

SalsAmigos Dancing and Teen Brain Development¹

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Two things are important at the outset. I am wildly fascinated by the human brain, its plasticity that continues throughout life, and the new research that shows that teen brains experience surprising periods of exuberant growth. Consider the following: “A piece of your brain the size of a grain of sand would contain one hundred thousand neurons, two million axons and one billion synapses, all ‘talking to’ each other. Given these figures, it’s been calculated that the number of possible brain states—the number of permutations and combinations of activity that are theoretically possible—exceeds the number of elementary particles in the universe.”² At the same time, this is my second important thing, I am reluctant to, perhaps I should say even opposed to, trying to justify including dancing in school curricular activities because I believe that it has a clear and powerful impact on teen brain development. It is frankly embarrassing to me that schools should need such persuasion to include the richness of music and dancing as essential to all meaningful human development.

Okay, with that off my chest, I must simply go on to talk about exciting research on teen brain development and neuroplasty. Then I can return to SalsAmigos dancing to show how it importantly contributes to teen and human brain development. The results are I think revolutionary and, should schools choose to respond to them, would mean a revolutionary shift in curricula resulting in brain demanding self-actuated movement activities like SalsAmigos dancing being considered as important as the current traditionally academic course offerings.

The traditional view, still widely held, is that the brain is highly plastic only during the first few years of human life. In these first years a child is capable of uttering perfectly any phoneme, becoming fluent in any one or several languages, learning to read, to speak, to walk, to play piano, to perform complicated bodily and mental tasks. Yet, once this critical period passes the brain becomes fixed and mental capacities are then set. During the rest of one’s life change certainly occurs through learning, yet the basic equipment and capabilities to learn are considered pretty much set. In this traditional view, human development throughout the early critical years is understood as of a different order and type than change throughout the balance of life. At the end of the critical developmental period the door is closed, the equipment and tools are fixed, and from then on one is rather stuck, for better or worse, with the mental equipment one has at that point.

The literature on youth brain development reflects a marked difference in tone and attitude between the critical period of child development and the post-critical period of teen development. The literature

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² V. S. Ramachandran, *Phantoms in the Brain* (New York: Quill, 1999), p. 8.

on critical-period child development has an urgent positivity about it. It hums with the concern that everything possible be done to support brain development during these critical years. The adult brain is being formed so schools and parents are prodded and pushed into providing every opportunity and encouragement to these adult-brains-in-the-making, that they develop as fully as possible.

A shift in attitude takes place as youth reach their teens. Suddenly the lion's share of the literature addresses human development in terms of teens being seen as "problems." There are endless articles and programs devoted to curtailing the brain-damaging effects of drugs, alcohol, television, risky behavior, careless sexual behavior, and so on. Surely it is not incidental that this shift from potentiality to problem, from positive to negative, correlates almost perfectly with the belief that brain development ceases at the end of the pre-teen critical developmental period.

Recent scientific studies, conducted in both clinic and laboratory, have markedly shifted these beliefs about brain development and the impact has yet to become widely known to the general population or even to teen educators. Jay Giedd of the National Institute of Health studied 150 living teen brains beginning in 1997. He found that teenage brains undergo periods throughout the teen years when the cerebellum keeps getting bigger and better. Teen brains experience periods of exuberance each followed by a rapid reduction to their final set adult brain level. Periods of exuberance likely continue into the early twenties. There are indications that the teen brain continues to develop in a number of ways.

These findings raise the question of what environmental elements influence what happens to the teen brain during these periods of exuberance and refinement. It is commonly held that some parts of the brain are more plastic, less genetically fixed, during these periods than others. The issue of what to do to assure full and healthy teen brain and human development seems to be only informally discussed. There are a few ideas here worth noting. There is a general pervasive attitude that is effectively expressed as "use it or lose it." There is a general belief that since the teen brain is more malleable than formerly believed there is greater potential for damage from environmental causes: drugs, poor nutrition, lack of use.

But it isn't yet clear what sorts of experiences teenagers might have that will most benefit this gift of extensions to the "critical period." Giedd simply says, "If that teenage brain is still changing so much, we have to think about what kinds of experiences we want that growing brain to have."³ Chuck Nelson at the Institute of Child Development at the University of Minnesota wrote, "The thing is, we know experience matters, but we just don't know what nature of experience matters, what's best for the brain."⁴ Curious to me in light of my having for a long time studied the importance of play, Giedd wrote, "What if we find out that, in the end, what the brain wants is play, that's certainly possible. What if the brain grows best when it is allowed to play?"⁵ I'm not really sure what he means here by play; I'm thinking he has something like lacrosse in mind. Provocative in any case.

³ Barbara Strauch, *The Primal Teen* (New York: Anchor, 2003), p. 21.

⁴ Quoted in Strauch, p. 42.

⁵ Quoted in Strauch, p. 44.

The radical message is that the critical period of the hardwired formation of the brain remains active through the teenage years. There is abundant and increasing evidence that aspects of the malleability, adaptability, growth, change in brain acuity can and does take place throughout the entire life cycle, or it has the potential to do so. Further, while it is not altogether clear specifically what environmental factors have the most impact, it is clear that changes to the brain are interconnected with experience. I believe another quite radical idea presented in this research is the emerging understanding that while brain functions are localized to specific parts of the brain, the brain nonetheless is so aware of itself and its vast complexity that changes in any parts of the brain tend to be experienced in some respects throughout the brain. Again “use it or lose it” applies as does “neurons that fire together wire together,” and “neurons that fire apart wire apart or neurons out of sync fail to link.”⁶

But I believe that we can actually say more about what sorts of experience are important to nurture continuing brain development. We need consult other areas of research. Clearly a major portion of the brain hardware developed and designed through experience in the critical periods contributes to what Mark Johnson⁷ refers to as a foundational body-based type of meaning that is pre-cognitive, non-linguistic, comprised of images (though not visual or even mentally visual), schemas and so forth. These, he argues, underlie and inform the so-called “higher” forms of meaning that we recognize as meaning more properly, that is, propositional, descriptive, and conceptual, all based in language. Indeed, what seems to be fixed through critical periods of brain development are just these foundational patterns and schemas and images which provide the ground patterns and processing routines that we use to learn, to perceive, to adapt to the world, to comprehend ourselves as selves and bodies. They seem to be established in the hard wired circuitry of our brains.

Self-actuated human movement is foundational to appreciating the whole complex of issues related to brain, mind, body. Mark Johnson shows that self-actuated movement creates our fundamental sensorimotor schemas that underlay even the highest levels of cognition. We know, certainly it is most obvious, that life seems synonymous with self-actuated movement; yet, I don’t think that we necessarily fully appreciate the complexity and profundity of such obviousness.

I am about to tell you something you will not ever forget because the image is so distinctive as is the revelation it makes. Kittens were raised in the dark and exposed to light only under controlled conditions. The kittens were divided into two groups. Kittens in one group were free to move around as they pleased; however, the kittens in the other group were confined to a little cart attached to the freely mobile kittens. Thus they moved about the world together in pairs, yet one actively engaged the environment through movement, while the other did so passively, that is, without motivating movement or actively interacting with the environment. Only the actively moving kittens developed sight. The passive kittens were functionally blind.⁸ The image of those kittens being pulled about by their siblings leaves us with another remarkable insight.⁹ Perception, indeed our world, depends on our

⁶ Norman Doidge, *The Brain that Changes Itself* (New York: Penguin Books, 2007), p. 64.

⁷ Mark Johnson, *The Meaning of the Body* (Chicago: University of Chicago Press, 2007), pp. 11-14.

⁸ *Ibid.*, pp. 174-75.

⁹ *Ibid.*, p. 175.

willful and experiential action; we must explore our world through directed bodily movement in order to even see it. Non-directed movement, even the experience of differing perspectives through non-directed movement, is not enough to wire up our brains for meaningful sight. We must explore the world with our moving experiential touch-based bodies to see the world. This example shows us that even sight is actually based in the sense of touch, the sense that is itself grounded in movement.

Maxine Sheets-Johnstone wrote, “We literally discover ourselves in movement. We make sense of ourselves in the course of movement.”¹⁰ We come into the world as moving sentient beings. There is then a primacy of movement. In the beginning of life we do not try to move or think about moving or take on the task of moving; we simply come into the world moving; we are not stillborn. Movement then is primal, something already there in the beginning. Therefore, we grow kinetically into our bodies. In our spontaneous movements we discover arms and legs and spines and knees and mouths, how they work, what they are for. In the course of our moving we come to know ourselves as animate beings. In these kinetic-kinesthetic self discoveries we come to awareness of abilities, of identities, of relationships. In these movement experiences we acquire the foundations for complex conceptual ideas such as containment, weight, effort, up and down, front and back, and so on. Thus, conceptual thought too is grounded in movement. Sheets-Johnstone says “everything cognitive leads back equally to movement, to animate nature.”¹¹

It is an odd thing, I think, that as we begin to inhabit our consciousness, our identities, our abilities, the primacy of movement slips into the background. We begin to believe that we exert “mind over body.” We come increasingly to understand the body more as meat, or as a transportation vehicle for the brain or the spirit or soul. We shift to distrust what are so powerfully present in our bodies: feelings and emotions, even our subjectivity. The moving body becomes a burden, an embarrassment, or an object of pleasure and pain. Typically there is a steady decrease in movement throughout life. Certainly there is plenty of attention on the importance of movement to gain cardiovascular fitness, yet there is precious little attention given to the importance of self-directed movement in the process of continuing to discover ourselves, to realize ourselves, to creatively expand ourselves. It seems that we often elect to be the kitten being pulled around the world by another rather than risk the bumps and bruises of moving our own bodies to discover ourselves as we discover our environment.

Now I fully understand that there are a great many human activities that keep us vital throughout our lives and I am not suggesting that SalsAmigos dancing is anything magical. Well, yes, I am certain that it is magical, but not the only magical thing around. I just want to talk about some aspects of SalsAmigos dancing so that you can appreciate things about it that are important to developing teen brains.

SalsAmigos dancing is a development on the Cuban salsa dance form called *rueda de casino*. It is done in a circle which means that everyone is doing the same thing at the same time. Moves are called, yet the dance is totally improvised. This means that one must be on the beat, salsa-stepping in the rhythm of

¹⁰ Maxine Sheets-Johnstone, *The Primacy of Movement* (Philadelphia: John Benjamins Publishing Company, 1999), p. 136.

¹¹ Ibid. The discussion in this paragraph is based closely on Sheets-Johnstone.

the music. At the same time dancers must listen for the calls and execute the called-for move immediately. These moves are done with a partner, so there is physical contact between partners. Thus the mental and physical challenge is coincident and dancers will experience thinking with their moving bodies rather than using their minds to control their movement. There can be no pondering.

In SalsAmigos dancing all dancers do moves as both leads and follows and this means that every movement is done in an ambidextrous way. It is amazing how the brain can wire a single movement pattern in mirrored executions. This is clearly powerful for developing right and left brains, although we well know that the hemispheres work quite differently.

SalsAmigos dancing is done in a group and there is a good deal of movement from partner to partner around the circle. This creates a sense of team, community, cooperation, and inclusiveness. There is no attention given to who are more experienced or more graceful. All assist one another in keeping the circle moving.

Obviously SalsAmigos dancing is wonderful exercise. The dance is done at the rate of about 6,000 steps per hour which is a good mile and a half brisk walk. It keeps the blood flowing, the body moving, and everything nurtured. Most exciting about the fitness aspect of SalsAmigos dancing is that it is so engaging that few experience it as physical exercise at all.

SalsAmigos dancing is movement. I have espoused the benefits of movement from the earliest stages of our development. It is self-actuated movement that is varied and demanding and surprising and engages the body and brain equally in a creative, social, and magical way.

References and Resources

- Norman Doidge, *The Brain that Changes Itself* (New York: Penguin Books, 2007)
Mark Johnson, *The Meaning of the Body* (Chicago: University of Chicago Press, 2007)
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