

# Children's Thinking, Physical Activity, Play, and Lifetime Benefits

by  
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Figure 1 Image of a young girl exploring clay.<sup>1</sup>

*“Sometimes the skin seems to be the best listener, as it prickles and thrills, say to a sound or a silence; or the fantasy, the imagination: how it bursts into inner pictures as it listens and then responds by pressing its language, its forms, into the listening clay.”*  
(Richards, 1989)

*“Surprisingly there is no single “movement center” in our brain.”*  
(Greenfield, 1995)

*“Movement and learning have constant interplay.”*  
(Jensen, 1998)

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<sup>1</sup> Image retrieved from <http://hall.gresham.k12.or.us/SH02-03/clay1.jpg>

## INTRODUCTION

Have you ever wondered why there are so few big fierce animals on the planet besides us? Or why and how we adapt our environments to us verses adapting ourselves to our environments? Have you ever thought about how much you learn simply by moving yourself and other things around in the world? And do you realize how much you gain by doing this on a long-term, regular basis?

Ecologist, Paul Colinvaux, writes, "People are animals that have learned to change their niches without changing their breeding strategy (Colinvaux, 1978, p 212)." We are no longer like other animals. "It is not intelligence itself that sets humans apart from other animals. People have been intelligent for a hundred thousand years, but lived in their appointed place like the rest of the animals. They obeyed the ecological rules of peaceful coexistence. The crucial thing setting people apart from other living things is their ability to change their niche at will (Colinvaux, 1978, p 219)."

As a scientist steeped in evolutionary theory, Colinvaux adeptly describes a human phenomenon that we all share – the ability to adapt our environments to us as we adapt ourselves to it. Unfortunately he does not go into explicit detail as to how humans have evolved to enable this phenomenon. Instead he focuses on social, cultural, and environmental factors over time, but not specifically on human development over time. In part, this is because we are still learning much about how we develop and evolve. Plus, Colinvaux is not a specialist in child psychology or human development. He is an ecologist, that is, someone who studies the interrelationships of organisms and their environments.

Other researchers, focused on child development, have noted similar findings but from the very different, highly focused discipline of child psychology. Piaget, Bronfenbrenner, and others have explored children's cognitive development from ecological or socio-ecological perspectives (Dixon, 2003). These researchers found that children learn through interaction with their physical environments as well as through movement and exploration alone.

### Underlying Theories

Ecological and Socio-ecological Models have been used extensively in environment-behavior, cognitive development, and physical activity research. These models and theories explain human activity as a function of interactions between people and their environments (Stokols, 1992). The most critical element of ecological or socio-ecological theory, similar to experientialist theory, is the perspective that man is part of his environment, not separate from it (Bronfenbrenner, 1979; Colinvaux, 1978; Lakoff & Johnson, 1980).

Within this framework, human development is conceptualized as taking place in a set of embedded contexts that include both micro- and macro-level systems and their

interaction (Bronfenbrenner, 1979). Behavior settings (e.g., schools, playgrounds, nurseries, homes) refer to the intertwining of these dimensions with human activities (Georgiou et al, 1996; Barker, 1968; Clitheroe, 1998). Environments contain a range of behavior settings that are seen to provide, in different degrees, "opportunities" or "affordances" for desired behaviors; the extent and the ways that those behaviors occur are further dependent on factors that are conceptualized as "filters" (e.g., perception, cognition, motivation) and "antecedent conditions" (e.g., access to play equipment, peer support, physical ability) (Wicker, 1972; Gibson, 1977, 1979; Michelson, 1977).

Applying the concept of affordances, environments exert probabilistic influences, making behavior more or less likely. Thus, they vary in the support they provide for activities, enabling or promoting some, while preventing or discouraging others (Sallis et al, 1998).

### **The Nature of Play and Physical Activity**

What motivates children to be physically active? Most children love to play and most of their play enhances perceptual-motor development (Macintyre, 2001). Children engage in complex movements which are typically categorized as gross movements, fine movements, and manipulative skills. Gross movements use the large muscle groups and are the ones most often recognized as beneficial for aerobic exercise like running and swinging. Gross movements which involve balance and coordination are developed first. Fine movements, like dancing to a beat or rhythm, and manipulative movements like those required to hit a ball with a bat, take more time to develop. In addition, body awareness, spatial awareness, and coordination are required for children to engage in any kind of strenuous physical activity.

Exploratory/Functional play occurs when children actively explore materials and environments over and over again (Macintyre, 2001). As children run their hands through sand and water, they make neural connections that cannot be made in any other way. As they climb up stairs and slide to the ground, they strengthen even more neural connections. As they challenge themselves on climbers and overhead ladders, cross clatter bridges and slide down fire poles, they insure that the neural connections that are forming become permanent parts of their brains. In addition to these benefits, climbers and upper body equipment also provide children with opportunities to develop emotionally. These components are highly difficult to master and they physically challenge children. Thus, as children increase their skills on overhead ladders and climbers, they develop a sense of accomplishment and independence. Exploratory play can be enjoyed in groups, offering social development opportunities. Children often enjoy swinging alongside one another as they test themselves and others. Playgrounds that are full of natural elements, in addition to fixed playground structures promote exploratory play and physical activity (Brown et al, 2005).

### **Health and Behavioral Risks of Limited Play Opportunities**

Sedentary lifestyles can lead to poor health later in life (Sallis & Owen, 1999). Some of the common health problems associated with inactivity include obesity, heart disease, type II diabetes, decreased self-esteem and confidence, increased likelihood of depression, decreased lifespan, increased levels of stress, decrease of "good" HDL cholesterol, loss of bone density and increased risk of osteoporosis, decreased cognitive abilities, decreased motor skills, decreased physical skills, lifelong drug dependency, decreased student participation in sports, decreased attention span, increased risk of cancer, decreased value of physical education, increased health care costs, and more (Sallis & Owen, 1999; Welk, 2002).

Even with current research declaring alarming national increases in obesity and reductions in physical activity, the value of school ground settings has not improved (Frank, 2002). In a recent study conducted to identify opportunities for increasing children's physical activity the playground setting was not addressed at all. The recommendations focused on 'new PE' programs, increasing the duration and testing of physical education, but never mentioned the quality of the outdoor physical environment and its ability to strengthen physical activity (Pyramid Communications, 2003).

Unfortunately, the social and built environment of many minority children living in impoverished urban neighborhoods frequently fails to support their healthy development. They are often exposed to life- and health-threatening environmental stressors such as street violence, homelessness, illegal drugs, and negative role models (McLoyd, 1998). They also have limited access to safe outdoor play spaces and to structured opportunities for involvement in organized sports and activity lessons (Sallis et al, 1996). Research shows that low socioeconomic status (SES) minority children are more likely than non-minority children with high SES to have negative health related outcomes, including low levels of physical activity (Nader et al, 1995; Sallis et al, 1996; McLoyd, 1998) and high rates of obesity (Ogden et al, 2002).

Finally, in terms of promoting the mental health of children and young people, research by the Mental Health Foundation (1999a) highlights the importance of children being

able to play and take risks and to use their own initiative. It is also essential for them to have opportunities to practice making and maintaining friendships and to deal with conflict – the basic skills needed in order to become 'emotionally literate', which increases their resilience to mental health problems (Mental Health Foundation, 1999b).

In the mental health field, the importance of unsupervised play enabling children to take risks, to think through decisions and to gain in self-confidence, has been emphasized (Mental Health Foundation, 1999). The increasing restrictions on children's free time and opportunities to explore play environments without close adult supervision and structured activities are thus a cause for concern and require further research in terms of their effects on children's mental health. Overall research focused on the role of play in promoting mental health among school-age children is lacking, with much of the existing data focused on the use of play therapy with children already experiencing mental health difficulties.

Health and behavioral benefits associated with stimulating unstructured play environments have been documented but have not been researched enough. To date, most research has been focused on problems and has not addressed preventive strategies that enhance children's development.

The available quantitative and qualitative research, though sparse, supports the hypothesis that differences in playground design are accompanied by differences in physical activity (Moore and Wang, 1997; Weinstein and Pinciotti, 1988) and outdoor education levels (Moore, 2003; Hungerford and Volk, 1990). For example, the transformation of an empty fenced-in blacktop schoolyard to a tire playground led to significant increases in active play. Children's engagement in organized games also increased, while uninvolved behavior decreased substantially, and active play rose from 16% to almost 40% of all observed behavior. While limitations in the research design make it impossible to draw definite conclusions from this research, the results of this and other research indicate that it is possible to design playgrounds that facilitate physical activity by providing stimulating environments that increase opportunities for

active play (Malone and Tranter, 2003; Weinstein and Pinciotti, 1988). Children will often make due with whatever resources are available to them (Moore, 1974), but it is likely that a high quality outdoor environment will attract children outdoors and provide a broader range of opportunities for physical activity and other educational pursuits.

In addition, principals reported that children were more ready to learn as a result of increased opportunities for challenging activities and creative play on the Learning Landscape playgrounds.

“Once the playground was open, there was a sense of calmness in the children when they entered the building that didn't exist before.”

Principal Comment (CRS, 2003)

The recognition that students are more attentive after school has been documented (Jarrett et al, 1998) and can be related to similar studies that relate worker's productivity to physical activity breaks. Most recently, new work on the effects of physical activity is also indicating that more sedentary lifestyles among children may be adversely affecting their academic performance and that by increasing levels of physical activity, academic performance can be stimulated (Berliner, 2001). This research, which is still in its infancy, is based on the premise that increased physical activity increases blood flow to the brain, which when coupled with learning tasks, causes the formation of dendrites and thus increases the neural pathways within the brain.

A variety of school-based projects which have introduced more physical activity into the school day have reported positively on the effects of these changes in terms of children being more alert, gaining better scores in government standardized tests and in some schools, less truancy and bad behavior (Berliner, 2001) – results which are likely to attract more detailed research attention in the future.

This idea that children need physical activity and healthy challenging play environments to stimulate thought is crucial and directly related to the notion that positive risk-taking can inhibit beneficial cognitive processes. In Macintyre's recent work *Enhancing Learning through Play* (2001), she notes that in the current pressure for children to achieve a range of key competences means that "there is likely to be less time for either free or structured play, fewer opportunities for children to decide what they would like to do and to determine their own pace of learning. To achieve the targets the children must conform to an 'outside' notion of what education in school is for, and to someone else's idea of what they should learn. They must, in following that agenda, confront someone else's problems rather than setting and solving their own".

To a large extent, Macintyre suggests that the value of play in education is in question because of a differing view as to what exactly education in school is for - to pass exams (which suggests the need for direct instruction) or a more enabling, exploratory form of learning (where play may have a greater role in helping children to explore and to learn from their activities). Having suggested that there are significant questions about the impact of play on formal learning, within the school setting, two specific areas of research interest have focused on the positive outcomes of school playtimes: firstly, the impact of play periods on social learning and the formation of friendships and peer networks; secondly, the effects on children's attention span in ensuing lessons (Cole-Hamilton et al, 2001).

In addition, there are a number of cognitive developmental benefits associated with physical activity (Williams, 1986; Cohen & Trostle, 1990; Moore, 1990; Jensen, 1998 & 2000; CRS, 2003). Also, several findings have shown student academic performance and classroom attentiveness are increased when physical activity is provided (Taylor, 1993; Moore, 1974; CRS, 2003) potentially increasing Colorado Student Assessment Program (CSAP) numbers over time.

## **CONCLUSION**

Research shows that children learn through experiences and interactions with the physical world. The mind and body are not separate, but connected. Brain research indicates that movement requires multiple areas of the brain with the cerebellum processing not only movement but also thought. In this way, motion and cognitive

thought are intimately connected. You can not move your body without working your mind. In two related studies, physical activity and movement were linked to mental health and cognitive performance in late adulthood (Anstey & Smith, 1999; Anstey et al, 1997). These studies indicate that physical activity and movement are necessary for cognitive performance as we age, not just when we are developing.

In conclusion, in order to fully understand children's minds and bodies as a connected whole in motion, we must integrate focused disciplines like psychology, kinesiology, biology, ecology, and more. Through multidisciplinary efforts we may just figure out why and how humans, who are big fierce animals, are not so rare after all. Perhaps we will even determine why and how we have managed to adapt our environments as a result of our bodies and minds in motion together. Personally I believe that the answer lies within each and every one of us and is most evident in childhood. It is during our early, formative years that we are most likely to explore and to try new things. It is at this time that we learn the most through trial and error in very concrete and experiential ways.

Where the Sidewalk Ends

There is a place where the sidewalk ends  
And before the street begins,  
And there the grass grows soft and white,  
And there the sun burns crimson bright,  
And there the moon-bird rests from his flight  
To cool in the peppermint wind.

Let us leave this place where the smoke blows black  
And the dark street winds and bends.  
Past the pits where the asphalt flowers grow  
We shall walk with a walk that is measured and slow,  
And watch where the chalk-white arrows go  
To the place where the sidewalk ends.

Yes we'll walk with a walk that is measured and slow,  
And we'll go where the chalk-white arrows go,  
For the children, they mark, and the children, they know  
The place where the sidewalk ends.

Shel Silverstein

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