

REFERENCES AND RESEARCH FROM *KIDS BEYOND LIMITS*

Your Child's Amazing Brain

- 28 **Our brains . . . create order out of chaos:** Evidence shows that the cerebral cortex shows ongoing activity in the absence of a stimulus that is comparable in size to stimulus-driven activity. Murphy BK, Miller KD. 2009. Balanced amplification: A new mechanism of selective amplification of neural activity patterns. *Neuron* 61: 635–48. Lewis MD. 2005. Self-organizing individual differences in brain development. *Developmental Review* 25: 252–77.
- 29 **After a child is born, she is just beginning to discover that she is a separate being in the world:** Evidence suggests neonates have awareness of themselves as differentiated and unique entity in the world. Rochat P, Hespos SJ. 1997. Differential rooting response by neonates: Evidence for an early sense of self. *Early Development and Parenting* 6(2): 150.1–8. Rochat P. 2003. Five levels of self-awareness as they unfold early in life. *Consciousness and Cognition* 12: 717–31.
- 30 **The child's ability to notice differences . . . is the source of information for the brain:** Physiologically, the basis of all sensory perception is contrast. Guyton AC. 1981. *Textbook of Medical Physiology*. Philadelphia: Saunders.
- 32 **Recently researchers Michael Merzenich and colleagues:** Merzenich and his team at the University of California San Francisco have done experiments to show the importance of what he terms *randomized movements*. Coq J-O, Byl N, Merzenich MM. 2004. Effects of sensorimotor restriction and anoxia on gait and motor cortex organization: Implications for a rodent model of cerebral palsy. *Neuroscience* 129(1): 141–56.
- 34 **Kassi's brain was . . . organizing a growing complement of sensations with finer and finer differentiation:** As we gain experience we gain control through using our muscles in a more refined and precise way. This process has been demonstrated in the brain. Jenkins WM, Merzenich MM, Ochs MT, et al. 1990. Functional reorganization of primary somatosensory cortex in adult owl monkeys after behaviorally controlled tactile stimulation. *Journal of Neurophysiology* 63(1): 82–104. Nudo RJ, Milliken GW, Jenkins WM, Merzenich MM. 1996. Use-dependent alterations of movement representations in primary motor cortex of adult squirrel monkeys. *Journal of Neuroscience* 16(2): 785–807.

35 The brain uses information it acquires through perceiving differences to create new connections between different brain cells; this capacity is called *differentiation*: Differentiation is a fundamental process underlying all forms of life. Prasad KN. 1980. *Regulation of differentiation in mammalian nerve cells*. Plenum, NY. Scientists are able to measure and track the process of differentiation as it is taking place in the brain. Hebrew University of Jerusalem. 2007. Scientist observes brain cell development in “Real Time.” *ScienceDaily*, May 29. Mizrahi A. 2007. Dendritic development and plasticity of adult-born neurons in the mouse olfactory bulb. *Nature Neuroscience* 10(4): 444–52.

44 Those connections come together in complex, dynamic, responsive, and continuously evolving patterns: For research describing development in terms of complex dynamic systems see Smith LB, Thelen E. 2003. Development as a dynamic system. *Trends in Cognitive Sciences* 7(8): 343–48. Thelen E, Smith LB. 1996. *A Dynamic Systems Approach to the Development of Cognition and Action*. Cambridge, MA, MIT Press.

