

# What About The Children?

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## RESEARCH SUMMARY

### **Neglect, HPA Axis Reactivity, and Development (2019)** A review paper

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Physical neglect is defined as the failure of a carer to give food, shelter, clothing, medical care or supervision. Many children identified as suffering from physical neglect may also be suffering from psychosocial neglect. Neglect can occur with other forms of maltreatment and it can therefore be difficult for researchers to isolate the timing and maltreatment-specific effects of neglect; however, it is a significant contributor to infant stress and cortisol release patterns in childhood.

The impact of cortisol on the brain and body is experienced long after cortisol levels have returned to baseline. Cortisol follows a pattern that contributes to our circadian rhythm. It increases sharply on waking up, peaking 30-45 minutes later, then decreases throughout the day, reaching its lowest levels 30 minutes after the start of sleep. The HPA axis (the Hypothalamus, Pituitary, Adrenal axis) is a key component controlling the stress system in mammals. When we experience stress our bodies respond by releasing cortisol to activate processes that help us react to the perceived threat. In a typical stress response, cortisol levels sharply increase following the onset of a stressor, reach their peak after about 20-25 minutes, before slowly decreasing back to baseline levels. Much research has been conducted examining the effect of neglect on the HPA axis in mammals; animal models have been used to help with an understanding of these causal mechanisms in human development.

Foetal exposure in humans to stress hormones programmes lifelong stress physiology. Reasons that lead mothers to be neglectful, and there are many, include stress, poverty, social problems and anxiety. These problems may also have caused them to experience high levels of stress during pregnancy. This could be a further possible pathway for their subsequently neglected child developing HPA axis regulation difficulties.

The HPA axis has its set point for regulation fixed early in life by both genes and experience. With previously institutionalised children, the first one and a half to two years is the most significant period for the effects of neglect on the HPA axis. These effects last even after children are moved into more supportive environments.

Children reared in institutions with low-quality caregiving provide a model for separating psychological from physical neglect. Also the timing and maltreatment-specific effects of neglect can be observed when children are later moved into higher quality care, such as being fostered with a family. Children in institutions usually experience psychosocial neglect, but whether there are differences between the effects of physical and psychosocial neglect on the HPA axis remains questionable. Physical and psychosocial neglect can signal that the children are not receiving proper care however, and these difficulties can activate the HPA axis, leading to its dysregulation.

There are two theoretical models that address early life adversity together with stress reactivity and development. The first is the "allostatic load model" which defines allostasis as the maintenance of stability through change. That is to say, when faced by a stressor, stress-

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mediating systems increase their activity to maintain stability throughout the challenging experience. If activated too frequently, or for too long, then modifications occur in the stress-mediating and stress-reactive systems, and this leads to impairment in their functioning. They can become hyper-reactive (over reactive) or hypo-reactive (under reactive). Stress-mediating systems, like the HPA axis, are being shaped early in life, and adverse care such as neglect, during those sensitive periods, shapes these systems which then respond differently from when not exposed to adverse early care. There can, in certain adverse circumstances therefore, be a more rapid accumulation of allostatic load and earlier presentation of physical and psychological disorders. There is evidence that in some circumstances being apparently psychologically and behaviourally resilient to chronic adversity early in life can lead to impaired physical health. Early life adversity should therefore be studied for its effects on physical health.

The second model, the “adaptive calibration model” is an evolutionary-developmental approach. This model, or hypothesis, incorporates life history theory along with the biological sensitivity of the child within the context of its response. The context hypothesis argues that stressors during early development shape stress reactivity. A moderate amount of stress results in a somewhat buffered system. However, very little stress, or high levels of stress, produce more highly reactive systems. Patterns of stress activation early in life calibrate stress response systems to take different life history strategies. Frequent activation of the HPA axis early in life would convey an unpredictable environment to the developing child, characterized by a high risk of experiencing serious physical danger. This would lead to an accelerated life history strategy, and the calibration of the stress response system to be readily adaptable to a high risk environment. (Note: *This circumstance gives rise to the creation of a highly combustible ‘on the edge’ type of personality, primed to instantly react to the slightest irritant*).

The immune system and HPA axis have a two-way connection. Immune system activity may both moderate and mediate the influence of neglect on the HPA axis. The immune system becomes less regulated following chronic cortisol increases. Although the immune system’s main function is to defend the body against infection it also responds to other stressors, including psychosocial stressors. These stressors can cause an inflammatory response. The immune system may also mediate the association between neglect and HPA axis function through chronic inflammation as well as contributing to the increased risk of physical and psychological problems related to neglect. Chronic low-grade inflammation is believed to contribute towards numerous physical and psychological disorders.

When children are still developing the capacity to regulate their stress response they need an external figure, a reliable caregiver, to buffer their stress systems. Attachment figures are the most potent stress buffers. Sensitive, responsive care-giving forms the basis of secure attachment relationships; these then provide more powerful stress buffers than insecure relationships. When children reach puberty the potency of parents as buffers of the HPA axis diminishes. Neglect may influence the stress system programming by disrupting attachment and depriving young children of a stress buffer. If institutionalised children have not had the chance to form a secure attachment to a member of staff, it is not clear whether any later attachment relationships will be successful at regulating their physiology.

Emotional and behavioural self-regulation is the ability to increase or decrease control over the experience and expression of emotion and emotion-related behaviour. The ability to self-regulate plays an important stabilising role in responding to stressors. Overall, greater self-regulation abilities are important for adapting an individual’s responses to stressors.

Evidence suggests emotion regulation skills may moderate the relationship between neglect and stress and, interestingly, differences were found in male and female responses to neglect. Female adults with a history of childhood emotional neglect showed emotion regulation skills, moderating the association between neglect and perceived stress. However, this was not shown in males. Also, previously institutionalised adolescents demonstrated less emotion regulation than adolescents born and raised in families.

The impact of neglect on the regulation of the HPA axis depends on the age when neglect was experienced and the age when effects were examined. There is evidence that infancy is a sensitive period for HPA axis development, lasting between 1.5 and 2 years of age. Puberty is another important age when stress systems may be elastic and shaped by experience.

Evidence of sex differences in outcomes following neglect is mixed. Some evidence indicates that boys are more impacted by early neglect. Females show greater improvements in later attachment quality; however, males do show greater reductions in callous-unemotional traits following foster-care intervention.

Genetics is also an influence on the HPA axis function. Family adversity moderates the heritability of HPA axis functioning at different points in a child's development. There are a number of different genes that are involved in the regulation of the HPA axis, and some appear to be playing a role in moderating the association between neglect and its function. There is evidence to show that shared genetics may account for some of the association between adversity and stress reactivity; however, a need has been identified for more research in this area.

Future work that could separate out the influence between the physical and the psychological aspects of neglect on the developing HPA axis, along with the moderators of each type, would be beneficial for a greater understanding of the mechanisms of these associations. This would also assist in helping to structure a more targeted approach to interventions, by learning how neglect can become biologically embedded. It might then become possible to reduce the influence of neglect on the developing stress system.

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