when the whistle was blown very hard. In the reaction patterns of the two groups of baby rats there was clearly a significant difference.

The researchers then examined the brains of the different groups of rats. They found that the rats in box 1 had brains with atrophy (meaning that the brain is partly damaged), while the rats in box 2 had normal brains. For the limbic system the same was true.

The frontal brain is the part that works with regard to anticipation, while the limbic system works in the area of emotions and memory.

If a mammal lives in an environment of stress the cortisone level will usually be too high and the nucleus of the synapses will have oedema and can explode.

When the baby mammal is alone every stimulus is a stress. But when the baby is together with an attachment figure the same information does not have to be stressful. It can become a joy and be pleasant.

Research: brain scans of abandoned children

For a time I worked in Romania with several scientists. Later they came to Toulon and Paris and they scanned the brains of a group abandoned Romanian children. Most of the children had both the atrophy and the synapses with oedema. Thanks to the Romanian scientists these children were placed in foster families. One year later a control scan of the brains of these children was made and both types of damage had disappeared. Apparently new neurone cells had grown and filled the gaps due to everyday stimulation and education, as is normal when one takes care of a child: talking, caring and playing and so on.

I call this phenomenon 'neuronal resilience'. This neuronal resilience depends on the way the child is surrounded by love and affection. If there is nobody to relate to the child will

develop atrophy and oedema in the brain. There will be low anticipation and a low level of memory. The child will be socially and emotionally less intelligent and more indifferent towards its environment. The part of the brain that plays a role regarding emotions is also where we remember things. In short: when you do not experience emotion, you do not have memory.

Neuronal resilience [in the brain] depends on the way the child is surrounded by love and affection. If there is nobody to relate to the child will develop atrophy and oedema in the brain. There will be low anticipation and a low level of memory. The child will be socially and emotionally less intelligent and more indifferent towards its environment.

Each recollected phenomenon is stored in the brain together with its social and emotional context

Everything that is in our memory is linked to the social and emotional context that prevailed when the phenomenon occurred. Intimate recollections are stored in the brain together with the facial expression and the mood of the mother, who was present when the recollected phenomenon took place. Our brain is thus filled with impressions that other people put into it.

The same is true for each word and each number that is stored in our brain. This word or number is stored together with the experience of the social and emotional context at the time it was recorded.

Comparative research regarding normal and maltreated children

Let us take as an example a normal girl of five years old, and a maltreated girl of the same age. It can clearly be seen that the maltreated child differs in many ways from that of a normal child for instance:

- the length/height,
- the weight,
- the language capabilities,
- attachment style,
- way of talking and kissing,
- way of approaching other people and seeking help when the child is distressed.
- the weight of the maltreated child is half of that of a normal girl,
- the electro encephalogram is impaired (brain atrophy / black 'holes' on the brain scan)
- The paradoxical sleep, which starts normally after 90 minutes, will be 20 minutes earlier for children who have been abused. Just before the paradoxical sleep occurs there are high and slow electrical waves, that help the stem of the brain to excrete growth hormones and hormones regarding sexual functions.

The good news: an abused child can recover quickly when placed in a loving foster family

It has been found that abused children can catch up if they are placed in a loving foster

family. However, if the situation was very bad just after birth then the brain is severely damaged and a full recovery of the body, the brain and the other functions will be much more difficult. Brain atrophy can also occur to adults, for instance after three weeks of isolation.

Research: a baby is not able not to mimic the adult

When a baby is young he/she cannot help him/herself but has to mimic the adult. It is a normal reflex to mimic. Only when the child is three to four years old and the neural connections between the frontal brain and the limbic system have been formed can the child choose not to mimic the adult.

Research Experiment: the ability of empathy is less developed among abused children

Empathy is the ability to project oneself into someone else's inner life. This mental performance is not possible before the age of four.

This insight was discovered with the following experiment: The researcher brought together a group of children of three years old. A ball is put in a basket. Then the researcher will ask one of the children to leave the room. Next the researcher takes the ball from the basket and puts the ball in the cupboard. Then the child is called back into the room and the researcher asks the child to fetch the ball. The other children tell the child that the ball is in the cupboard but nevertheless the child goes to the basket to pick up the ball.

When children are four or five they have grown so much psychologically that they will take in the message of the other children and fetch the ball in the cupboard.

This is the normal development of children. However, when a child was abused and abandoned then the behaviour pattern is quite different. Then a child will still go to the basket to pick up the ball, even when they are five or six years old. They remain much more self-centred and are still not able to pick up the messages from the other children, their ability to empathise has not yet matured. The cause of this lack of empathy is the lack of affection during the first months and years of the child's life.

However when these abused children are placed in an affectionate foster family with a certain structure then the child can recover, but the later this takes place the more difficult the development of resilience will be.

Research: abandoned children do better when the whole village takes care of them

In the past few years Boris Cyrulnik worked with abandoned children from Romania, the Czech Republic and Slovakia.

In Peru the situation concerning abandoned children is much better, especially in the native Indian villages, because the whole village takes care of the children who do not have parental care. For this reason these children do not cause much trouble when growing up later on.

On the other hand in France and throughout Europe when a single mother is depressed or unhappy the child has only one attachment figure. If the mother or the main attachment

figure is depressed the child may show atrophy in the brain as a consequence of this.

Experiment: fledgling ducks have a critical period from 14 to 17 hours after birth

Konrad Lorenz (winner of the Nobel Prize in 1973) carried out an experiment with fledgling ducklings. As soon as the fledglings came out of the egg they were placed in a box without light and one exit, in front of which a decoy was placed that could be operated from a distance. It was found that from birth until 13 hours after birth the little fledgling does not follow the decoy. From 14 to 17 hours after birth the fledgling follows it in 90% of cases, whatever the speed and direction taken by the decoy. After the 17th hour the fledgling does not follow any more, and its movements become random.

During the 14 to 17 hour period the fledgling excretes most acetylcholine, a neuro mediator that plays a role regarding the biological memory.

There are medicines that fight depression or Parkinson's disease that suppress the excretion of acetylcholine, but the side effects are that you prevent the human being from remembering his/her attachment bonds and from experiencing emotions.

Research: children and adolescents have several critical periods regarding their biological development

John Bowlby stated that the 'duck experiment' was only true for ducks and not for human beings. The scientific community believed this because John Bowlby was so much admired, but some time ago it was discovered that mammal babies all have a critical period in which the attachment bond is established. For mammal babies this period is not three hours but, depending on the type of animal, can be, for instance, five weeks. For apes it is six months. Human babies have several critical periods for various functions, one of these being for the establishment of attachment bonds. The process of building up the attachment bond is suppressed when the baby is given anti depressant drugs, because this "flattens" the emotional activity of the baby.

The first year is a crucial period for the development of the child because in this period the number of synaptic connections that occur is double that of when the child is two years old.

Puberty is another such period. At that time testosterone is excreted 18 times more than before by boys and 3 to 4 times more by girls, while simultaneously the number of synaptic connections is being reduced. This is an efficient way of dealing with the synaptic connections because the person in question has now learned how to behave in many different types of situations and does not need to explore this any more in so many different ways.

The first year is a crucial period for the development of the child because in this period the number of synaptic connections that occur is double that of when the child is two years old.

Research: trauma can evoke a critical situation for the brain

Another critical period from a biological and psychological point of view can be experienced by a person when he or she is traumatised. The emotional activity of the person is then dulled and he or she is in psychological agony, in a near death situation. The brain is then 'switched off'. If at such a moment you take a scan of the frontal brain and the limbic system both are dark. The frontal brain is not functioning as far as emotions, language, pleasure and so on is concerned. Human beings can suffer twice: the first time when it happens in reality, the second time in the representation that we make of the event in question.

Research: the first words spoken to a newborn baby have an impact on the biological structure of the brain

Some research into mothers and babies was done at the hospital in Toulon. The people who were helping with the birth of babies were asked to write down the first sentence said to the newborn baby, when the baby was shown to the mother. Most of the time the words were very nice, for instance 'What a beautiful baby', 'he looks like Jesus', 'he will be a football player like his father' and so on, but sometimes a mother would say: 'Don't you see that the child wants to die?' The mother makes this statement because she is convinced of this. It is her representation of the reality. Such a statement organises the sensory environment of the baby in question. In this way the biological structure of the brain of the child is formed and this is directly related to the representations in the mind of the mother. The statement 'Don't you see that the child wants to die?' was made by a mother who was melancholic and she interpreted everything as near to death. Everything that the mother saw was perceived in this way and for this reason the mother created a stressful environment for the baby.

Case study: the family context can have a big impact on the development of the child

Another example was of a mother who was shown her newborn baby girl. The mother said: 'she is pretty, it is terrible'. This sentence is absurd. However, when looking at the history of the mother it is put into perspective. The baby is her second child and her first child was a boy born with only one arm. The mother developed a hyper attachment to this child, and this child developed very well. When the normal and pretty baby girl was born, the mother experienced it as unfair and unjust. She thought: 'you have two arms and you cry. Shut up, you must be quiet. You do not have the right to cry'. In this way the mother surrounded the child with a dismissive sensorial reality and the child developed an avoidant attachment, she was alone and self centred, late in language development and difficult to love. When people in her environment tried to love her, she was always avoidant and pushed them away.

Research in Israel: pregnant women who suffered from post traumatic syndrome gave birth to babies with many problems

Research was undertaken by Isy Pelc (from Brussels Free University) who studied the cases of 170 pregnant women in Tel Aviv, Israel. These women suffered from post traumatic syndrome because of terrorist attacks. They were stressed. When their babies were born their birth weight was 50% lower than the average in Israel and their skull perimeter was 24% smaller than the national average. In the babies of the stressed mothers the growth hormone level was significantly lower than for normal children and the sexual hormone level was nearly zero. The language development of these children was retarded. At the age of nine the children were obese and diabetic, with high blood pressure, they had difficulties in processing information regarding space and time and they were behind at school. The children's brains were scanned which confirmed the retardation in terms of neuronal resilience and vascular development.

Then the children (at the age of nine) were placed in good foster families. After five to seven years the children were again examined and tests showed that they had become normal children: the obesity had disappeared, the diabetes had disappeared, their blood pressure was normal and they had caught up at school.

Love and affection nurtures the development of the child

The love and affection of the parents nurtures the development of the child, including the structure of his / her biological brain. Mary Main taught us that the semantic structure of our language is an effective structure. It is not only important what we say, but also how we say it. In a hospital in Marseille researchers observed the interaction between a baby and its mother. The researchers found that the baby initiated the interactions in 60% of the cases. Then the mother reacted and gave words and meaning to what the child experienced and expressed non-verbally. In this way these words and meanings are biologically internalized in the brain of the child.

As societies we can and should learn from all these experiments and take measures to avoid the many pitfalls for our young families.

Restructuring our scripting

In each critical period of life we are able to restructure our scripting to learn how to attach, how to behave, how to relate and how to love. There are three ways of restructuring our scripting:

- Biological: we need to live in a secure environment. For this reason immigrants are often anxious because they do not know the rituals and the habits of the country where they live. Everything is new for them. When we take away the stress then the person in question is stimulated to develop further.
- Restructuring the representation of ourselves. Scientists have researched the activity of

the brain during various activities such as speaking, making music etc.. We can, for instance, see that the limbic system lights up or, for other activities, the left brain does so. By talking with somebody about certain occurrences in our lives we integrate these experiences again and in this way we restructure our representation of what happened. Because of this we will change our behaviour.

- The third way is the social organisation in which we find ourselves, for instance the (foster) family in which we grow up.

Because of the above-mentioned considerations I believe that resilience is always possible, but often not so easy to achieve because of the efforts we must make. The older the person is the more difficult the change process will be.



© Epicscotland/Alamy

Professor Boris Cyrulnik is a neurologist and psychiatrist and Director of Teaching at the University of Toulon in France. He is considered to be one of the most authoritative leaders and advocates in France in the area of children and childhood. Because Boris Cyrulnik acquired such a vast knowledge in the areas of neurology, psychiatry and ethology (the science of the behaviour of animals and human beings) his work regarding children is extraordinary rich and diversified.

Boris Cyrulnik is considered as a key expert regarding the resilience of children and as such he introduced the word 'résilience' in the French language. Some of his best selling books, several written together with other authors, are:

- De Chair et d'âme (2006) (About the flesh and the soul)
- Parler d'amour au bord du gouffre (2004) (Speaking about love on the verge of disaster)
- Le murmure des fantômes (2003) (The whispering of ghosts : trauma and resilience)
- Les Villains Petit Canards (2001) (About little, naughty boys)
- Un merveilleux malheur (1999) (Marvellous bad luck)
- L'Ensorcellement du monde (1997) (The spell of the world)
- La Naissance du sens (1995) (The dawn of meaning)
- De la parole comme d'une molécule (1995) (Speaking of words as if they are molecules)
- De l'inceste (1994) (About incest)
- Les nourritures affectives (1993) (Food for affection)
- Le visage : sens et contresens (1988) (The face: sense and nonsense)
- Mémoire de singe et paroles d'homme (1983) (The memory of a monkey and the human word)
- Autobiographie d'un épouvantail (Autobiography of a scarecrow / terrorist)

Boris Cyrulnik has worked during his entire professional career on the subject of the development of children and people in general and the interaction between the person and his biological, psychological and social environment. He is one of the few scientists in the world who commands a view of new scientific insights in neurology, psychiatry, psychology, biology, ethology, linguistics and philosophy and who is able to translate this into sound policy recommendations for numerous organisations working for and with children.