The Readiness Is All

by Malcolm Williamson

The study of fossil remains of early man helps us piece together the story of *Homo sapiens*'s physical development. But what of the human mind? What part did our gradually awakening consciousness play in the evolution of our species? Edwardian psychologists inherited a nascent science barely distinguishable from philosophy. Methods chiefly relied on introspection and reflection. Things started to change radically at the turn of the twentieth century. The gathering of meaningful data was frustrated by disagreement over the facts of consciousness based on personal accounts, and there was pressure to situate the study of the mind in a larger biological context (Broadbent 1961, 22). The turning point came in 1913 when John Watson proposed a "behavioural" approach to psychology. Interest subsequently shifted from what went on silently inside the skull to visible action; psychologists began to put more emphasis on environmental factors than they had ever done before (Broadbent, 30, 38).

Watson looked to Pavlov's work on the conditioned reflex as the basic unit from which habits are formed, and for the next forty years, Behaviourism predominated. However, looking back, much of early theory was inevitably crude and lacking in nuance, and it's perhaps not surprising that Alexander and his brother A.R. resisted efforts to have the Technique studied at that time (Dalton 2002, 99, 233). Though John Dewey was keen to get Alexander's technique scientifically tested, he protested that we are more than "a passive puppet played upon by external manipulations" and that Alexander's discovery of a Central Control "corrects the ordinary conception of the conditioned reflex [and] … brings the conditioning factor under conscious direction" of the individual (Alexander 1985, 11).

Discoveries in palaeoanthropology that have helped us form a tentative explanation of how our pre-human (hominid) ancestors evolved physically and mentally were unavailable to Alexander. Around 50,000 years ago—towards the close of the Palaeolithic period that had lasted some 2.5 million years—modern human thinking appears to have blossomed in one of several archaic human species. This article reports on one theory about the predisposing factors that allowed for this ramping up of our mental software.

We have to appreciate how recently all this occurred in evolutionary terms. To put things into perspective, the last common ancestor with our closest relatives (the chimpanzee and bonobo) lived around seven million years ago. Raymond Dart first discovered remains of our likely ancestor *Australopithecus afarensis* in 1925—a kind of ape-man living around 3.5 million years ago who walked on two legs but had a small ape-like brain and features.[1] Dart wrote:

> The ancestors of Australopithecus left their fellows in the trees of Central Africa through a spirit of adventure and the more attractive fleshy food that lay in the vast savannas of the southern plains. (Dart and Craig 1959, 195)

He speculated that

> for the production of man a different apprenticeship was needed to sharpen the wits and quicken the higher manifestations of intellect—a more open veld country where competition was keener between swiftness and stealth and where adroitness of thinking and movement played a preponderating role in the preservation of the species. (209)

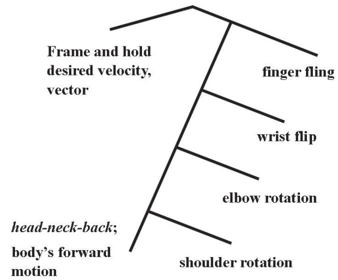
By 500,000 years ago, brain-size had doubled for at least one species of pre-human, making it the biggest of any creature relative to body-size (Restak 2012, 22). Within the nervous system thinking is intimately linked with action (Restak 2012, 99). Making tools or preparing food not only involved decision-making about what to do but also *thinking through* the planning and control of movements. In particular, sophisticated throwing weapons such as spears and javelins were in use from 300,000 years ago:

> Rather than say that man is unique in being the "tool-using animal," … it is more accurate to say that man is the only mammal which is continuously dependent on tools for survival. This dependence on the learned use of tools indicates a movement into a previously unexploited dimension of behaviour and this movement accompanied the advent of bipedalism. (Bartholomew and Birdsell as cited in Dart and Craig, 203)

This change in behaviour led to physical changes:

> As the australopithecine forerunners placed increasing reliance on upright posture, the whole mechanism of their bodies was correspondingly changed. The respiratory system especially and the lower limbs were so strengthened that the standing position was no longer exhausting and the creatures could breathe easily while their hands were busily engaged. (Dart and Craig 1959, 196)

1 The most famous example is "Lucy" in the National Museum of Ethiopia, Addis Ababa.



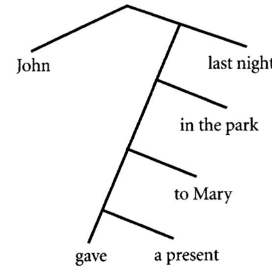


Figure 1 (left) Nested plan for throwing (adapted) **Figure 2** Syntax

The neurobiologist William Calvin has put forward a theory that the mental control required for accurate ballistic throwing may account for our ancestors' enhanced cognitive ability. Unlike (mainly vegetarian) chimps that tend to fling missiles in an impulsive, hit-or-miss fashion, our ancestors learned to throw with more forward planning to increase accuracy and so avoid going hungry. Behaviourists would say that greater accuracy created a powerful reward-learning dynamic that reinforced successful behaviours.

Why would skilful throwing have such a dramatic impact on cognitive ability? When you consider what has to be done to throw something towards a target, you realize there is mental pre-planning and preparation that follows a "ready–get set–go" sequence to muster the precise coordination required. You have to aim on-the-fly at an unpredictable target, unlike whole-body leaps and bounds or throwing a dart at a dartboard (or a basketball dunk that combines both). It requires ordered forward planning—*with syntax*—to perform exact coordination (figure 1). Calvin writes:

> The highest velocity action is in the wrist movement, but planning it requires you to take account of what the elbow is doing: wrist flicks, where mistakes matter most, are nested inside elbow uncocking. What you want to achieve is a certain launch velocity, but you want the launch to occur at just the correct angle to the vertical. Elbow planning needs to know what the shoulder is doing. And the shoulder too has a forward velocity due to what the whole trunk is doing, that forward velocity added by the legs. …
>
> You need, in other words, a coherent plan: all of the parts (and there are about a hundred muscles involved) have to form an internally compatible plan. So, if the target is not standing at the location of one of your well-rehearsed set pieces (such as for playing darts), you need to make a novel, staged, coherent plan. And then execute it in an eighth of a second, getting all those muscles to come in at just the right time and with just the right strength. (Calvin 2004, 95–6)

In primitive, simpler times, daily life would have been less complex and had fewer changes. Our ancestors could have relied on instinctive guidance and control of those "hundred muscles" (and much more) involved in catching their dinner. Alexander's thesis, however, is that conscious control is less hit-and-miss and much more reliable when it comes to learning new skills:

> Civilization, with its multitudinous problems of life and its perpetual interplay of personalities, demands even in the minutiae of physical action a constant reasoning, a deliberate and comparatively rapid adaptation to surroundings such as instinct is quite unable to provide. (Alexander 1912, 11; 1996, 123)

How much would conscious control also have been needed to develop the mental skills for throwing with speed and accuracy? Of course, Alexander did not mean that we have to micromanage our movements. After "framing and holding [the intended goal] in our mind," we must not only think about the specific activity (of throwing) but also ensure that maladaptive habits don't upset the coordinated relationships between the head, neck, and torso. Hence, the primary importance of the head-neck-back relationship (*primary control*) in organizing the limbs for effective action as demonstrated with the Alexander procedure, *hands on the back of a chair*:

> Great care must be taken to see that the pupil has not interfered with the mechanism of the torso … What is essential here is a co-ordinated use of the arms … in which the movement of the arms is linked up with the use of the other parts of the body. (Alexander 2004, 117)

This coordinated activity requires enhanced *working memory* that "involves maintaining information "online" for later retrieval while turning your attention to something else" (Restak 2012, 35–6).

I mentioned *syntax* a moment ago, something that is usually associated with language structure. (The question of where language and speech fit into the timeline is for some other time.) At first, there's likely to have been some simple proto-language: sounds for naming objects and "closed class" words such as *to, from, up, down, in, on,* etc. For more complex sentences, an ordered, coherent pattern of thoughts that is somehow arranged off-line is needed, similar to orchestrating movements for throwing (figure 2). Once we had the ability to think in an extended way for one activity, our ingenuity made it possible to transfer this thinking to other tasks. Just such a cross-over could have been driven by the blossoming of human thought, creating a virtuous spiral of influences i.e., pre-planned throwing and formation of complex extended sentences for communicating who did what to whom, where, and when (Calvin 2004, 86f.; Restak 2012, 25). Compare the scheme for sentence construction (Calvin 2004, 87) with the one above for throwing. Many years prior to this, Dart had written:

> The accurate use of bludgeons and missiles, i.e., hitting and throwing for the purpose of killing, was the only habit capable of shifting the weight of apes from their knuckles and buttock bones onto their feet. When describing the adolescent pelvic bone fragments … I pointed out that the only suitable base for the torsional bodywork involved in

> striking and pitching was the human type of lower limbs. Each lower limb is completely extensible and each is linked at the bottom to a foot—operating on its three corners, of big toe, little toe and heel—through an exceedingly mobile ankle joint. The sturdy lower limbs resulting from this body-torsional mechanism are essential as a solid base for hammering and hurling. Anatomically and physiologically, not so much because it implies the capacity to leap sideways, as because it implies the vastly more significant ability to stand still by immobilizing the feet; the whirling body and flailing limbs clutching tools and weapons operate from the fixed rocklike base of the feet as *an intellectually directed mechanical whole*. (Dart and Craig 1959, 204, emphasis added)

The sensory reports, or as Alexander referred to them, "guiding sensations" (Alexander 1910, 80; 1996, 58, et al.) of the present position of our body serve to frame the plan for what follows, as does the space around us—for instance, our target if hammering or throwing. And the tentative movement plan itself frames the next round of perception. "We frame things in sequence, as in our anthropological preoccupation with what comes first and what follows" (Calvin 2004, 75).

The Alexander Technique involves giving a sequence of orders or directions for the primary control (i.e., the dynamic head-neck-back relationship)—which could be relied on to work instinctively in earlier times. John Dewey called it a series of "what nexts?" Each step in our directing is an end in itself that immediately then becomes the basis for the organization of the next step, and so on (Dewey 1957, 36). It's reminiscent of Alexander's remarks on directing:

> My daily teaching experience shews me that in working for a given end, we can all project one direction, but to continue to give this direction as we project the second, and to continue to give these two while we add a third, and to continue to keep the three directions going as we proceed to gain the end, has proved to be the *pons asinorum* of every pupil I have so far known. (Alexander 1985, 42)

And:

> the pupil should be given the experience, at first in the simplest activities … *of projecting the directions for the new and more satisfactory use* in their proper sequence, primary, secondary etc. "all together, one after the other," as already explained. (68)

This extended action-planning—thinking and perceiving—may account for the accelerated expansion of neural connectivity that was needed for the rise of civilization, culture, and creativity. And it all happened so recently! Writing was invented just 5,000 years old ago. Karl Popper considered polyphonic music—a mere 450 years old—to be: "the most unprecedented, original, indeed miraculous achievement of our Western civilization, not excluding science" (Popper 1974, 43). Polyphony is the name for highly organized but seemingly independent threads of melody woven into a rich tapestry of sound. Did you see what I did there? It's called analogy. The human ability to search out patterns and similarities and combine them to form entirely new ideas is fundamental to the scientific method.

What of our future?

> Nature never "intended" us to occupy the position of dominance in the living world that, for whatever reasons, we find ourselves in. To a remarkable extent, we are accidental tourists as we cruise through Nature in our bizarre ways. But, of course, we are nonetheless remarkable for that. And still less are we free of responsibility. (Ian Tattershall as cited in Calvin 2004, 59)

As we've seen, modern thinking ability is remarkably recent, and like any "Mark I" version, we are prone to glitches and malfunctions. The pace of change is such that we don't have time for evolution to take its course and iron out problems (Alexander 1910, 7f.; 1996, 5f.). Unless we can find ways to see further ahead and quicker ways to adapt and respond, we are likely sleep-walking into disaster. Consider how slowly it's taking us to heed the warning signs of climate change or reduced bio-diversity. Somehow, we have to pull ourselves up by our own bootstraps. On an optimistic note, it is for science to shine a light and give us advance warning of what lies on the road ahead. Equally, it is for medicine and education to provide practical solutions and to patch up the glitches in our inherited makeup—to fill in the gaps that instinct cannot supply.[2] Dewey concluded in his "Introduction" to *Constructive Conscious Control* that

> the method [the Alexander Technique] is not one of remedy; it is one of constructive education. Its proper field of application is with the young, with the growing generation, in order that they may come to possess as early as possible in life a correct standard of sensory appreciation and self-judgment. When once a reasonably adequate part of a new generation has become properly co-ordinated, we shall have assurance for the first time that men and women in the future will be able to stand on their own feet, equipped with satisfactory psycho-physical equilibrium, to meet with readiness, confidence, and happiness instead of with fear, confusion, and discontent, the buffetings and contingencies of their surroundings. (Dewey in Alexander 1985, xxxii)

2 See Calvin's chapter, "The Future of the Augmented Mind," 171–190, and Restak's chapter, "Can We Build a Super-Brain?," 29–39.

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MALCOLM WILLIAMSON (Constructive Teaching Center, 1984) studied viola at the Royal College of Music and was subsequently a member of several orchestras, including the London Festival Ballet (English National Ballet), the National Orchestra of Iceland, and the Scottish National Orchestra. He trained as an Alexander Technique teacher with Walter and Dilys Carrington and began teaching the Technique at the Royal Northern College of Music, Manchester, in 1985. He served on STAT's governing council for twelve years in various roles including Treasurer, Chairman, and Editor of *STATnews*. Malcolm has campaigned widely for the Alexander Technique as a foundation for music training and has been involved with several research projects. He is interested in the history of the technique and how it links in with current science.