

Factors of Evolution Revealed in Hand Puppet Behavior

The Temporal Act of Symbolic Art, Movement, the Hand, Play, and the Brain

By Jeffrey L. Peyton

Puppets are known to exert an extraordinary force upon children. Adults are also deeply affected by their gravitational pull when playing with or using them. The property of play is the primary element involved in the hand puppet's power. But there is more. The pet-like appearance, the 'little' voice and expressive movement signals safety, disarms, and elicits humor, expressiveness and articulation. The universality with which children embrace the puppet archetype is a reflection of its power to engage the full spectrum of brain resources. Possibly the most elemental art form, the hand puppet represents a bio-media made for communicating with children and reaching young minds of all ages. When an adult presents a puppet to a group of children or young adults, the best side of human nature and the full constellation of brain resources is called forth— attracting movement, surprising spontaneity, playfulness, imagination, communication, socialization—and a bond between the young and the adult. Higher order language and critical-symbolic thinking are primed by the inclusion and influence of the brain's "first mate", namely the human hand.

Learning is an activity present in all life forms, but is most refined and pronounced in mammals, established by movement, shaped by the hand, organized, fostered, and propelled by the invention of play and nursing—the evolutionary foundation of learning. All these elements form a unified intelligent learning system comprised of both internal and external features and characteristics. The self-organized culmination and expression of this system is manifest in the appearance of a unique species-typical art form that physically represents, engages, and facilitates the complex, cross-talking, super-conductive features of that system. A brief snapshot of the elements and properties found at work in puppet behavior are briefly described below. Each of the sections will be filled out with narrative and citations, but they present the gist of the proposition.

Art (*the genetic foundation of puppet art and evolution*)

If the brain is ever to be charted and an enduring theory of the arts created as part of the enterprise, it will be by step wise and consilient contributions from the brain scientists, psychologists, and evolutionary biologists.

—E.O. Wilson

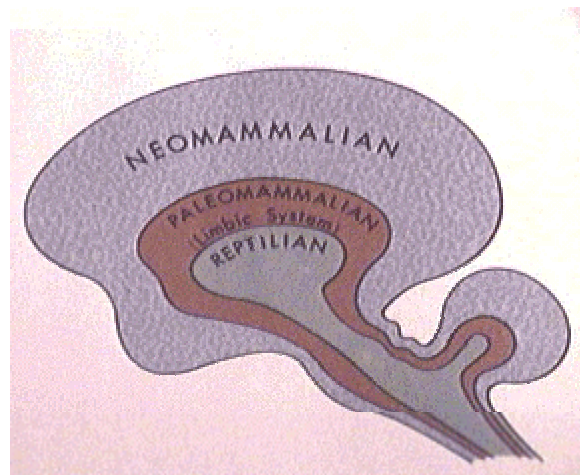
The evolutionary function of Art is to provide and transmit neuronal 'agency' (Wilson, *Consilience*). Thus, the art and archetype of the hand puppet—the simple act of puppet play engaged in by child and adult in which a lifelike form or behaving entity is made to move and talk—can be viewed as the consummate transmission utility expressed as a

form of behavior that is species-specific (unique) to human beings. With its likely origins in cave art and headdresses, the hand puppet has evolved as a visual 'agent of nature'. Just as flowering plants gave us first-time blooms in the evolution of botanical life, the hand puppet once appeared like a bloom on the hand to replicate the constellation of elements that underlie its purposeful behavior: a relay station outside of—yet connected to the inner self, an ambassador of mind. The Hand Puppet opens a window into the brain and its mysterious, communicative workings. Here is a brief snapshot of the workings and elements found inside the bloom.

[Include: LD & Visual Thinking: Tom West, In the Mind's Eye.
The Alphabet and the Goddess: The Conflict Between Word and Image, L. Shlain]

Movement (*the universal of physical movement equips puppets with charmed energy.*)

From atoms to supernovas, movement is the physical order of continuity in the universe in which the brain has organized, moved, managed itself, and carved its unique niche. Movement is spontaneous, random, orderly, symmetrical, predictable, and intentional—even play (see below) is a kind of movement. Movement is present in our vast family of planetary life. In the brain it defines the degree and extent of consciousness and self. Movement is the fundamental job of the Brain. The brain controls life functions and physical movement related to survival. The Triune Brain has three intraconnected spheres.



Paul D. MacLean

- Brain 1 keeps us ticking
- Brain 2 invented Nursing and Play
- Brain 3: is the symbol-maker and projector of things outside the brain. The result of messages sent back through the hand (an auxiliary sensory system). Brain 3 could not have evolved without a heavy lifter, without a friend to tell the brain how smart it actually could be. That friend was the Hand.

The Hand

The job of the Hand is not only to lift and grab the milk out of the fridge. Like the magician skilled in the art of movement, illusion, and play, the human hand put on a “r-evolutionary” show for the brain that provided its ‘higher education’. In evolution the Hand has led us to—and through—the architectures of gesturing, language, art, tools, speech, and culture. Because of the hand, we are able to think and speak as we do. Brain 3 owes its existence to the hand. The fact that puppet art is part and parcel of the hand—the dancer and the dance—is indicative of its pivotal role in representing the special agency between mind and hand. We would not be human were it not for the hand. In the words of E.O. Wilson, “The brain bears stages of 400 million years of trial and error, traceable by fossils, molecular homology in nearly unbroken sequence, from fish to amphibian to reptile to primitive mammal to our immediate primate forerunners. In the final step the brain was catapulted [*Frank A. Wilson would say lifted by the hand; like a crane, the hand, and no other prime mover, brought the brain*] to a radically new level equipped for language and culture.”

Play: (*the mental soil upon which great inventors and scientists establish their work.*)

As a fundamental element of life inherent in all forms of matter, play is at work in natural symmetry and random events throughout the universe. Play has evolved to its highest expression in mammals as a specialized form of learning behavior. Play has been identified as a critical factor in socialization and child development. In an evolutionary sense, play is the wellspring of learning. In modern terms, play may be viewed as nature's most intelligent learning system. It is also the mental soil upon which great inventors and scientists establish their work.

Nevertheless, the value of play is often overlooked and its effects are not seriously considered. In schools, students are barricaded from play as they ascend the grades. Even though research on play behavior relating to early childhood education fills the shelves of bookstores and academic libraries, a recent search of the literature reveals no research on the subject of adult-child play relationships. To Paul D. MacLean, Senior Research Scientist Emeritus, Department of Neurophysiology, National Institutes of Mental Health, the subject of play has proved similarly elusive in the field of brain science:

In view of the prominence of play among mammals and its civilizing influence in human evolution, it is curious that it has received so little attention in neurobehavioral research. In one handbook of experimental psychology, for example, the subject of play is dealt with in less than a page, and in a three-volume handbook of neurophysiology, there is no reference to play.

Play changes movement into meaning. Play gave Movement its ability to impart experience to the player. Play is movement more refined and intentional. Play is movement transformed into patterns and reciprocity. Play is an invention and a gift from Nature to the mammals. Mammals use play to teach the young how to become social,

responsive, and open to learning. From a human vantage point, nature gave the most important job to play. The river of play carries an endless flotilla of art and craft artifacts created by the human hand. That the river would one day deliver a representational form (a totem as well as a tool of self-reference) into the hand, with an innate tendency toward emulated movement, speech and articulation, should come as no surprise.

Technology

To make the use of puppets a practical option for group learning and communication, the old model of cloth forms, scripts, and stages was re-cast as an open-ended language of symbols and ideas. The patented system effectively demonstrates that the common cultural conveyor we know as paper could be transformed into a visual, play-driven communication platform—a *communication currency*. Accordingly, a given hand puppet becomes a part of speech in a limitless learning language based on the universal drive to communicate through play. The behavioral dynamics of puppet behavior are extracted, re-formatted, and mainstreamed to serve as an operating system that renders any idea visual to the eye and accessible to the hand. Simple paper puppets become hand held ideas—a powerful, low-cost communication resource.

The merging of the puppet medium into the common classroom demonstrates its potential as soft technology capable of achieving a full integration of play energy into the learning infrastructure and emerging technologies. The successful application of play and paper opens the door to extended applications in common cultural carriers such as books and computers which also use paper. In 1995 Puppetools was the first education course offered online by The New School for Social Research in New York City, demonstrating that teachers could be trained in the use of communicative play via computers; that humanizing technology solutions could be delivered by high technology.

[Include: Kauffman and tools and evolution]

Summary

The world of brain science that the hand puppet leads us into comprises a much greater constellation of elements that make up that world. These include the existence of movement, the role of the hand, the force and energy of play—all as they relate to matters of human evolution, survival, learning, and self. There are ironies. One such irony is that the little hand puppet gives physical geography and substance to matters that are largely invisible and illusive, especially in the conduct and discourse of education.

Think about these concepts: Movement. Hand. Play. Brain. They are all ghosts. But through the puppet, these elements may be grasped. Another irony is that something so eccentric, usually associated with magic and fantasy, something so ignored and patronized, can appear at the leading edge of science—on the frontier of

the mind. As a portal to brain science, puppet media cuts through its own myth and magic to bring people, particularly those who shape and implement education policy, face-to-face with irreducible principles of learning and evolution. That sounds like a tall, improbable order for a medium better known as a symbol of early childhood education and entertainment. But, as I will demonstrate, the medium of puppetry (not just because it sits out there on the hand not far from the head), appears to have evolved not merely as art but as a form of behavior designed by nature to help us call up the best side of human nature. In this way, the behavior of puppet play brings us more fully out of our *sel/ves* to put us in better touch with our *sel/ves*.

Novel Motor/Somatosensory Activity Is Associated With Increased Cerebral Cortical Blood Volume Measured by Near-Infrared Optical Topography, Jeffery L. Peyton, BS; W. Thomas Bass, MD; Bonnie L. Burke, MS; L. Matthew Frank, MD

ABSTRACT

Recent reports suggest that learning is enhanced by emotion, spontaneity, and play. The mechanisms of this enhancement are unclear and might involve increased cortical stimulation by the limbic system. Since neuronal activity is tightly coupled to changes in cerebral blood flow and volume, the demonstration of increased cortical blood volume during playful versus routine motor/somatosensory activity would imply enhanced neuronal activity and provide insight into the complex interaction between play and learning. Near-infrared spectroscopy was used to detect changes in cortical blood volume during performance of (1) rudimentary visual, motor, and speech tasks; (2) integration of the tasks in a familiar routine manner; and (3) integration of the tasks in a novel, spontaneous, playful manner. No significant differences in cortical blood volume were found during the performance of the individual rudimentary tasks and their routine integration. However, the novel integration activity was associated with a significantly greater increase in frontal lobe oxyhemoglobin, deoxy-hemoglobin, and total hemoglobin, as well as parietal lobe total hemoglobin. This small pilot study provides a limited measure of physiologic support for a relationship between play and learning. (*J Child Neurol* 2005;20:000–000).

Copyright © Jeffrey L. Peyton 2002. All rights reserved