Demanding Self-movement: the Key to Acuity

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With the baby boomers nearing retirement and their accompanying concerns about maintaining their mental health, a whole new multibillion dollar industry related to recovering brain acuity has emerged. In my overview of the literature, the issues seem to center around memory. And, it is veiled with those self-ageist jokes that I admit I thoroughly detest. You know those little quips that refer to the supposed humor of lost capacities and lost memory. Phrases like "senior moment" are silly at best. Associated with this is a plethora of books whose subject is the "brain," how to understand it, how to care for it, how to nurture it, and so on. I've read quite a few of these. The online aspect of the industry is focused on offering, usually for a hefty price, exercised, games, and puzzles that claim to increase mental sharpness and memory.

Independent research that has surveyed a great many of these "mental exercises" has shown rather convincingly that while they all seem to lead to improved skill in the particular tasks that constitute the particular exercise—that is, one can work puzzles better—the overall impact on memory and acuity of these activities is not actually significant.

What is shown to be of value, with rather clear demonstrable evidence, is physical exercise. The explanation for these results is rarely even considered, but most commonly it is associated with the contribution of physical exercise to general health, to increased blood flow, and to a greater sense of vitality. One clever scientist speaking in an NPR interview recommended doing both of these so-called brain challenging activities and physical exercise.[1] When, at the end of the interview, he was asked what he personally did for his brain health and memory, he proudly indicated that he did both at once, he walked on a treadmill while he read a newspaper.

Okay, I'm going to do my best not to be cynical or rudely critical, but I want to approach this matter of brain acuity and issues of memory in continuity with what we have discussed in the last several lectures. To briefly summarize the core understanding: from birth (actually before) we learn, we gain a sense of self, we establish basic bodily concepts, we create fundamental programming as an organism, through the sensorimotor-proprioceptive processes of moving in the world and encountering the world in physical ways. Furthermore, this process does not end, when incorrectly we believed that the brain was physically complete at around age seven, but rather continues in important ways throughout life. I'll discuss in another lecture the notions of plasticity and how our lifestyle tends unnecessarily to support decreasing plasticity.

A very simple lesson we may take from our discussion of the primacy of movement is that conceptual development, memory, acuity as an organism, and vitality are inseparable from sensorimotor-

[1] See also Pierce Howard, Owner's Manual for the Brain (3rd ed 2006), pp. 122-3 and 221-32.

proprioceptive activities. Thus, we may understand anew why physical exercise is important to so-called brain acuity and memory. It is for all the reasons commonly given, but also because physical exercise involves movement and proprioceptive encounter with the environment.

However, I would argue that there are types of movement much more valuable than walking a treadmill while reading a newspaper. Note that this approach to doing it all is actually simply multitasking and that it is certainly not particularly challenging in either task because walking a treadmill is to simply call on extremely simple sensorimotor programming that has no mental challenge at all. The only mental challenge I could see in this activity occurs in the first minute or so on the first use of a treadmill when you have to figure out how to make it go and how to get walking on it so that you don't fall off. Beyond that, it requires no challenging attention. Further, reading a newspaper or other material remains in a rather disembodied sphere of thoughts unconnected with any sort of action whatsoever.

Taking inspiration from infants, it is not difficult to propose that the most important type of action one may engage for acuity (and this is acuity of the organism, incidentally, not just brain) is action that is challenging to the sensorimotor-proprioceptive system. That would be self-movement initiated in response to challenge from the environment; the more complex the movement the better. This style of self-movement is an actively engaging challenging movement that demands one's attention to alter and adjust the movement based on interaction with the environment. I have been interested in this idea for a long time and have surveyed a good many activities to determine the presence of this complete form of activity and have found, interestingly, that many activities may have an initial phase when this occurs, but then quickly gives way to simple repetition without challenge.

Playing tennis (or similar competitive racquet sports) has a high measure of this type of challenging self-movement because one must constantly adjust one's whole body movements in constantly unpredictable demands determined by the way the other player hits the ball. Riding a skateboard in a skate park or elsewhere is another example where balance speed movement are constantly being impacted by the vastly changing terrain of the park or course and by the efforts of the rider to do particular tricks. Basketball is another sport that certainly engages this constant engagement of the body based on environmental demands. If we think of baseball, it certainly has these, yet they are occasional, far more than might be desirable as a form of activity engaged to develop acuity. Add to this list yoga and soccer and other movement forms.

Interestingly dancing is identified as an activity that is engaging in this particular way. I have developed a form of salsa that provides a fun way to accomplish this constantly challenging demanding self-movement. It is a form of *rueda de casino*, in which casino (or Cuban) style salsa is done in a circle with moves that can be remarkably complex that are called. The form I have developed engages every dancer in both the lead and follow role and with the circle oriented to the inside as well as to the outside. And, of course, the dance is done to music. Thus, dancers must move in complex patterns as partners to the music executing moves in both lead and follow role immediately upon command and many of these moves involve changing partners or moving in complex interweaving patterns around the circle. I love this style of dancing and have taught it for years. However, I must admit that I have tried on many occasions to teach it to adults and found that adults tend, with very few exceptions, to become

utterly frustrated and most simply cannot do it. I'll take up the topic of our movement patterns during our life course in another lecture. I have taught this at the high school level for many years to hundreds of dancers and found that they love the dance and learn it with little difficulty … even though they may frequently vocalize their sense of how hard it is. I just laugh at them and keep them dancing. Here is a video of this dance.

Now another activity that I do regularly that I believe has similar characteristics is "step aerobic dance." This is a movement form that is invariably found in fitness centers rather than dance studios. It involves moving in stepping patterns at medium speed in named patterns on and off and around a "step," a piece of equipment about 18" by 48" (my guess). This "step" can be elevated to differing elected heights by the participant. A step class then involves constant called self-movement patterns that build up into routines comprised of perhaps half a dozen called patterns and then as many as six to eight of these routines are accumulated during an hour-long class. The patterns can be complex, the routines even more complex, the routines are always done both to the right and to the left and sometimes oriented to the back of the step and the front of the step, and the pace is constant. There are no levels, no breaks to teach elements, or rest periods. A good step aerobics class provides an hour of constant challenging self-movement involving every body part in complex and unpredictable ways. The call comes but a split second before the move is executed and they come fast and furious.

Okay, enough for my personal experience. Like my efforts to teach *rueda de casino*, this activity is a difficult one for most people to enter. To come into the midst of this activity is daunting and discouraging to many. I've seen dozens leave the class in the first fifteen minutes. It takes many classes before one can begin to feel that he or she knows enough of the moves to not find oneself standing and watching others move. And a good class is so unpredictable that even the most experienced person will occasionally find a sequence difficult. And, this is an almost exclusively female activity. I'll have more to say on that topic in another lecture.

Neuroscientists have yet to grasp this principle and that is likely because, while only our central nervous system is located in the brain and the rest is dispersed throughout the body, neuroscientists tend to focus largely on what is in the skull, thus the prominence of the use of the word "brain." Here is an interesting example, a personal anecdote told by Pierce Howard, the PhD author of *The Owner's Manual for the Brain* (2006). He writes, "I've had many friends try to encourage me to take aerobic dance classes. For me, personally, that is a distasteful proposition—I don't like the music most aerobics instructors use to motivate their participants, don't like the follow-the-leader format, don't like the emphasis on dressing out for the event, don't like having to drive there. … Instead I walk. I love to walk." (pp. 226-7) I describe later why I think many of Howard's "don't likes" are based in his gender and his age (he was early 60s at his writing), but the point here is that Howard shows no awareness of the neurophysiological differences in the impact of organismic acuity between aerobic dancing which is engaging the sensorimotor-interoceptive system in constant creative stress and walking which has little to no challenge to this system but relies on the most common and simple sensorimotor patterns.

To summarize this discussion now: sharpness of organism (what in a weaker moment I might refer to as brain/body acuity) is based in self-movement, in movement that is challenging and demanding

sensorimotor-proprioceptive movement. This is not a form of movement that one ought to look to as a hedge against the mental decline associated with aging, but rather should adopt as a lifestyle as early as possible. Dancing and dance-related movement forms often rank very highly among forms that offer the desired challenge, yet, of course, there are many others.