

# **The Benefits of Play: Effects on the Learning Brain**

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**Science confirms our intuitions about the benefits of play.**

Play appears to have important positive effects on the brain and on a child's ability to learn.

Want specifics?

Here are a few examples of the benefits of play.

## **Play opportunities improve memory and stimulate the growth of the cerebral cortex**

In 1964, Marion Diamond and her colleagues published an exciting paper about brain growth in rats. The neuroscientists had conducted a landmark experiment, raising some rats in boring, solitary confinement and others in exciting, toy-filled colonies.

When researchers examined the rats' brains, they discovered that the "enriched" rats had thicker cerebral cortices than did the "impoverished" rats (Diamond et al 1964).

Subsequent research confirmed the results—rats raised stimulating environments had bigger brains.

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They were smarter, too—able to find their way through mazes more quickly (Greenough and Black 1992).

Do these benefits of play extend to humans? Ethical considerations prevent us from performing similar experiments on kids. But it seems very likely that human brains respond to play and exploration in similar ways.

## **Play and exploration trigger the secretion of BDNF, a substance essential for the growth of brain cells**

Again--no one has figured out an ethical way to test this on humans, so the evidence comes from rats: After bouts of rough-and-tumble play, rats show increased levels of brain-derived neurotrophic factor (BDNF) in their brains (Gordon et al 2003). BDNF is essential for the growth and maintenance of brain cells. BDNF levels are also increased after rats are allowed to explore (Huber et al 2007).

## **Kids pay more attention to academic tasks when they are given frequent, brief opportunities for free play**

Several experimental studies show that school kids pay more attention to academics after they've had recess--an unstructured break in which kids are free to play without direction from adults (see Pellegrini and Holmes 2006 for a review).

There is some circumstantial evidence, too: Chinese and Japanese students, who are among the best achievers in the world, attend schools that provide short breaks every 50 minutes (Stevenson and Lee 1990).

Note that physical education classes are not effective substitutes for free playtime (Bjorkland and Pellegrini 2000).

Physical exercise has important cognitive benefits in its own right. But physical education *classes* don't deliver the same benefits as recess. Researchers' suspect that's because PE classes are too structured and rely too much on adult-imposed rules. To reap all the benefits of play, a play break must be truly playful.

How long should recess be? No one knows for sure, but it seems possible that recesses are most effective when they last between 10 and 30 minutes. One small study of 4-5 year olds, researchers found that recesses of 10 or 20 minutes enhanced classroom attention. Recesses as long as 30 minutes had the opposite effect (Pellegrini and Holmes 2006).

## **Language and the benefits of play**

Studies reveal a link between play--particularly symbolic, pretend play--and the development of language skills. For example:

Psychologist Edward Fisher analyzed 46 published studies of the cognitive benefits of play (Fisher 1999). He found that "sociodramatic play"—what happens when kids pretend together—"results in improved performances in both cognitive-linguistic and social affective domains."

A study of British children, aged 1-6 years, measured kids' capacity for symbolic play (Lewis et al 2000). Kids were asked to perform such symbolic tasks as substituting a teddy bear for an absent object. Researchers found that kids who scored higher on a test of symbolic play had better language skills—both receptive language (what a child understands) and expressive language (the words she speaks). These results remained significant even after controlling for the age of the child.

Recent research also suggests that playing with blocks contributes to language development. For more information, see this article about construction toys and the benefits of play.

## **Play promotes creative problem solving**

Psychologists distinguish two types of problem—convergent and divergent. A convergent problem has a single correct solution or answer. A divergent problem yields itself to multiple solutions.

Some research suggests that the way kids play contributes to their ability to solve divergent problems.

For instance, in one experiment, researchers presented preschoolers with two types of play materials (Pepler and Ross 1981). Some kids were given materials for convergent play (i.e., puzzle pieces). Other kids were given materials for divergent play (blocks). Kids were given time to play and then were tested on their ability to solve problems.

The results? Kids given divergent play materials performed better on divergent problems. They also showed more creativity in their attempts to solve the problems (Pepler and Ross 1981).

Another experimental study reported links between pretend play and divergent problem-solving ability (Wyver and Spence 1999). Kids given training in pretend play showed an increased ability to solve divergent problems. And the converse was true as well: Kids trained to solve divergent problems showed increased rates of pretend play.

## **Math skills and the benefits of play**

Here's an intriguing story:

A longitudinal study measured the complexity of children's block play at age 4 and then tracked their academic performance through high school (Wolfgang, Stannard, & Jones, 2001).

Researchers found that the complexity of block play predicted kids' mathematics achievements in high school. In particular, those who had used blocks in more sophisticated ways as preschoolers had better math grades and took more math courses (including honors' courses) as teenagers.

Ho-hum, you say—these results just tell us that kids who are smart in preschool continue to be smart in high school.

But it's not that simple. The association between block play and math performance remained even after researchers controlled for a child's IQ. It therefore seems plausible that block play itself influenced the cognitive development of these kids.

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## **References: The benefits of play**

And here are the scientific studies cited in this article:

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