



Success in the Early Years

Building a Foundation for the Future

Research Summary: (2011 Galileo Educational Network)

www.galileo.org/pl/earlylearning

McCain, M. N., Mustard, F. & Shanker, S. (2007). The early years study 2: Putting science into action. Toronto, ON: Council for Early Child Development. <http://wwwFOUNDERS.net>

This Canadian study builds on the findings from the first Early Years Study and the surge of interest in early brain development sparked by that study. Since the first study, the field has grown rapidly. New empirical findings now show how experiences affect the wiring of the brain. Through the use of new technologies, researchers have had the opportunity to closely examine the processes involved in healthy brain development and the pivotal role played by emotions. This has enabled stronger measures of clarity and a deeper understanding of the kinds of environments and experiences that promote or impair the developing brain.

The study highlights the importance of play in:

- expanding intelligence
- providing a testing ground for language and reasoning connected to the challenges children face in school, such as literacy, math, and science concepts
- stimulating the imagination, encouraging creative problem solving
- helping to develop confidence, self esteem, a sense of strengths and weaknesses, and a positive attitude toward learning.

The researchers contend that play is a significant factor in brain and muscle development. They further contend neighbourhood schools are the natural location for quality early childhood centres in every community. Centres should involve children, parents, and the community; revolve around the power of play; provide full-time, full-year options, nutrition, and links to home-based and specialized services; and be staffed by a skilled, competent, and a fairly compensated workforce.

The Science of Early Childhood Development: Closing the Gap Between What We Know and What We Do (National Scientific Council on the Developing Child, Harvard, 2007)

<http://www.developingchild.net/pubs/pubs.html>

This report is designed to provide a framework to address two recent developments in early childhood education which include new neurobiological research that shows early experiences shape brain architecture and the importance of investing in young children and their families as a contribution to a prosperous and sustainable society.

The National Scientific Council, based out of Harvard University, brought together leading neuroscientists, developmental psychologists, pediatricians and economists to create a

consensus around what a critical review of each field's current literature and knowledge contributes to what are core principles in child development.

The core concepts of development these leading thinkers or learning scientists arrived at are:

- child development is a foundation for community development and economic development, as capable children become the foundation of a prosperous and sustainable society
- brains are built over time
- the interactive influences of genes and experience literally shape the architecture of the developing brain, and the active ingredient is the “serve and return” (interactive) nature of children’s engagement in relationships with their parents and other caregivers in their family or community
- both brain architecture and developing abilities are built “from the bottom up,” with simple circuits and skills providing the scaffolding for more advanced circuits and skills over time
- toxic stress in early childhood is associated with persistent effects on the nervous system and stress hormone systems that can damage developing brain architecture and lead to lifelong problems in learning, behavior, and both physical and mental health
- creating the right conditions for early childhood development is likely to be more effective and less costly than addressing problems at a later age.

Policy implications that were identified included:

- the basic principles of neuroscience indicate that early preventative intervention will be more efficient and produce more remediation later in life
- a balanced approach to emotional, social, cognitive and language development will best prepare all children for success in school and later in the workplace and community
- supportive relationships and positive learning experiences begin at home but can also be provided through a range of services with proven effectiveness factors. Babies’ brains require stable, caring, and interactive relationships with adults – any way or any place they can be provided will benefit healthy brain development.
- science clearly demonstrates that, in situations where toxic stress is likely, intervening as early as possible is critical to achieving the best outcomes. For children experiencing toxic stress, specialized early interventions are needed to target the cause of the stress and protect the child from its consequences.

More information is available at <http://www.developingchild.net/>.

Pellis, S.M & Pellis, V.C. (2007). Rough and tumble play and the development of the social brain. Sage Journals Online: Current Directions in Psychological Science. April 2007, 16(2), 95-98.

Key Findings: Rough and Tumble play is a recurring feature of childhood and studies show that engagement in such play is correlated with measures of social competence. (Pellegrini 1995) Play fighting involves many areas of the brain. These behavior patterns are organized in the lower brainstem. Play fighting is highly social. When rats play flight, the areas of the brain that work together to deal with social phenomena are activated. The work suggests that juvenile play fighting induces the release of chemical growth factors in these areas of the brain that promote growth and development in the areas of the brain that involve social discrimination and decision making. These brain areas are many of the same areas that regulate social behavior and cognition. Improvements derived from play fighting may improve the capacity for more subtle social interactions.

Conclusions: The laboratory study of rats suggests there is a mechanism accrued during play fighting can improve social competence. There is evidence that there is continuity between human and non-human animals for some forms of play. It may not be the case that the more socially competent children engage in more play fighting but that play fighting may promote the development of social competency. It has also been established that for humans or non-human animals, play fighting is more frequent and rougher in males. Adult rats that were prevented from playing with peers as juveniles ended up with many emotional and cognitive deficits.

Blair, C. & Diamond, A. (2008). Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology*, 20, pp 899-911

This research examines interrelations between biological and social influences on the development of self-regulation in young children and considers implications of these interrelations for the promotion of self-regulation and positive adaptation to school. Emotional development and processes of emotion regulation are seen as influencing and being influenced by the development of executive cognitive functions, including working memory, inhibitory control, and mental flexibility important for the effortful regulation of attention and behavior. Developing self-regulation is further understood to reflect an emerging balance between processes of emotional arousal and cognitive regulation. Early childhood educational programs that effectively link emotional and motivational arousal with activities designed to exercise and promote executive functions have been effective in enhancing self-regulation, school readiness, and school success.

National Scientific Council on the Developing Child (2007). *The Timing and Quality of Early Experiences Combine to Shape Brain Architecture: Working Paper #5*. <http://www.developingchild.net>

Key Findings: What Science Tells Us

1. The architecture of the brain depends on the mutual influences of genetics, environment, and experience.
2. Early environments and experiences have an exceptionally strong influence on brain architecture.
3. Different mental capacities mature at different stages in a child's development.
4. Sensitive periods occur at different ages for different parts of the brain.
5. Stimulating early experiences lay the foundation for later learning.
6. Impoverished early experience can have severe and long-lasting detrimental effects on later brain capabilities.
7. Brain plasticity continues throughout life.

Brown, S., & Vaughn, C. (2009). *Play: How it shapes the brain, opens the imagination, and invigorates the soul*. New York: Penguin Group Inc.

Play is a biological drive as integral to our health as sleep or nutrition. In fact, our ability to play throughout life is the single most important factor in determining our success and happiness. Dr. Brown has spent his career studying animal behavior and conducting more than six thousand "play histories" of humans from all walks of life—from serial murderers to Nobel prize winners. Backed by the latest research, *Play* explains why play is essential to our social skills, adaptability, intelligence, creativity, ability to problem solve, and more. Play is hardwired into our brains—it is the mechanism by which we become resilient, smart, and adaptable people.

Beyond play's role in our personal fulfillment, its benefits have profound implications for child development and the way we parent, education and social policy, business innovation, productivity, and even the future of our society. From new research suggesting the direct role of three-dimensional-object play in shaping our brains to animal studies showing the startling effects of the lack of play, Brown provides a sweeping look at the latest breakthroughs in our understanding of the importance of this behavior. A fascinating blend of cutting-edge neuroscience, biology, psychology, social science, and inspiring human stories of the transformative power of play, this book proves why play just might be the most important work we can ever do.

Play Science – The patterns of play. The National Institute for Play (2009).
http://www.nifplay.org/states_play.html

This web site presents seven patterns of play as elements of a larger, holistic framework outlined by Stuart Brown and his colleagues at The National Institute for Play. The seven patterns of play identified include:

- 1. Attunement play** – (observed in the interactions of a mother and her baby) when parent and child make eye contact they initiate a harmonic meeting of the minds. As they gaze into each other's eyes, the baby will radiate a compelling smile and the mother will automatically respond with a surge of emotion and verbal and bodily joyfulness – and smile back. This is universal in all cultures across the globe.
- 2. Body and movement play** – Movement is primal and accompanies all the elements of play. Learning about self-movement creates a structure for an individual's knowledge of the world - it is a way of *knowing*. Movement structures our knowledge of the world, space, time and our relationship to others. Movement play lights up the brain and fosters learning, innovation, flexibility, adaptability, and resilience.
- 3. Object play** – Curiosity about the manipulation of “objects” is a pervasive, innately fun pattern of play, and represents its own “state” (intrinsic pattern) of playfulness. Early on, spoons, teething rings, or foods become objects of play. As skills in manipulating objects (e.g., banging on pans, skipping rocks) develop, the richer the circuits in the brain become. We find pleasure in the physical part of object play, in putting together a puzzle, kicking the ball through a goal, or simply tossing a paper wad in the wastebasket. Object play with the hands creates a brain that is better suited for understanding and solving problems of all sorts.
- 4. Imaginative play** – Imagination is perhaps the most powerful human ability. The earliest evidence of imaginative play comes at about the age of two in the form of fragmentary stories. The imperative to create narrative occurs worldwide in children and is an integral aspect of their play. Children engage in imaginative play often, naturally and energetically moving freely back and forth between reality and pretend. As children grow older it is the opportunity for imaginative play that continues to nourish their spirit. Throughout life, imagination remains a key to emotional resilience and creativity. Imagining the inner life of others and comparing it to one's own is one of the keys to developing empathy, understanding, and trust of others, as well as personal coping skills.
- 5. Social play** – Play is the gas that drives the engine of social competence. It allows society to function and individual relationships among many to flourish. There are several subtypes of social play including:
 - a. Friendship and belonging** – kids begin social play with other first through “parallel” play, which serves as a bridge to more cooperative play later on. By the time children are four to six years old, mutual play become the crucible in which empathy for other is refined. Give-and-take, with shared contagious enthusiasm, characterizes healthy mutual play.

b. Rough-and-tumble play – in animals and humans has shown that it is necessary for the development and maintenance of social awareness, cooperation, fairness, and altruism. Its nature and importance are generally unappreciated, particularly by preschool teachers or anxious parents, who often see normal rough-and-tumble play behaviour such as hitting, diving, and wrestling (all done with a smile between friends) not as a state of play, but a state of anarchy that must be controlled. Lack of experience with rough-and-tumble play hampers the normal give-and-take necessary for social mastery, and has been linked to poor control of violent impulses in later life.

6. Storytelling and narrative play – Storytelling has been identified as *the* unit of human understanding. It occupies a central place in early development and learning about the world, oneself, and one's place in it. As we grow, the drama of stories enlivens us and the narrative structure tells us something about how things are and how things should be.

Storytelling has the capacity to produce a sense of timelessness, pleasure, and an altered state of vicarious involvement that identifies narrative and storytelling with states of play.

7. Transformative-integrative and creative play – Play can become a doorway to a new self, one much more in tune with the world. Because play is all about trying on new behaviors and thoughts, it frees us from established patterns. For children, who are always in the process of changing and becoming, transformative play is a constant part of their world, and often goes unnoticed.

Diamond, A., Barnett, W.S., Thomas, J., & Munro, S., (2007). Preschool program improves cognitive control, *Science*, 318, 1387-1388.

A growing body of new research indicates that many children start school not ready to learn not because they do not know their letters or numbers but because they lack one critical ability: the ability to regulate their social, emotional, and cognitive behaviors. Current research shows that self-regulation – often called executive function -- has a stronger association with academic achievement than IQ or entry-level reading or math skills.

Mature intentional make-believe play is the foundation of self-regulation development in preschool. It creates conditions in which young children are able to act in a more mature way and use more mature mental functions. Children remember more, attend better, and have better self-regulation. This kind of play is the only classroom experience that naturally provides the three types of interactions which lead to self-regulation: regulation by others, regulation of others, and self-regulation.

Most children do not engage in the kind of intentional make believe play that fosters self regulation.

Today's children spend more time being entertained – watching TV or playing video games. They learn to play soccer or go to art and music lessons but they do not have long stretches of unstructured time where they go out into the back yard and play with neighborhood children of different ages who act as play mentors. Unlike twenty years ago, children come to preschool without knowing how to play in a way that will promote self-regulation. Without deliberate scaffolding by teachers providing opportunities to engage in mature play, many young children will not develop it on their own. Mature intentional play has the following characteristics:

- Supports expressing and representing intention through planning ahead of playing (“I’m, going to pretend that I am the doctor and you are the mom and you have a sick baby...”)
- Has explicit roles with rules for how to act (the doctor acts in a specific way, the patient acts in another way)
- Uses symbolic props (children invent props when they don’t have them)
- Has an extended time frame (lasts for hours and can continue for days).

- Includes extensive use of language. Children discuss who they are each going to be and what will happen in the play. For example, I ask you if your baby has a broken arm and you say no, a fever. I will have to give your baby a shot. The baby will cry. They you'll tell the baby not to cry because the medicine will make her better
- Involves an imaginary pretend scenario For example, children pretend that things happen that are realistic but can also be totally fantasy, such as when they pretend to go to the moon to have dinner.

Executive Function- Frameworks Institute www.frameworksinstitute.org

Air Traffic Control: Children’s ability to focus and pay attention is like Air Traffic Control at a busy airport. Some planes have to land and others have to take off at the same time, but there’s only so much room on the ground and in the air. In the brain, the mechanism that acts as Air Traffic Control is called executive function. It regulates the flow of information and the focus on tasks, creates mental priorities and avoids collisions, and keeps the system flexible and on time. In children, this mechanism needs to be actively geared up as early as possible.

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Focus Questions

1. What are your initial reactions to the information shared today? Where do you see challenges or opportunities? Do you see connections to other initiatives such as Action on Inclusion/ Action on Curriculum?
2. What implications does play-based learning have for your school division? Staff? Parent Community?
3. How can play-based learning be cultivated in the leadership community to support teachers and parents?
4. In what ways does play-based learning help ensure children are “ready” for later learning?

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