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Considerable research, both experimental research with animals and research with humans, now documents the detrimental effects of early stress on brain development. These effects can occur not just in response to intense and repetitive stressful situations, but with some probability may also occur in situations of parenting that is not responsive. In this context, this article addresses the biologically and ethologically based reasons that crying is detrimental to infants’ development—negatively impacting neurological structures, stress responses, physical health, and socioemotional well-being.

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From birth, human infants have a limited ability to control their environment. If distressed, they will usually cry, but it is not up to them what happens in response to that cry. Infants have limited self-soothing abilities (Emde, 1998), and are reliant upon an appropriate response from caregivers. Of course, as they develop, their response repertoires increase so that they may be responded to more effectively, and their own coping and self-soothing behaviors also develop.

It remains true, however, that the successful development of an infant and even a young child is due to an intricate, interactive process between that child and its caregivers. In that context, the number and kinds of stressful events (or “stressors”) that an infant encounters in the course of a day is a factor that may have a major effect on their development. While caregivers cannot totally eliminate stressors, they can have major control over the number and kinds of stressful events. Caregivers can impact infants’ experiences of stressors as well by being present, holding and/or otherwise consoling an infant during a stressful event.

The purpose of this article is to examine a large body of evidence on the effect of early stressors on development. In “Why Not ‘Crying It Out’ Part 2” in this Special Issue, we examine common care practices in some cultures, such as northern Euro-American cultures, that can produce excessive stress for some infants and young children. What mitigates against these stressors is re-adopting practices familiar to lactation consultants and protective of infants’ development. These practices can include co-sleeping or parent settling sleep,

increasing the rate of bodily contact and holding, and other responsive care behaviors. The argument for these mitigating practices will be presented based on this evidence.

Evidence for the Negative Effects of Stress on Development

The literature on the effects of early stressful events on development has been growing by leaps and bounds in roughly the last 15 years. The evidence for these effects comes from two sources: (a) experimental research on animals, such as rats or monkeys, which combines controlled exposure to stressful events with examination of brain changes and behavior, and (b) research involving human children and adults that relates different kinds of early experiences to brain changes and/or to behavior in a correlational fashion. Each will be briefly reviewed in turn.

Effects of Stressful Events on Brain Development in Non-Human Animals

Recognizing that we are mammals is an important step in helping to understand the importance of early care. Because of the nature of development, researchers and scientists are able to explore the connection between care and brain development—particularly with regard to early care and the impact on later behavior—more readily than they might if working with new parents and infants. The information gathered has provided substantial support that solidifies the importance of early care. The strength of this support is presented here as a means of assuring lactation consultants of the value and importance of the sleep and care routines often recommended.

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Biological Importance of Maternal Care

A number of investigators have studied the long-term effects of stressful early rearing conditions in nonhuman animals. Some of the early research in this area provides a clear look into the importance of care in shaping later behavior. In their research using rhesus monkeys, Suomi and colleagues (1987; 1991) have investigated the differential effects of being reared by their mother in the traditional way or by being separated from the mother and being reared by peers. Peer-reared monkeys seemed to develop relatively normal social behavior as long as they were in familiar settings. When exposed to stressors, such as separations from other monkeys, however, they exhibited much more behavioral disruption, and a greater activation of the hypothalamic pituitary adrenal axis and other systems involved in dealing with stress.

Suomi (1987) also reported that there were important individual differences in the reactivity of different individual monkeys, with roughly 20% of them being highly reactive to stress. Even when mother-reared, these monkeys showed much more extreme behavioral and physiological reactions to stressful situations. They might, for example, appear fearful in novel situations and have heightened levels of cortisol and ACTH (adrenocorticotrophic hormone). These patterns of behavior, both from monkeys who were reared by peers, and in the highly reactive monkeys, have been found to persist into later development.

Stressful Environments and Caregiving

Research continues to support these earlier findings. In an extensive review of studies with rodents and also non-human primates, Sánchez, Ladd, and Plotsky (2001) summarized a great deal of evidence showing the role of stress in early rearing for both rodents and primates. What was evident through the review was that early adverse experiences, including prenatal stress or illness in the mother and separations from the mother, for either brief or extended periods of time, changes the way that the limbic-hypothalamic-pituitary-adrenal (LHPA) axis is regulated. While the negative effects on this stress-regulation system have been shown to vary somewhat in different individuals and during different periods of development, across all the species studied, a number of similar effects were seen. These included: “increase in fearfulness and anxiety-like behavior, and ... deficits in social behavior, sexual behavior, and cognitive performance” (p. 440, Sánchez et al.).

One interesting finding that is also part of this literature is that for rodents, certain caregiving behaviors from the

mother, specifically licking and grooming of the pups during the first 10 days, led to reduced levels of plasma adrenocorticotrophic hormone as well as other responses to stress (Liu et al., 1997). According to the authors, an important function of maternal behavior is to “program” the regulation of the LHPA axis. We will argue (below) that the same is true in humans.

Research on Effects of Stressful Events on Human Behavior and Brain Development

The long-term effects of early stress experiences have been found to be much the same in humans. Sources of stress examined in regard to infants’ well-being have included studies regarding trauma or abuse in infancy (e.g., Essex, Klein, Cho & Kalin, 2002; Ito, Teicher, Glod, & Ackerman, 1998; Perry, 1997). Other literature discusses stressors that a significant number of children are exposed to, including low socioeconomic status (Lupien et al., 2000), stress due to maternal depression (e.g., Ashman et al., 2002; Essex et al., 2002), and simply “low quality maternal behavior” (Hane & Fox, 2006). This body of research has been summarized both by the National Scientific Council on the Development of the Child (2005) and Shonkoff and colleagues (2012).

These latter reports, in particular, include evidence showing that there are short- and long-term effects on both mental and physical health when children grow up in stressful environments. Exposure to chronic stress seems to be associated with physical disorders (for example, cardiovascular disease, cancer), and also psychological disorders, such as depression and anxiety (see McEwen & Seeman, 1999). In some studies, exposure to high amounts of cortisol that is released in response to stressors has been shown to result in damage to the hippocampus (involved in learning and memory; e.g., Lupien et al., 1998), and the amygdala (involved in the processing of emotions; e.g., Wolterink et al., 2001).

Why This Is Important

During the first years of life, a child’s experiences of stress will begin to shape the functioning of their stress response systems. When infancy is marked by acute or chronic stress experiences, the impact on this system can be irreversible, leading to the development of an overactive, intense response system to stress or a dampening of response (Gunnar, 1998). Infants’ first experiences are crucial for the developing hypothalamic-pituitary-adrenocortical (HPA) axis because this system is very responsive to stimulation. This can be seen by parents and care providers in infants’ experiences of everyday events, even minor events such as being

undressed. In her work, Gunnar has found that infants can experience elevations in cortisol during these caretaking activities (Gunnar, 1992). Some infants may be more sensitive to these events based on being temperamentally more reactive. The findings of this kind of research are very much echoed in the findings from the research reported by Sánchez, Ladd, and Plotsky (2001), among many others.

The sum of this research, conducted across different populations and using many different methodologies, suggests that exposure to stressors early in life can rearrange certain systems in the brain, particularly the limbic-hypothalamic-pituitary-adrenal (LHPA) axis, which responds to stress. Dysregulation of the LHPA axis is related to both physiological changes that are related to physical illnesses, and to psychopathology (see Caldji, et al., 2001; DeBellis, et al., 1994; Heims, Owens, Plotsky, & Nemeroff, 1997; Young, Abelson, Curtis & Nesse, 1997). Most importantly, these effects appear to be present along a continuum of stressor severity, from severe stressors such as separations from the mother, to those that are less severe.

What Kind of Model Should We Use When Thinking about the Effects of Stress?

In thinking about the possible effects of stressful events, it is important for parents, and those working directly with parents, to have an explanatory model that fits the results that are described. With such a model, it would be possible to address some of the typical early care questions parents may raise. Questions might include whether an equally severe form of stress could be expected to have the same kinds of effects on all individuals? Are there characteristics of individuals or are there other events that might mitigate these possible effects?

A Model Helpful for Working with Families

Currently, one can best describe the explanatory models of the field as consisting of multilevel-dynamic systems accounts, in which characteristics of individuals, as well as contexts, are both important in understanding outcomes of development. According to Sameroff (2010), the self consists of interacting psychological and biological processes, resulting in a biopsychological self-system. In this system, psychological processes include social behaviors, cognitive and emotional intelligence, and mental health, while the biological processes include the nervous system and neuroendocrine systems among other processes. The system then interacts within the settings of family, school, etc. This transactional model

of development suggests a system of back and forth influences between the biology of the individual and the characteristics of the various environments that the individual interacts within. That is, a biological change may affect an individual's behavior, which might then elicit changes in the environment. That changed environment can then impinge on the biological systems that started the cycle in the first place. These transactions have to be considered over time, and in the context of how the individual is changing. In general, in examining the influence of negative events, such as stress, research has relied on what is called the diathesis-stress model (e.g., see paper by Caspi and co-authors, 2002), in which a biological vulnerability of some kind is shown to worsen the effects of stress.

Model Application

This model helps to explain what lactation consultants know from working with families. However, in this application, the lactation consultant has the tools and explanations to help mothers understand the importance of seeing their infants as individuals and their relationship with the infants as impacting their system of interaction.

A second new development in the field helps to make even more clear the importance of the interaction between mothers and infants – a relationship that the lactation consultant has the capacity to discuss with mothers. This development is the recognition of a more general “differential susceptibility” to experiences (Belsky, 1997). For example, in studies of the effects of children's early experiences in child care, few overall negative effects of child care were found. When researchers focused only on children with negative temperaments, however, they found that these children were both more negatively affected by low-quality care environments and more positively affected by high-quality care environments (Pluess & Belsky, 2009). Keeping these models in mind will be useful when considering whether some infant care practices, that are used by many parents in this and other cultures, could cause significant enough stress to change an infant's developmental course to one that is less than optimal.

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Development of Electronic Health Record (EHR) Implementation Guide for Documentation of Exclusive Breast Milk Feeding (EBMF)

Beginning in 2014, a digital Clinical Quality Measure, *Exclusive Breast Milk Feeding in Infants* (NQF 0480), is one of multiple measures that eligible hospitals and critical access hospitals may select as part of the Health Information Technology for Economic and Clinical Health Act's "meaningful use" reporting component for 2014 EHR adoption financial incentives. This measure is also a mandated measure for those hospitals accredited by The Joint Commission and helps support the requirements of Baby-Friendly designation. Providing EHR vendors and hospitals/providers with guidelines (both technical and functional) allows for a collaborative approach towards quality data capture and reuse downstream. [Read the full announcement.](#)

Source: USBC