

Developing a healthy stress response in childhood: The role of the environment

Jennifer Lavoie, M.Ed.
Liane C. Pereira, M.S, M.A.
University of McGill

Abstract

Learning to cope with stress is part of healthy development in childhood, which leads to better stress management in adulthood. The critical period for learning to regulate one's stress response is early childhood, but this is also a time when children have little control over their environment yet learn cues for responding to stress from their social and physical environments. Children who are most impacted by stress in the environment are also the ones who do not have access to the social, emotional, and physical resources to help them learn to cope effectively with stress. Working from a psychobiological definition of stress, this paper presents the magnitude of the impact of stress in early childhood on future physical and mental health as the rationale for the need to construct and implement supplemental resources to those available in the children's developmental environments.

Résumé

Apprendre à composer avec le stress fait partie du développement normal de l'enfant, et cette faculté permet de mieux gérer le stress à l'âge adulte. La période névralgique pour apprendre à canaliser le stress est le début de l'enfance, mais cette étape de la vie en est une où les enfants ont peu de contrôle sur leur environnement. Or, les enfants arrivent malgré cela à acquérir des réflexes pour répondre au stress en puisant dans leur environnement social et dans leur environnement physique. Les enfants qui souffrent le plus du stress environnemental sont aussi ceux qui n'ont pas accès aux ressources sociales, émotionnelles et physiques qui pourraient les aider à apprendre à composer efficacement avec le stress. Se fondant sur une définition psychobiologique du stress, l'article décrit l'ampleur de l'incidence que le stress vécu au début de l'enfance peut avoir sur la santé physique et mentale future des individus, et se sert de ce constat pour justifier le besoin d'élaborer et de mettre en œuvre des ressources d'appoint dans les environnements où les enfants se développent.

Stress is a part of living, however when stress levels are not well-managed they can lead to many physical and mental health problems later in life (E.g., Beckie, 2012). This is especially poignant for children who are in the early stages of physical, cognitive, and emotional development because stress can alter these trajectories in sometimes significant and lasting ways (Danese & McEwen, 2012). Early childhood is a critical period for developing a healthy emotional and behavioural response to stress, which in turn impacts the physiological response to stress. When children live in a constant state of physiological stress without the emotional, social, and physical resources to offset it, many negative physical and mental health outcomes ensue (Shonkoff et al., 2012). Furthermore, the children who are the most impacted by stress in the environment are also generally the ones who do not have access to the resources to help them cope with it effectively. With such profound implications for physical and mental health and general quality of life, childhood stress is a subject of significance and interest to researchers across many disciplines.

Studying stress from a psychobiological perspective highlights that stress is a state of physiological arousal affecting cognition, emotions, and behaviour that has a detrimental effect on child development when chronic or constant. Consequently, this review will (a) highlight the relationship between childhood stress and development; (b) examine the impact of the developmental environment on how children learn how to cope with stress; (c) present the factors that affect stress in childhood; (d) frame the need for supplementing social and emotional resources to children's developmental environments; and (e) discuss the implications for professionals in psychology working with children and for future research on stress in childhood.

Defining Stress

Establishing a common framework and context for understanding how stress impacts childhood allows researchers and practitioners to construct stress in a similar manner. When discussing a phenomenon as complex as childhood stress, it is helpful to establish



a common understanding because the perspective from which stress is studied will determine how the resulting knowledge is translated to recommendations for practice. For example, if stress is only studied observationally, as is often the case in many research studies, much of the complexity of the mind-body interaction is lost, and the practice developed from the research will not address the complex factors of interaction that affect stress. By studying the interaction between the physiology and psychology of stress, meaningful practice recommendations can be made that reflect the inherent multifacetedness of stress. Accordingly, this review presents stress as a psychological state that impacts both the mind and body (Lundberg, 2008). This understanding of stress posits that events or situations that exceed an individual's perceived abilities to resolve the event or situation trigger a measurable stress response in the body (McEwen, 2006), essentially a state of arousal as the body diverts its resources to resolving and overcoming the situation (Motzer & Hertig, 2004). While there are many long-term damaging effects to the body when stress is chronic or constant (McEwen & Gianaros, 2010), it can also help an individual adapt to his or her surroundings when the individual has the resources to effectively or appropriately address the stress. Thus, the resources that the individual has at his or her disposition can change the impact that stress has on his or her mind and body. This distinction highlights the key role that the social, emotional, and physical resources in the environment have in supporting how well children cope with stress.

Environmental Impact on how Children Experience Stress

Psychobiological research on the impact of chronic stress in childhood is crucial because of the foundational impact childhood has on life course health and development (Center for the Developing Child at Harvard University, 2010; Shonkoff et al., 2012). Part of healthy development is learning to cope with stress in the environment, whether it be chronic stress from living conditions, acute stress from life events, or daily hassles, because a continuously aroused stress response is particularly damaging for children who are still developing physically, emotionally, and cognitively (Danese & McEwen, 2012; Duncan & Murnane, 2011). The Center on the Developing Child at Harvard University (2010) has emphasized the significance of environments that are physically and emotionally safe and that invite interaction between caring adults and children for setting a foundation of future physical and mental wellbeing. In fact, relationships, physical space, and the availability of adequate physical, cognitive, and emotional resources are all part of that developmental environment and need to be in-

cluded when intervening in childhood stress.

Previous studies have identified various factors in the environment that elicit a psychobiological stress response in children and impact their development. These factors include adverse life experiences (Felitti et al, 1998; Foster, Hagan, & Brooks-Gunn, 2008), toxins in the environment (Diez-Rioux & Mair, 2010), unsafe environments (Sharkey, Tirado-Strayer, Pappachristos, & Raver, 2012), and neighbourhood poverty (Chen, Cohen, & Miller, 2010; Schulz et al., 2012). Danese and McEwen (2012) discussed a decrease in hippocampal volume and an increase in amygdala volume in response to chronic or toxic stress created by these factors. They stated these changes in the brain—"deficits in declarative, contextual, and spatial memory" (p. 30) and increased fear response—hurt the child's development in ways the child cannot control. Similarly, Duncan and Murnane (2011) posited that these changes in hippocampal and amygdala volume may affect the child's ability to identify and regulate emotions, both important tools in deactivating the stress response. Teaching these skills not only helps in daily functioning but also makes lasting physiological changes on future physical and mental health.

Supplementing Resources in the Developmental Context: Social and Emotional Skills

When intervening in childhood stress to make lasting physiological changes, the strategies employed need to be developmentally sensitive. The central difference between the ways that children and adults experience stress is that children generally have fewer developed coping skills to manage situations or events that elicit a stress response. In fact, the Center on the Developing Child at Harvard University (2007) explained that young children depend on caregivers to teach them to deactivate their stress response; they stated "healthy development depends on the capacity of these [stress response] systems to ramp up rapidly in the face of stress, as well as their ability to ramp back down and return to baseline when they have done their job" (p. 10). Gunnar and Donzella (2002) elaborated that children who are not receiving sensitive care from their caregivers have a higher response to environmental stressors than children who are receiving sensitive care. When caregivers either do not model effective stress deactivation methods or are not responsive to the needs of the child, young children do not learn the tools that they need to cope with the stress they experience, which, in turn, affects their behaviour. Thus, even though they have little control over their environments, caregivers, or socioemotional learning, children are the ones most impacted when they do not learn the coping skills to regulate their stress re-

sponse. As a vital part of a child's developmental environment, caregivers should be included in stress management training because they are key influences on the development of children in their care.

In addition to targeting caregivers in the mediation of stress responses in childhood, emotion-regulation skills should also be included in stress interventions because regulating emotions is part of learning healthy mechanisms to cope with stress. Specifically, expressing emotion is part of learning to regulate emotion (Peedom, 2008), and Heim, Ehler, and Hellhammer (2000) elaborated that suppressed emotions may be related to lower daily cortisol levels, an indicator of an unhealthy stress response. Thus, the inability to recognize and express emotions could be impacting how children respond to stress. Taylor, Way, and Seeman (2004) explained that children who do not learn these social and emotional regulation skills, specifically "the experience, control, and expression of emotion" (p. 1366) when they are young are much more likely to have difficulties coping with stress when they are adults. In comparison, children who employ emotional regulation skills are better equipped to regulate their stress responses, which is why teaching these skills to all children, not just the ones who seem to be struggling, is so important. Additionally, teaching all children socioemotional skills is a way to support children who have not had access to the same resources in their developmental environment without placing a negative stigma.

Implications for Professionals in Psychology and Future Research

Understanding the impact of the environment on the development of children's stress response has implications for professionals who work in psychology, particularly in terms of facilitating more effective intervention in childhood stress. One of the ways to recognize when children are not coping effectively with stress is negative behavioural and emotional manifestations, as they may indicate they have not learned the social and emotional regulation skills necessary for managing stress (Taylor, Lerner, Sage, Lehman, & Seeman, 2004). These behavioural and emotional manifestations can include externalizing responses such as frequent tantrums, and internalizing responses such as the emotional inability to recover from unpleasant events, which can be indicated by emotional withdrawal and social inhibition (Essex et al., 2006). This is especially relevant for professionals working in school psychology because children who are not managing their behaviour and emotions well are often the ones most referred for psychological assessment and care (Loman & Gunnar, 2010) in educational settings. Those working with children should view these behaviours as symp-

oms of a more pervasive problem, and also as an indication that there are deficits in the socioemotional development of the child that require attention. While one may presume that the child will learn these skills from caregivers or even at school, this is not always the case (Repetti, Taylor, & Seeman, 2002). When professionals in psychology believe that these skills will be learned from adults in the child's developmental context, the focus in the child's psychological care becomes treating the undesirable behaviour and heightened emotional responses of the child more so than building the tools to affect change at the problem's origin (Lean & Colucci, 2010). As such, teaching emotion- and behaviour-regulating skills as a part of the child's psychological intervention may influence the desired long-lasting changes on both a psychological and physiological level. Essentially, these psychoeducational tools will enable children to change how they react to stressors, thus impacting both their mental and physical health.

In moving towards a model of educating children about emotional regulation techniques as a primary part of their psychological intervention before such intervention is necessary, children will become better positioned to control their responses to stress to support their own physical and mental health. This way, children who do not have or who have not had access during the critical period of development to these social resources will still have the opportunity to learn stress management strategies. One promising model for teaching emotional regulation techniques includes school-wide approaches of social and emotional learning (Jones & Bouffard, 2012), which would move away from a model of targeted intervention towards a model of universal design (Howard, 2004). This inclusive strategy of using prevention and promotion would reach a broad and diverse group of children, benefitting a greater number of children than is possible to reach through targeted psychological intervention alone.

Another implication of this research is to include environmental factors in childhood stress studies, through pathways such as responsive caregiver relationships (Repetti, Taylor, & Seeman, 2002), safe physical environments (Evans, 2006), and modeling of effective stress-management techniques (Taylor et al., 2004). In particular, studies exploring the interactions between factors in the environment and differences between individual responses to stressors would elaborate on the pathways through which children develop healthy stress responses. Including these factors would help determine how personal characteristics such as social or emotional competencies impact the way children experience these stressors and would have great implications for psychological and educational practice.

Moving Forward in the Field of Childhood Stress and Development

Stress that is chronic, constant, or beyond children's coping abilities is very damaging to future physical and mental health and the impact of this damage lasts long into adulthood. For example, stressors in the environment that impact children's development include difficult life events (Foster et al., 2008), neighbourhood poverty (Schulz et al., 2012), neighbourhood safety (Sharkey et al., 2012), and exposure to toxins (Diez-Rioux & Mair, 2010), among many others. The strategies that children learn to cope with stress when they are young are used into adulthood, thus it is to society's benefit that children learn effective tools as early in life as possible. This research suggests that the developmental environment is very important to the way children learn to respond to and recover from stressors. Part of the process of mediating the ill effects of chronic and constant stress in childhood includes involving parents and caregivers, focusing on emotional regulation and socioemotional learning, and using universal models to teach stress management skills. Future research can focus on increasing the understanding of how children experience stress at a biological and psychobiological level. This continued research and practical support for responsive environments where children live and grow is a vital component in affecting change toward a healthier future for the coming generations.



References

Beckie, T. M. (2012). A systematic review of allostatic load, health, and health disparities. *Biological Research For Nursing*, 14, 311-346. doi:10.1177/1099800412455688

Center on the Developing Child at Harvard University. (2010). The foundations of lifelong health are built in early childhood. <http://www.developingchild.harvard.edu>

Center on the Developing Child at Harvard University. (2007). A science-based framework for early childhood policy: Using evidence to improve outcomes in learning, behavior, and health for vulnerable children. <http://www.developingchild.harvard.edu>

Chen, E., Cohen, S., & Miller, G. (2010). How low socioeconomic status affects 2-year hormonal trajectories in children. *Psychological Science*, 21, 31-37.

Danese, A., & McEwen, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior*, 106, 29-39. doi:10.1016/j.physbeh.2011.08.019

Diez Roux, A. V., & Mair, C. (2010). Neighborhoods and health. *Annals of the New York Academy of Sciences*, 1186, 125-145. doi:10.1111/j.1749-

6632.2009.05333.x

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., ... & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43, 1428-1446.

Duncan, G. J., & Murnane, R. J. (2011). *Whither opportunity?: Rising inequality, schools, and children's life chances*. New York; Chicago: Russell Sage Foundation; Spencer Foundation.

Essex, M. J., Klein, M. H., Cho, E., & Kalin, N. H. (2002). Maternal stress beginning in infancy may sensitize children to later stress exposure: Effects on cortisol and behavior. *Biological Psychiatry*, 52, 776-784.

Essex, M. J., Kraemer, H. C., Armstrong, J. M., Boyce, W. T., Goldsmith, H. H., Klein, M. H., ... & Kupfer, D. J. (2006). Exploring risk factors for the emergence of children's mental health problems. *Archives of General Psychiatry*, 63, 1246-1256.

Evans, G. W. (2006). Child development and the physical environment. *Annual Review of Psychology*, 57, 423-451.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood experiences (ace) study. *American Journal of Preventive Medicine*, 14, 245-258.

Foster, H., Hagan, J., & Brooks-Gunn, J. (2008). Growing up fast: Stress exposure and subjective "weathering" in emerging adulthood. *Journal of Health and Social Behavior*, 49, 162-177.

Gunnar, M. R., & Davis, E. P. (2013). The effects of stress on early brain and behavioral development. *Neural circuit development and function in the brain* (pp. 447-465). San Diego, CA: Academic Press.

Gunnar, M. R., & Donzella, B. (2002). Social regulation of the cortisol levels in early human development. *Psychoneuroendocrinology*, 27, 199-220.

Heim, C., Ehler, U., & Hellhammer, D. H. (2000). The potential role of hypocortisolism in the pathophysiology of stress-related bodily disorders. *Psychoneuroendocrinology*, 25, 1-35.

Howard, K. L. (2004). Universal design for learning: Meeting the needs of all students in the curriculum--multidisciplinary. *Learning & Leading with Technology*, 31, 26-29.

Jones, S. M., & Bouffard, S. M. (2012). Social and emotional learning in schools: From programs to strategies. *Social Policy Report*, 26, 1-22.

Koch, F. S., Ludvigsson, J., & Sepa, A. (2010). Parents' psychological stress over time may affect children's cortisol at age 8. *Journal of Pediatric Psychology*, 35, 950-959.

Lean, D. S., & Colucci, V. A. (2010). Barriers to learning:

- The case for integrated mental health services in schools. Lanham, Md: Rowman & Littlefield Education.
- Loman, M., & Gunnar, M. R.. (2010). Early experience and the development of stress reactivity and regulation in children. *Neuroscience and Biobehavioral Reviews*, 34, 867-876.
- Lundberg, U. (2008). Stress and (Public) Health. In K. Heggenhougen (Ed.), *International Encyclopedia of Public Health* (pp. 241-250). Oxford: Academic Press.
- McEwen, B. S. (2006). Protective and damaging effects of stress mediators: Central role of the brain. *Dialogues in Clinical Neuroscience*, 8, 367-381.
- McEwen, B. S., & Gianaros, P. J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences*, 1186, 190-222. doi:10.1111/j.1749-6632.2009.05331.x
- Motzer, S. A., & Hertig, V. (2004). Stress, stress response, and health. *The Nursing Clinics of North America*, 39, 1-17.
- Peedom, J. (Director). (2008). Life at 3: Bad behavior. In J. Cummins (Producer), *Life at 1, 3, 5, and 7: A longitudinal study in child development*. Princeton, N.J.: Films for the Humanities & Sciences.
- Peedom, J. (Writer). (2006). Life at 1: stress and its impact. In J. Cummins (Producer), *Life at 1, 3, 5, and 7: a longitudinal study in child development*. Princeton, N.J.: Films for the Humanities & Sciences.
- Repetti, R., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin*, 128, 330-366.
- Schulz, A. J. P., Mentz, G., Lachance, L., Johnson, J., Gaines, C., & Israel, B. A. D. (2012). Associations between socioeconomic status and allostatic load: Effects of neighborhood poverty and tests of mediating pathways. *American Journal of Public Health*, 102, 1706-1714.
- Sharkey, P. T., Tirado-Strayer, N., Papachristos, A. V., & Raver, C. C. (2012). The effect of local violence on children's attention and impulse control. *American Journal of Public Health*, 102, 2287-2293.
- Shonkoff, J. P., Garner, A. S., Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, Section on Developmental and Behavioral Pediatrics, Siegel, B. S., ... & Wood, D. L. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129, 232-246.
- Taylor, S. E. , Lerner, J. S. , Sage, R. M. , Lehman, B. J. , & Seeman, T. E. (2004). Early environment, emotions, responses to stress, and health. *Journal of Personality*, 72, 1365-1393.