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NATIONAL SCIENTIFIC COUNCIL ON THE DEVELOPING CHILD

# Children's Emotional Development Is Built into the Architecture of Their Brains

WORKING PAPER 2



Center on the Developing Child  HARVARD UNIVERSITY

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The National Scientific Council on the Developing Child, housed at the Center on the Developing Child at Harvard University, is a multidisciplinary collaboration designed to bring the science of early childhood and early brain development to bear on public decision-making. Established in 2003, the Council is committed to an evidence-based approach to building broad-based public will that transcends political partisanship and recognizes the complementary responsibilities of family, community, workplace, and government to promote the well-being of all young children. For more information, go to [www.developingchild.net](http://www.developingchild.net).

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# The Issue

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A GROWING BODY OF SCIENTIFIC EVIDENCE TELLS US THAT EMOTIONAL DEVELOPMENT BEGINS EARLY in life, that it is a critical aspect of the development of overall brain architecture, and that it has enormous consequences over the course of a lifetime. These findings have far-reaching implications for policymakers and parents, and, therefore, demand our attention.

From birth, children rapidly develop their abilities to experience and express different emotions, as well as their capacity to cope with and manage a variety of feelings.<sup>1,2,3</sup> The development of these capabilities occurs at the same time as a wide range of highly visible skills in mobility (motor control), thinking (cognition), and communication (language).<sup>4</sup>

Yet, emotional development often receives relatively less recognition as a core emerging capacity in the early childhood years. The foundations of social competence that are developed in the first five years are linked to emotional well-being and affect a child's later ability to functionally adapt in school and to form successful relationships throughout life.<sup>5,6,7,8</sup>

As a person develops into adulthood, these same social skills are essential for the formation of lasting friendships and intimate relationships, effective parenting, the ability to hold a job and work well with others, and for becoming a contributing member of a community.<sup>9,10</sup>

Disregarding this critical aspect of the

developing child can lead parents and policymakers to underestimate its importance and to ignore the foundation that emotions establish for later

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growth and development. Thus, it is essential that young children's feelings get the same level of attention as their thinking. Indeed, learning to manage emotions is more difficult for some children than learning to count or read and may, in some cases, be an early warning sign of future psychological problems. The failure to address difficulties in this equally important domain can result in missed opportunities for interventions. Had they been initiated early, these interventions could have yielded tremendous benefits for large numbers of children and for society.

## What Science Tells Us

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THE CORE FEATURES OF EMOTIONAL DEVELOPMENT include the ability to identify and understand one's own feelings, to accurately read and comprehend emotional states in others, to manage strong emotions and their expression in a constructive manner, to regulate one's own behavior, to develop empathy for others, and to establish and sustain relationships.<sup>2,11,12</sup>

Emotional development is actually built into the architecture of young children's brains in response to their individual personal experiences and the influences of the environments in which they live. Indeed, emotion is a biologically based aspect of human functioning that is "wired" into multiple regions of the central

nervous system that have a long history in the evolution of our species.<sup>13,14,15,16,17</sup>

These growing interconnections among brain circuits support the emergence of increasingly mature emotional behavior, particularly in the preschool years. Stated simply, as young children develop, their early emotional experiences literally become embedded in the architecture of their brains. Here is what we know:

**The emotional experiences of newborns and young infants occur most commonly during periods of interaction with a caregiver (such as feeding, comforting, and holding).**<sup>8,11,18,19</sup> Infants display distress and cry when they are hungry,

cold, wet, or in other ways uncomfortable, and they experience positive emotions when they are fed, soothed, and held. During this early period, children are incapable of modulating the expression of overwhelming feelings, and they have limited ability to control their emotions in the service of focusing or sustaining attention.<sup>13</sup> Associations between positive emotions and the availability of sensitive and responsive caregiving are strengthened during infancy in both behavior and brain architecture.<sup>20</sup>

**The emotional states of toddlers and preschoolers are much more complex.**<sup>24</sup> They depend on their emerging capacities to interpret their own

## The emotional health of young children is closely tied to the social and emotional characteristics of the environments in which they live.

personal experiences and understand what others are doing and thinking, as well as to interpret the nuances of how others respond to them.<sup>2,11,22,23</sup> As they (and their brains) build on foundations that are established earlier, they mature and acquire a better understanding of a range of emotions. They also become more capable of managing their feelings, which is one of the most challenging tasks of early childhood.<sup>3,24,25,26,27</sup>

**By the end of the preschool years, children who have acquired a strong emotional foundation have the capacity to anticipate, talk about, and use their awareness of their own and others' feelings to better manage everyday social interactions.**<sup>24</sup> Their emotional repertoires have expanded dramatically and now include such feelings as pride, shame, guilt, and embarrassment — all of which influence how individuals function as contributing members of a society.<sup>21,28</sup> Throughout the early childhood years, children develop increasing capacities to use language to communicate how they feel and to gain help without “melting down,” as well as to inhibit the expression of emotions that are inappropriate for a particular setting.<sup>3,29</sup>

**When feelings are not well managed, thinking can be impaired.** Recent scientific advances have

shown how the interrelated development of emotion and cognition relies on the emergence, maturation, and interconnection of complex neural circuits in multiple areas of the brain, including the prefrontal cortex, limbic cortex, basal forebrain, amygdala, hypothalamus, and brainstem.<sup>30</sup> The circuits that are involved in the regulation of emotion are highly interactive with those that are associated with “executive functions” (such as planning, judgment, and decision-making), which are intimately involved in the development of problem-solving skills during the preschool years.<sup>31</sup> In terms of basic brain functioning, emotions support executive functions when they are well regulated but interfere with attention and decision-making when they are poorly controlled.<sup>19,32,33,34,35</sup>

**We now know that differences in early childhood temperament — ranging from being extremely outgoing and adventurous to being painfully shy and easily upset by anything new or unusual — are grounded in one's biological makeup.**<sup>36,37</sup>

These variations lead to alternative behavioral pathways for young children as they develop individual strategies to control their emotions during the preschool years and beyond. They also present diverse challenges for parents and other adults who must respond differently to different kinds of children.<sup>38</sup> When it comes to finding the “best” approach for raising young children, scientists tell us that one size does not fit all.<sup>39</sup>

**Young children are capable of surprisingly deep and intense feelings of sadness (including depression), grief, anxiety, and anger (which can result in unmanageable aggression), in addition to the heights of joy and happiness for which they are better known.**<sup>40,41,42,43</sup> For some children, the preschool years mark the beginning of enduring emotional difficulties and mental-health problems that may become more severe than earlier generations of parents and clinicians ever suspected.

**The emotional health of young children — or the absence of it — is closely tied to the social and emotional characteristics of the environments in which they live, which include not only their parents but also the broader context of their families and communities.**<sup>44,45,46,47,48</sup>

Young children who grow up in homes that are troubled by parental mental-health

problems, substance abuse, or family violence face significant threats to their own emotional development. The experience of chronic, extreme, and/or uncontrollable maltreatment has been documented as producing measurable changes in the immature brain.<sup>49,50</sup>

**Children’s early abilities to deal with their emotions are important not only for the foundation**

**these capacities provide for the future, but also for the children’s current social functioning with their parents, teachers, and peers.** Indeed, differences in how young children understand and regulate their own emotions are closely associated with peer and teacher perceptions of their social competence, as well as with how well-liked they are in a child-care setting or preschool classroom.<sup>51,52,53</sup>

## Correcting Popular Misrepresentations of Science

AS THE PUBLIC’S APPETITE FOR SCIENTIFIC INFORMATION about the development of young children is whetted by exciting new findings, the risk of exaggerated or misleading messages grows. Within this context, it is essential that scientific fact be differentiated from popularly accepted fiction.

**There is no credible scientific evidence that young children who have been exposed to violence will invariably grow up to be violent adults themselves.** Although these children clearly are at greater risk for adverse impacts on brain development and later problems with aggression, they are not doomed to poor outcomes, and they can be helped substantially if provided with early and appropriate treatment, combined with reliable and nurturing relationships with supportive caregivers.<sup>54</sup>

**Science does not support the claim that infants and toddlers are too young to have serious mental-health problems.** Young children who have experienced significant maltreatment

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exhibit an early childhood equivalent of post-traumatic stress disorder, which presents a predictable array of clinical symptoms that are amenable to successful therapeutic intervention.<sup>55</sup> (See Working Paper 6, “Mental Health Problems in Early Childhood Can Impair Learning and Behavior for Life.”)

## The Science-Policy Gap

THE FACT THAT YOUNG CHILDREN HAVE FEELINGS is old news. The extent to which infants can experience deep emotional pain as a result of early traumas and losses is less understood. The realization that young children can have serious mental-health problems, including anxiety disorders and signs of depression accompanied by the same kind of brain changes seen on electroencephalograms in clinically depressed adults, is startling news to most people.<sup>40,44,56,57</sup>

The fact that significant and prolonged emotional distress can affect the emerging architecture of a young child’s brain should be a sobering wake-up call for society as a whole. Despite the availability of rich and extensive knowledge on the emotional and social development

of young children, including its underlying neurobiology, current early-childhood policies focus largely on cognition, language, and early literacy. Policies addressing children’s emotional and behavioral needs have been the exception, not the rule. This gap between what we “know” about healthy emotional development and the management of behavioral difficulties, and what we “do” through public policies and programs, is illustrated by the following examples:

**Uneven availability of support for parents and providers of early care and education** to deal with common, age-appropriate behavioral challenges, such as discipline and limit setting.<sup>58</sup>

**Limited caregiver and teacher training to evaluate and deal with children who present significant emotional and/or behavioral problems** in early care and education programs. This is particularly alarming in the face of recent evidence of dramatic increases in prescriptions for behavior-modifying medications to treat preschoolers.<sup>59,60</sup>

**Minimal expertise in early childhood development or “infant mental health” within**

**child-welfare agencies that assess and treat children who have been the victims of serious maltreatment,** despite extensive evidence that very young children can experience debilitating anxiety and trauma from parental abuse or neglect or from witnessing violence in their family or neighborhood, as well as data illustrating that early interventions can moderate the effects of these traumas.<sup>61</sup>

## Implications for Policy and Programs

THE SCIENCE OF EARLY CHILDHOOD DEVELOPMENT is sufficiently mature at the present time to support a number of well-documented, evidence-based implications for those who develop and implement policies that affect the health and well-being of young

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children. Five compelling messages are particularly worthy of thoughtful consideration:

**All early childhood programs, including Head Start, must balance their focus on cognition and literacy skills with significant attention to emotional and social development.** Children clearly need the social and emotional capabilities that enable them to sit still in a classroom, pay attention, and get along with their classmates just as much as they need the cognitive skills required to master the reading and math concepts taught in kindergarten.<sup>62</sup>

**The rich and growing science of early emotional and social development must be incorporated into services to support parents** who are struggling to manage routine behavioral difficulties in their young children, as well as those who are trying to figure out whether, when, and how to deal with more serious social or emotional problems.<sup>63</sup>

**Providers of early care and education must have sufficient knowledge and skills to help children who present common behavior problems early on, particularly those who exhibit significant aggression or difficulties with attention and “hyperactivity.”** The achievement of this goal requires a two-pronged approach. First, greater attention must be focused on the social and emotional development of children in both pre-professional training programs and continuing professional education. Second, all early childhood programs must have access to specialized mental-health services that have professionals available to meet the needs of young children whose problems cannot be addressed adequately by front-line staff.<sup>19</sup>

**Expertise in early identification, assessment, and clinical treatment must be incorporated into existing intervention programs** to address the complex and currently unmet needs of young children with serious mental-health problems such as depression, anxiety, and significant antisocial behaviors. Central to this challenge is the need to accurately differentiate transient emotional difficulties that reflect a “phase” that the child will outgrow from diagnosable disorders that require clinical treatment.<sup>19</sup>

**All child-welfare agencies that have responsibility for investigating suspected abuse or neglect must include a sophisticated assessment of the child’s developmental status, including cognitive, linguistic, emotional, and social competence.** This could be accomplished through closer collaboration between child-protective services and early intervention programs

for children with developmental delays or disabilities, as mandated by the Keeping Children and Families Safe Act of 2003 (Public Law 108-36).<sup>64</sup>

THESE IMPLICATIONS FOR POLICY AND PRACTICE are striking in their simplicity, the extent to

which they reflect common sense, and their solid grounding in the science of early childhood and brain development. Closing the science-policy gap as it affects the future of our children, and therefore our society, should be an important priority for all who are engaged in public life.

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# Notes

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## WORKING PAPER SERIES

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*Young Children Develop in an Environment of Relationships* (2004)

### Working Paper #2

*Children's Emotional Development Is Built into the Architecture of Their Brains* (2004)

### Working Paper #3

*Excessive Stress Disrupts the Architecture of the Developing Brain* (2005)

### Working Paper #4

*Early Exposure to Toxic Substances Damages Brain Architecture* (2006)

### Working Paper #5

*The Timing and Quality of Early Experiences Combine to Shape Brain Architecture* (2007)

### Working Paper #6

*Mental Health Problems in Early Childhood Can Impair Learning and Behavior for Life* (2008)

### Working Paper #7

*Workforce Development, Welfare Reform, and Child Well-Being* (2008)

### Working Paper #8

*Maternal Depression Can Undermine the Development of Young Children* (2009)

### Working Paper #9

*Persistent Fear and Anxiety Can Affect Young Children's Learning and Development* (2010)

### Working Paper #10

*Early Experiences Can Alter Gene Expression and Affect Long-Term Development* (2010)

### Working Paper #11

*Building the Brain's "Air Traffic Control" System: How Early Experiences Shape the Development of Executive Function* (2011)

## ALSO FROM THE CENTER ON THE DEVELOPING CHILD

*The Foundations of Lifelong Health Are Built in Early Childhood* (2010)

*A Science-Based Framework for Early Childhood Policy: Using Evidence to Improve Outcomes in Learning, Behavior, and Health for Vulnerable Children* (2007)

*The Science of Early Childhood Development: Closing the Gap Between What We Know and What We Do* (2007)

*Early Childhood Program Evaluations: A Decision-Maker's Guide* (2007)

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