Stress In Infancy And Early Childhood

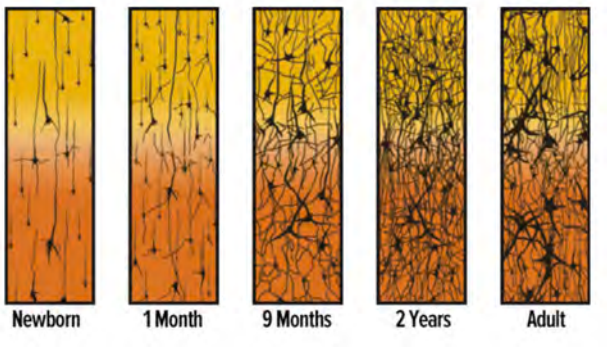
OVERVIEW

This document provides an overview of the scientific community's current understanding of the factors that cause stress early in life, the outcomes of those stressors, and the role of the caregiver (particularly mother) in buffering the stress response.

The Importance of The First Years On Life-Long Brain Development

The first three years of a child's life are the most crucial time for brain development. Never again do humans master anything as complex as language or coordinated walking and running actions (Figure 1). The brain is most "plastic" early in life. That means it is most likely to change in response to learning and experience. Later, plasticity is limited. For example, early life offers opportunity for learning more than one language fluently, whereas later in life a second language is learned with effort and rarely acheives the mastery of native tongue.

The brain is a sponge in early childhood, learning all the world has to offer quickly and being shaped by it. Much like building a house, what is learned early in life becomes the foundation on which everything else builds. If it is a solid foundation, the house is strong and resilient. If it is a weak foundation, it is susceptible to poor outcomes. Physical or psychological stress on either the mother or the infant in these years can shape development in ways that can last throughout life. It can impact the foundation.



Adapted from Corel, JL. The postnatal development of the human cerebral cortex. Cambridge, MA: Harvard University Press; 1975.

Figure 1. The first years of life are the most foundational for brain development. Synaptic density (representing the richness of cells and their connections in the human brain grows a great deal over the first two years. The goal is to shape that growth with as positive an environment as possible.

What is stress?

People think of stress as worry. But stress is also the body's physical response to experiences called "stressors." The brain is always taking in information and deciding if there is any threat to survival. If there is a threat, like a car racing down the street, the body becomes goes into a survival mode called "fight or flight": hormones are released, causing pupils to dilate, the heart to start racing, and digestion to stop. Some stress can be good but too much stress can cause wear and tear on the body that lasts a lifetime.

Because **stress** is a physical response, infants and young children are as likely to experience it as anyone else. Because their brains and bodies are changing, or are plastic, that experience has a particularly negative effect on their development.

Stress
neurobiological response to a disruption in the adaptive functioning of an individual or system

Stressors
experiences or environmental conditions that cause a stress response

Maternal Buffering
the ability of the presence of the mother to act as a signal of safety and to reduce the stress response for children.

Plasticity
The amount of change in a behavior or brain region in response to learning or experience

Infant and toddler **stressors** can be physical, like malnourishment, lack of sleep, or violence. A particular stressor for infants is when they do not have a good relationship with a stable caregiver. Infants rely on primary caregivers (here we often refer to mothers but any loving adult can serve this role) to regulate their development, as they learn to become increasingly independent and to stand on their own. This is called '**maternal buffering**'[1], the process whereby the mother absorbs the environment for the baby, so that the baby can be free of the physical effects of the stressor in the presence of the mother. This allows the brain to stay young and learn from the world without having to worry about their own survival. In scientific terms, it allows for a long period of **plasticity**, or openness to learning and change by the environment.

Studies show that a mother's bond with her infant is crucial for the infant's healthy development and survival[2]. The mother is the infant's first and most important link to the world, and much of what the infant learns about the world around her, including language and social cues, is learned more from her mother than any other companion. A strong maternal bond is characterized by the feelings of love the mother has for her infant, which often manifest themselves through the mother smiling or speaking to the infant or her willingness to provide care[2].

The Science Of Social Buffering Of Physical Stress Response

Before an infant matures enough to achieve emotional independence, the presence of the mother acts as a kind of supplementary buffering system for stress, as the infant's body and brain cannot deal with this stress on its own[3]. The presence of an infant's mother in a stressful situation reduces the amount of stress hormones such as **cortisol** that are released to impact the brain. In the

cases of insecurely attached infants and mothers, though, this mechanism has been found to be negatively impacted, meaning that mothers no longer act as effective buffers for stress and its effects on the infant brain[3].

This can be extremely detrimental to infants faced with stressful situations and extended high levels of **cortisol** as a result of chronic stress can lead to atypical brain development. For example, chronic stress has been found to affect myelination within the brain—a process which allows neurons to quickly and effectively communicate with one another. Chronic stress also causes phenomenon of accelerated maturation that leads to emotional reactivity mentioned above. This buffering continues well into childhood. By adolescence, peers start to become as important as family when it comes to the buffering response[4].

When the mother is stressed or depressed, she is not able to act as a buffer for her infant. High levels of stress can affect the mother's behavior and attitude towards the infant after birth, which can lead to unhealthy child rearing practices which further impact infant brain development. Emotional disorders such as anxiety or depression can cause a change in the way the mother thinks about her child, sometimes making her feel as though she is an inadequate caretaker and leading to feelings of helplessness. This, in turn, changes how she treats the infant and can lead to the child feeling undue amounts of stress. In addition, maternal anxiety/depression leads to an infant having atypical social experiences in early life, which in turn can lead to atypical emotional development. Emotional disorders can also affect the mother's bond with the child leading her to, in some cases, neglect it both physically and emotionally[1].

Cortisol
hormone with many functions; functions related to the stress response are an increase in blood sugar and suppression of the immune system

Internalizing disorders
include depression and anxiety and involve emotional disregulation

The infant brain then shifts from learning mode into survival mode, adapting to the stress in the environment in ways that speed up infant brain development. In the short-term, this helps the baby or young child survive. It is adaptive. In the long term, it can shape the brain to have a hyperactive stress response throughout life, causing problems with cognitive and emotional regulation in late childhood and beyond. Early life stress has been shown to predict:

- Higher than normal reactivity to any emotional stimulus. A simple argument could lead to a violent or destructive temper tantrum as a result of the brain's inability to effectively regulate emotion[5,6].
- A higher tendency to internalize emotions. This tendency often manifests in **internalizing disorders**, like anxiety or depression[5,6].
- Poorer cognitive or achievement skills that make it difficult for the child to be vocationally or academically successful, in part as a result of the extended release of stress hormones in the brain which can affect structures responsible for learning and memory[9]. Complications in cognitive development, especially in language, suffer because a child's first understanding of social interaction stems from the facial expressions of those around them.[7]

Infant Stress Invterventions

A number of interventions have been shown to mitigate the negative effects of initial maternal stress on children's neural development. These approaches are generally divided into maternal focus and infant focus interventions. **Maternal focus** interventions target the child by decreasing the mother's stress levels or increasing her commitment to the infant. Programs educate caregivers on how their response to stress affects their child's development and how they can display more sensitive parenting behaviors. A similar result was obtained in a study where nurses visited disadvantaged pregnant mothers, and later their infants at home[8]. Results showed this simple informative health parenting interaction improved children's outcomes 12 years later, and resulted in reductions in substance use and mental health problems, relative to children from the same backgrounds but without the early nurse visits.

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Infant Focus Interventions
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Self-regulation
ability to regulation own emotions, actions, and thoughts effectively. This develops gradually throughout childhood and is an indicator of success later in life.

Infant focus interventions aim to help infants directly without focusing on the mother. Maternal focus interventions are found to be generally more effective than infant focus interventions, making the latter a more last resort option for improving infant mental health. Here we offer two examples of maternal focus interventions.

Maternal Focus: ABC-T[9]

The Attachment and Biobehavioral Catch-up for Toddlers (ABC-T)[9] intervention is designed for high-risk groups, and adoptive or foster parents. The intervention is an opportunity for parents to support their children's' self-regulation development. **Self-regulation** refers to a child's ability to regulate their attention (e.g., to sit and listen to a lesson or to follow direction), emotion (e.g., to not tantrum out of fear and helplessness), and actions (e.g., to not act in anger toward self or others). In particular, the intervention aimed to give parents and other caregivers the tools to provide nurturance, to be responsive to the child's needs, and to care the child without using frightening tactics. This stule of parenting offers the child confidence in their safety and buffers the stress response in uncertain situations. The intervention lasts for roughly 10 60-minute sessions, where a coach offers feedback in real-time, as the parent was interacting with their 6-24 month-old child.

Often parents have a difficult time understanding the child's signals, what it is that they want or need, which can lead to a cycle of upset for both the parents and their child. This can be particularly problematic if the parent is already stressed, depressed, or anxious. In the first two ABC-T sessions, the coach helps the parent figure out the child's verbal and non-verbal cues, and offers support in how to respond to those cues with nurturance. The next two sessions teach the parent to follow their child's lead. Sessions 5-8 are where parents are encouraged to see themselves through the child's eyes, and to recognize scary behaviors and develop other more supportive responses to their child. The final two sessions are to practice the new nurturing interaction strategies learned in previous sessions. The presence of a coach is key to the success of the intervention. It often takes someone outside of the parent-child circle to see what is happening without emotion or judgment.

In one study testing the efficacy of this intervention with American foster parents, they found that children of foster parents who received this intervention showed similar self-regulation outcomes to children who were never in foster care, and they outperformed children in foster care whose parents never received the ABC-T intervention.[9]

Maternal Focus: Family Foundations Intervention[10]

Psychoeducational intervention approach that focuses on behavioral change rather than medical or pharmacological intervention

The first of the maternal focus interventions focuses on decreasing maternal stress, beginning before the birth of the child and continuing for two to three months postpartum. The intervention focuses specifically on co-parenting quality, under the assumption that strengthening the bond between parents will lift some of the stress of the mother.

The intervention is **psychoeducational,** which means it is relatively inexpensive, and has been found to have more long lasting effects than medical mental health treatments. In addition, medications such as antidepressants have been found to have negative effects on an infant if a mother takes them while pregnant, making psychoeducational therapy a far safer option.

As previously stated, prenatal depression and anxiety can cause a number of side effects in the infant, such as low birth weight or medical complications at birth, mortality, poor developmental/behavioral outcomes, chronic health issues and psychological issues. The stress that causes maternal anxiety/depression can come from a number of sources, but this intervention focused specifically on poverty and financial strain, choosing to test the intervention on low-income first time parents. The intervention consisted of nine classes—five during pregnancy and four after birth that were held on a weekly basis. The material was comprised of presentations, videos, couple skills training exercises and group discussions (Spotlight). It was found that this intervention significantly helped mental health and adjustment for parents and reduced maternal depression, improved overall parenting quality, decreased family violence, improved the child's ability to regulate emotions (which led to decreased emotional reactivity and anxiety/depression rates) and improved their ability to adapt to schooling environments when tested at the age of seven.

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Maternal Focus: Maternal Bonds[2]

A weak maternal bond can result in increased perceived parenting stress on the mother, which in turn can result in unhealthy parenting techniques. The mother then feels the child is difficult which further weakens the maternal

bond, creating a cycle that is difficult to break. Maternal bonding can also reduce the effects of postpartum depression. For these reasons, this intervention focused on improving the maternal bond between mother and child in order to decrease stress on the mother and thus mitigate negative effects on brain development.

The maternal bond is created in the first week weeks after birth and is characterized by positive feelings, emotional warmth, affection, and maternal behavior (cuddling/smiling). This period is also termed as 'falling in love with the baby.' Through no fault of her own, maternal stress, especially extreme cases that result in psychiatric disorders (depression, anxiety, etc.), can lead to bonding impairment as a result of irritability, hostility, aggressive impulses, or rejection towards the infant on the part of the mother. The more severe the depression, the worse the impairment to bonding is.

This intervention used a video-feedback approach in which mother-infant interaction was recorded and then analyzed with regard to the positive behaviors shown by the mother in terms of interaction and emotional connection with her child. The mother was then given positive feedback on these aspects of her behavior, supporting positive reinforcement and an increase of the positive behaviors. Although this approach was effective in strengthening the maternal bond, treatments need to be customized in order for the intervention to be most effective.

SPOTLIGHT ON

Family Foundations Intervention

- Mutual support strategies four couple during stressful times
- Parental emotional self-management
- Conflict resolution skills between the couple
- Cognitive attributions to conflicts within the relationship (i.e. who each member of the relationship blamed for conflicts when they came about and how they could consciously change this pattern of blame)
- Problem solving skills
- Communication skills

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