

Development of Cultural Consciousness From the Perspective of a Social Constructivist

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Abstract:

In this condensed survey, I look to recent perspectives on evolution suggesting that cultural change may alter the genome. Since theories of development are nested within assumptions about evolution (evo-devo), I next review some oft-cited developmental theories and other psychological theories of the 20th century to see if any match the emerging perspectives in evolutionary theory. I seek theories based neither in nature (genetics) nor nurture (the environment) but in the creative play of human communication responding to necessity. This survey finally looks to more recent work to do with the appearance of independent self-consciousness in the individual following empathic group awareness. The result of such self-created group awareness and symbolic communication is seen to be cultural consciousness, unique to humanity, from which individual consciousness and personhood derive. I conclude by noting the general implications for these approaches in our schools, politics, and in ultimate ontological questions.

1. Introduction

Despite the rhetorical encouragement in curriculum guides toward cooperative projects and group learning, it seems most schooling in the English-speaking world remains largely competitive and individualistic. Considering the predominant theories of human development, learning, and the evolution of the human mind, this should be no surprise. Evolutionary or developmental theories have concentrated either on the species or on the individual, in either case reducing it to a pattern that determines the “nature” of said species or individual. Despite recent work on the emergence of altruism (e.g., Fletcher & Doebeli, 2009; de Waal, 2008), there have been few evolutionary or developmental theories that give precedence to group dynamics as the ground of unique human behavior and individuality.

In the last century, behaviorism tended to see the individual as a hedonistic cipher blindly pursuing pleasurable feelings and avoiding painful ones. Evolutionary theories (especially the neo-evolutionists who followed Darwin) also emphasized the selfishness of the individual who sought only to be the fittest, survive the longest, and reproduce the most. So, very broadly speaking, both nurture – the environmental conditioning aspect of behaviorism – and nature – our genetic inheritance – see the individual as a self-seeking monad, which fits quite well into the ethos of a capitalist economy driven by the *enlightened self-interest* of Adam Smith (1776/1994). This could be coincidental, or not.

There is little question that the predominant metaphors for the human mind these days are the computer and the brain. Yes, the brain, for no matter how many neuroscience images of the brain in action we see, we are still not *seeing* experiential consciousness. To experience consciousness, we must be subjectively conscious. These two metaphors continue the idea of the isolated human being, in this case, the human mind, exhibiting behaviors that arise in isolation and could, in theory, be fully understood once we understand the computational brain. The brain's functioning "wetware" is seen as equivalent to the "hardware" of a computer (or computer networks). Thus much of learning theory, from brain-based learning to standardized tests, caters to this neural-computational metaphor, implying that behavior and thought are predetermined by the material substrate that supports them. Thus education should be based on the information processing of the individual via the tried and true transmit and test model of education.¹

Social psychology and evolutionary anthropology are still very active and a good deal of research is being done into the communal origins of the human mind, but such things do not receive the media attention that any new discovery linked to evolutionary psychology, computer consciousness, or headed with the prefix *neuro-* automatically attracts (cf. LeGrenzi & Umiltà, 2011). Check any newsstand to see the titles of lead stories. It seems we are more comfortable imagining ourselves as software programs on the neurochemical hardware of the brain or as conditioned by our genes than we are imagining ourselves as the product of the choices we make together. This is the aim of this excursus – to trace the breaks in this pattern of individual isolation and determinism and see where cultural creativity has occasionally broken through, especially in evolutionary theory and in theories of human development, and to outline three major researches that indicate the communal origin of human conscious experience — that is, cultural consciousness as the singular human achievement that is the source of individual consciousness and personhood.

My second section below is a condensed survey through the history of evolutionary ideas with special attention to the visionary ideas of Jablonka and Lamb (2006). The third section runs through developmental theories, seeking hints of cultural creativity with a trajectory that should be easy to follow. Following this, the fourth section focuses on the recent research of Tomasello and Rochat that brings cooperation, shared identity, and language back into evo-devo theories. Finally, I will conclude by noting the implications of these researches in education, politics, and, speculatively, an ontological worldview.

2. Evolution

2.1 Survey

First, many have seen parallels between long-term evolution of the human species and short-term development in the individual human being – in other words, ontogeny recapitulates phylogeny. Without getting into this in detail, this recapitulation has not been shown to be exact, not even in the close resemblance of the human zygote to that of a fish, but, generally speaking, patterns of individual development do seem similar to those that we know from human evolution, especially in early childhood development (Rochat, 2009; Tomasello, 2014). So it can be seen that the way evolution is understood will have a bearing on the way we view individual development. This macrocosm/microcosm pattern is colloquially known as *evo-devo*.

¹ This is in spite of so-called *brain-based learning* that, in general, vastly exaggerates the plasticity of the brain and encourages education based on experience and novelty (see Nixon, 2013), just as John Dewey recommended in 1916.

Darwin proposed natural selection with an emphasis on the individual organism, but it should be noted that the other originator of evolutionary theory, Alfred Russel Wallace, emphasized group selection and even went so far as to suggest evolutionary change worked in a manner that current systems theory suggests (Kottler, 1985; Maturana & Varela, 1980). This indicates that research into developmental theories might look to group dynamics more than to the genetics and motivations of the individual. Darwin wrote before the discoveries of Gregor Mendel in genetics that explained the mechanisms through which evolutionary change occur, but he would have been helped immensely by this knowledge, especially including genetic mutations, of which only a very few prove to fortuitous. However, Mendel did not recognize learning as having an evolutionary effect (Bowler, 2003).

It's the early neo-Darwinists like Thomas Huxley and Herbert Spencer, and, later ones like Richard Dawkins, who push the hard line that evolution is random, without purpose, and rarely affected by the life experience or learning of individual or sub-group species members. It should not be forgotten that Darwin's original theories did not rule out the suggestion of Lamarck that a single life's experience can alter the traits that are passed on in evolution (Bowler, 2003). Neither did original Darwinism deny the possibility that *learning* in life by a small group or an individual could prolong the life of a species long enough for it to accommodate such learning and for evolution to take place, as in the simultaneous theorizing of American paleontologist Henry Fairfield Osborne, English psychologist Conway Lloyd Morgan, and American psychologist James Mark Baldwin in what became somewhat unfairly known as the "Baldwin effect" (Baldwin, 1894; Jablonka & Lamb, 2006).

More recently, however, systems theory indicates that any identifiable system (including evolution) is open and subject to change from within, known as *autopoiesis* in the theories of Humberto Maturana and Francisco Varela (Maturana & Varela, 1980; Cull, 2013). This implies the potential for self-inspired creation (Capra, 1996). Geneticist Mae Wan Ho (2003) has reinvigorated vitalism by suggesting that evolutionary change results from multiple causes, some of them in one lifetime, as in Lamarkism. Furthermore, the meaningless, random nature of evolution has been questioned by noted philosopher Thomas Nagel in his little book, *Mind and Cosmos: Why the Materialist Neo-Darwinist Conception of Nature is Almost Certainly False* (2012), in which he presents arguments for a natural (non-deistic) teleology or purpose in evolution. Biologist Stuart Kauffman (2008) has made the case for nature's processes being less subject to the "laws" of nature than to nature's creativity, which he calls the *natural sacred*, no God or gods required.

2.2 Jablonka and Lamb

There have been many others who have let some fresh air into the random determinism² of neo-Darwinian evolutionary theories, but the recent work of Jablonka and Lamb, *Evolution in Four Dimensions: Epigenetic, Behavioral, and Symbolic Variation in the History of Life* (2006), goes so far as to accept the likelihood of a self-constructive humanity, especially with regard to cultural change affecting fundamental evolutionary genetics. This is a watershed book, though its ideas remain controversial for mainstream science.

As can be seen from the title, the strict neo-Darwinism of *it's all in the genes* and *genes determine human nature* is rejected in favor of four dimensions that change genetic inheritance. These dimensions

² *Random* because in neo-Darwinism genetic mutations occur randomly and evolution is regarded as purposeless, and *determinism* because evolutionary genetics determines what each individual life will be like.

are not randomly chosen but appear as the result of a great deal of thought and research by the authors, each of whom is well-recognized in her field. Jablonka is a Professor at the Cohn Institute for the History and Philosophy of Science and Ideas at Tel Aviv University, and Lamb was Senior Lecturer at Birkbeck College, University of London, before her retirement. Previously, they have published widely on epigenetics.

Jablonka and Lamb describe the four dimensions in order, beginning with most widely accepted image of evolution as based in DNA transfer and recombination, subject to random mutations. The second dimension, epigenetics, is their specialty and thus a good deal of the book is dedicated to it. *Epi-* meaning *after* is an appropriate name for structurally altered DNA found to have occurred after birth or, in rare cases, just before it. The epigenetic effect on the immune system has been well established, but some have dismissed it as occurring only very early after birth (or possibly before) in response to the primary caregiver (Dean & Maggert, 2015). Jablonka and Lamb see epigenetic alteration as a possibility all through life and suggest the plasticity of neural functioning as an example of it. Many other researchers (e.g., Meaney, 2010) accept that epigenetics in child development is proof of the interdependence of gene and environment in the regulation of phenotype.

The third dimension is behavioral learning found in the animal kingdom (which includes humanity). When an individual animal or small groups of them manage to learn a successful new way of dealing with a situation through either breakthrough insight as in gestalt (Köhler, 1927) or the trial and error of the learning curve, such learning, if shared through mimesis, will be carried on and eventually alter the genetic propensity for such behavior. A good example of this is the Japanese macaque monkey (*Macaca fuscata*) that learned to keep warm in winter by bathing in open hot springs. Macaques now appear to unhesitatingly enter such hot springs without having been previously exposed to them (Kawamura, 1959).

The final dimension is symbolism, as in symbolic interaction, which the authors base on the estimable philosophic project of Ernst Cassirer (e.g., 1944). Such symbolism (mostly due to language – though music, math, art, etc. are mentioned as other symbolic systems) is found primarily in human beings though the authors are amenable to extending this franchise to certain primate populations, like bonobo, that have been reared by humans. Seemingly based solely on work with bonobos by Sue Savage-Rumbaugh (e.g., Savage-Rumbaugh & Lewin, 1994; Savage-Rumbaugh, Shanker, & Taylor, 1998), they take the long, slow, early evolution of language approach. They do, however, cite the highly regarded Terrence Deacon (1997) to indicate that language and the brain co-evolved, that is, each influenced the development of the other. In this view, language emerged naturally and gradually from earlier communication systems based, apparently, in mimesis and nominative indications (such as pointing, gesturing, signalling, or various codes of behavior) rather than from teaching, as formal symbolic (abstract) systems require.

The authors seem unacquainted with the post-Saussurean structuralist tradition in which formal language structures – words and phrases – are understood as *self-referential*, an important and often ignored insight. As this theory would have it, meaning or semantics is only possible within an already complete language system. Language itself is the background referent, not the external world. If this is so (and it is controversial), language could not have slowly evolved but must have, instead, appeared comparatively suddenly – say, over generations rather than millennia – and grown rapidly as new vocabulary and syntactic elaborations were desperately sought to appease the now abstractly thinking

human mind – seeking causes for effects and other narrative explanations mainly in mythic sources. French postmodern linguist Julia Kristeva (1989) declared,

[N]o matter what the moment and the circumstances of its appearance in the animal scale were, language could only have been born in a single stroke. Objects couldn't just start to signify progressively. After a transformation ... a passage was effected from a stage where nothing made sense to another where everything did. (p. 46)

This seems to me worth noting, for such a perspective takes the invention of language by the symbolic species (Deacon, 1997) out of the natural unfolding of genetic evolution and sees cultural creativity as changing our hominid heritage. This has the advantage of admitting that the human species is *different in kind* from all other species, a position made unpopular today by cognitive science, sociobiology, and evolutionary psychology. But being qualitatively unique for being in possession of a reflexive symbol system that can direct cultures and alter genes need not result in magnified anthropocentrism. Instead we could feel the fear and trembling of those who must bear the awful responsibility of playing a role in the ongoing biological evolution on this planet. But even this sounds unnecessarily grandiose. The fact is that humans give evidence of their uniqueness in private, daily practices like, say, feeding wild birds in winter, which neither increases social status nor enhances the likelihood of passing on their genes.

Be that as it may, the inclusion of symbolism as an evolutionary determinant is a breakthrough idea, at least in the sciences, and, though sometimes resisted by the authors, it recognizes the unique status of humanity on this planet, the creature who influences its own evolution, realizing that human culture and lived experience are constructing the next moment (unlike Savage-Rumbaugh's captive bonobo, in spite of their occasional symbol use). The role we already play in the planet's future is readily apparent.

If the authors are correct in their current interpretation of evo-devo (evolution + development, each influencing the other) – and they certainly make a very strong case – then the scientism of the extreme neo-Darwinists, sociobiologists, or evolutionary psychologists must certainly make room in their theorizing for the fact that experience, learning, and human symbolic interaction influence not only development but also epigenetic and thus genetic evolution. Our future is neither random nor predetermined, in this case, but it is indeed in our hands and the choices we make as a people. Finally, their last two dimensions of evolution help to explain and evaluate theories of development.

3. Development

3.1 Nature versus Nurture

This is not the place to review all major theories of development or theories of learning related to development, but I will continue my theme by looking at major theories that include social factors in learning and possibly allow for cultural creativity. I see such cultural creativity as not *necessarily* growing out of environmental factors, as in behaviorism, or genetic factors, as in evolutionary biology. Cultural creativity may appear out of nothing but necessity.³ From what has gone before, we can see that such cultural creativity, if maintained over generations, may actually change the genome and become part of the human heritage. This is not recognized in the review of most developmental theories that follows.

³ The Ancient Greeks regarded necessity as the Goddess Ananke (Hillman) – so overwhelming were her powers of creating the pathological anxiety that results in necessary actions (cf. Hillman, 1980).

From the late 19th century onwards, we see the great antagonists, nurture and nature, proceeding on their agendas. Pavlov began his work on training dogs to salivate to demonstrate the power of environmental conditioning even as the early neo-Darwinists reached an epitome of influence in scientific circles. It seemed to many that either “man” was a machine (La Mettrie, 1748), albeit an evolved one, or he was a hapless product of social conditioning. At this time, a new force, psychology, became evident in the work of Freud, and now humans were seen as hapless products of the sexual repressions of the unconscious mind, the repressions being nurture but the sexual libido being nature. In fact, Freud developed a “psychosexual” developmental theory in which the individual had to maneuver between the Scylla of social repression and the Charybdis of the uncivilized id or libido to attain appropriate genital-centered sexuality in maturity (Freud, 1915/2011). There is no other choice but neuroses. *No choice* seems to be the underlying theme of most evo-devo theories that see human beings as products.

Other developmental or learning theorists who have had an influence on education can often be placed into either the environmental or the genetic determinist camp with only a few seeing cultural or individual creativity, often based in the acquisition of formal language structures, as an alternative camp of its own that by definition is never pre-determined. Among the early perspectives to perceive that complex social communications allowed for the possibility of humanity expressing the creative freedom that is already present in nature is the philosophy of Henri Bergson (1911/83) in France and simultaneously that of the major pragmatists in the United States. The latter group sometimes included the early social behaviorists who refused to be confined within the stringent restrictions of the emerging environmental conditioning theories of behaviorism that denied that humans had free will and even that human consciousness was an illusion (Watson, 1913; Skinner, 1972).

3.2 Behaviorism and Environmental Determinism

Nearly everything that can be said about the vast canvas of behaviorism has been said. It certainly makes the strongest case for environmental determinism against the influence of instincts, inherited character traits, and genetic influence in general. As noted, it works by assuming all animals, including humanity, are basically hedonistic, that is, pleasure seeking and pain avoiding. In this way, any animal, individually or in groups, can be trained in any way conceivable if someone controls how and when those pleasurable rewards are given or withheld.

For this reason – the unfairness inherent in the idea of there being the trainers and the trained – behaviorism has received much opprobrium. However, there is little doubt that infants, toddlers, and young children need to be trained for they do not have the wherewithal to make informed choices. There is also little doubt that, in spite of all sorts of liberated classrooms and enlightened teachers who cater to individual needs, the structure of the school system is itself based on the principles of behaviorism (and the military). If one works hard and succeeds, one may do well in school subjects and be rewarded by moving upward through the grades. If one does not, one will eventually be forced out of the system. This is not even to mention the rewarding warmth and praise bestowed by teachers and parents on those children who do well and the lack of same for those children who do not.

So behaviorism (which prospers these days under the sobriquet of *neobehaviorism* in which it is admitted that people do have minds but only the illusion of choice-making) is a suitable way to manage animals and young children in accord with the third dimension of evolution in Jablonka and Lamb (2006). But biological constraints on behavioral conditioning, in accord with Jablonka and Lamb’s first two dimensions, must be admitted, including *autoshaping*, inherited behaviors that appear without regard for reinforcement, and *instinctive drift*, the tendency of organisms to revert to instinctual, unlearned

behaviors (LeFrançois, 2011). Recent work on the appearance of altruism (Erikson, 1980; Fletcher & Doebeli, 2009; Tomasello 1999, 2015) also denies the fundamental self-serving drive on which behaviorism depends. Most of all, however, it is the fully human symbolic activity whose complexity allows for degrees of free agency and cultural creativity – the final evolutionary dimension in Jablonka and Lamb – that reveals that behaviorism is not a suitable explanation for human action,⁴ and that such training certainly should not be the sole means of education for maturing students. No doubt in our culture the enormous power of behaviorism’s conditioning techniques will continue to be employed in advertising, election campaigning, and propaganda.

Behaviorism as neobehaviorism opened the way to (and was often replaced by) social behaviorism (Mead, 1934), social psychology (Lewin, 1935), and social learning theory (Bandura, 1977; Vygotsky, 1978), all of which put the community before the individual in the development of the self, as will be seen below. But before I continue on the trajectory to current research into the development of unique self-consciousness in humans (Rochat, 2009) and the shared intentionality (Tomasello, 2008) that allows for such self-consciousness, speech (Tomasello, 2005), thinking (Tomasello, 2014), and human morality (Tomasello, 2015), the opposite trend to environmental determinism must be outlined, i.e., *genetic determinism*.

3.3 The Cognitivist Revolution and Genetic Determinism

The evolutionary genetic camp has come a long way since the early neo-Darwinists found influential footholds in sociobiology (Wilson, 1975) and evolutionary psychology (e.g., Buss, 1999). It may have reached its apogee of influence in the 1990s with the publication of *The Bell Curve* (Herrnstein & Murray, 1994) and the claim that inherited intelligence is the primary determiner of social success. The rise of cognitive science carried this position forward both in neuroscience and, perhaps surprisingly, in the artificial intelligence program of computer science. In either case, the human individual is often regarded as a cipher without free will who only carries out its programming either on the wetware of the brain (e.g., Bridgeman, 1990) or the metaphoric hardware of the brain-as-computer. For example, the seemingly unpredictable behavior of teen-agers can now apparently be explained through studies of teen-age brains, as revealed in two popular periodicals (Dobbs, 2011; Giedd, 2015).

Though in a very broad and less determinist fashion, evolutionary materialism as found in cognitive science or, simply, *cognitivism* as it is known in much of today’s educational psychology literature, is flourishing today as the dominant developmental and learning theory (see, e.g., Gelman, 1978; LeFrançois, 2011; Bigge & Shermis, 2004; Woolfolk, 2012). Cognitivism, however, comes in many varieties, from the human brain as individual serial computer to the human brain as a parallel network information processor that learns and adapts to its learning. All cognitivism, however, depends on the assumption that the brain is what learns and adapts in human beings, the implication being that humans are essentially physically carapaces around their central processing organ, the brain, which functions on computational principles to determine which actions to take. Such information processing may include an element of free will, at least in terms of the choosing which information to process; that is, one may choose a focus for one’s attention to some degree. However, there remains the problem of fully explaining how such independent information processors, as brains are assumed to be, can connect with other brains and, though such connectionism, learn such things as shared intentions, altruism and morality, which are usually considered value-laden judgments to do with sensed meaning.

⁴ It should be noted that it was the publication of linguist Noam Chomsky’s “A Review of B. F. Skinner’s Verbal Behavior” (1959) that rang the death knell on the huge influence behaviorism had been enjoying.

It was Jerome Bruner, one of the most influential developmental theorists, who made the switch from structural information processing to narrative meaning making in the 1970s and 1980s in a series of memorable books and articles, beginning with “Beyond the Information Given” (1973). It had been Bruner’s intention to make the break from behaviorism by illustrating how humans create their own conscious selves and make their own meaning through shared narratives (Bruner, 1987, 1990a), but he inadvertently opened the door to cognitivism instead when his theories of meaning making were reduced to information processing, in which consciousness is not necessarily required.

“We were not out to ‘reform’ behaviorism but to replace it” (p. 3), wrote Bruner (1990b). “There is no one explanation of man,” [and no explanation of the human condition can make sense] “without being interpreted in the light of the symbolic world that constitutes human culture” (p. 138). Bruner here is clearly in accord with the uniquely human fourth dimension in the evolutionary approach of Jablonka and Lamb (2006), so, as such, he becomes the inheritor of the ideas of Cassirer (1944, 1946) with regard to the transcultural importance of symbolism in the revelation of the human mind.

He is also carrying forward the formative suggestions of Mead (1934), who posited the sense of self as arising only through social interaction, and Vygotsky (1978), who saw the self as a social construction that could then act to influence the society that called it forth. His emphasis on symbolic narratives in the construction of the human world seems inspired by the sociological theories of Goffman (1959), Berger and Luckman (1967) and Blumer (1969), as well as the important theories of dynamic memory construction in Bartlett (1932) and Halbwachs (1925/1992). These theories do not name *cultural consciousness* but often assume it. How could the need for meaning determine neural processing in the individual monad of the isolated human brain? Cassirer’s emphasis on myth and Bruner’s emphasis on narrative indicate the understanding that human brains connect to each other through symbolic communication channels that allow a cultural network to function as an extension of individual brains. As a well-known linguist wrote: “When language is made overt, as in speaking and writing, it is able to provide a link between what would otherwise be independent nervous systems, acting as an imperfect substitute for the synapses that fail to bridge the gap from one mind to another” (Chafe, 1994, p. 41).

Bruner’s revolution was “an all-out effort to establish meaning as the central concept of psychology – not stimuli and responses, not overtly observable behavior, not biological drives and their transformation, but meaning” (1990b, p. 2). But this emphasis was shanghaied by the cognitive revolution in which the key idea was changed from *constructing meaning* to *processing information*, and the dominant metaphor for human decision-making changed from social-emotional engagement to the computer. It is probably fair to say that neuroscience and the computer analogy remain the dominant paradigms in development theory today, each supporting the other and both failing to acknowledge the power of symbolism and relational intersubjectivity in the formation of individual consciousness.

3.4 Social Constructivists

Before meeting two current researchers who provide strong experimental evidence for the intersubjective origin of symbolic community and thus for human self-consciousness, in all fairness it should be noted that throughout the 1980s and onward, strong theories emerged that continued to support human relationality and the vital importance of shared intentionality in a community. Erikson’s identity crisis notions (1980), first published in 1959, leave the responsibility for choosing the right path through such crises with the individual and the influences upon him or her. Bandura (1977, 1986, 1991) with his social-cognitive theory of development is an important transitional figure who found a

mediating path between cognitivism and social learning theory. Kegan's (1982) processes of human evolution and development (evo-devo) strongly emphasize how creative insight allows one to incorporate past stages and advance forward into a less self-constricted, more transcultural sense of being. Fogel (1993) makes a very strong but not widely read case for relationality as essential for the emergence of the individual. Neisser (1993) through inspired psychological experiments demonstrates that our self-perception is learned from the environment and others. The current research trajectory that I now review opposes the reductionist determinism of both the environment and genetics.⁵

4. Current Research in Evo-Devo

4.1 Introduction

Aside from being relatively more current, the research and writing of Michael Tomasello (1999, 2005, 2008, 2014, 2015) and Philippe Rochat (1999, 2001, 2009, 2014) have also undergone extensive investigation both in the laboratory and the field, often using innovative experiments, before interpretive theory began, unlike many of the less grounded theories mentioned above. Their work is both empirical yet insightfully interpretive. Both work with patterns in phylogenetic evolution and ontogenetic development; however, Rochat's research has been more explicitly developmental in early childhood. Rochat more boldly rejects the neuroscientific and the evolutionary paradigms as the determining factors in individual development and looks to cultural creativity, but, in spite of his declared allegiance to evolutionary psychology, I suggest Tomasello inadvertently moves into the social constructionist camp himself.

4.2 Tomasello

Tomasello has been something of a publishing industry on his own these passed 20 years or so. Admittedly, as the co-director of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, he must have numerous graduate assistants or laboratory researchers to assist him in his efforts. He straddles both sides of the evo-devo world, "his work – combining studies on large apes and children – is unparalleled in the field" (Pléh, 2014, p. 979).

Tomasello is also notable in that his basic theoretic position – that humanity diverges from other animals including the great apes because of their evolved cognitive ability to focus attention together – has undergone several revisions over the years as new experiments with children or with apes have revealed shortcomings to him. His willingness to adapt and revise is to be lauded. At this point, however, he remains unwilling to loosen his credentials as an evolutionary psychologist (at least according to Pléh, 2014) and reconsider his allegiance to the controversial "theory of mind" perspective, so popular today. This effects his final position in that he must explain the natural evolution of cognition as preceding the appearance of speech, and, according to Tomasello, what led to the unique advance in human cognition was the human need to work together in such things as the hunt and in maintaining social cohesion as families united to become tribes (Tomasello, 1995, 1999). Early on, he called this unique cognitive ability *shared attention*, but when shared attention was shown to be fairly commonplace among great apes that were studied, he made the significant adaptation to instead referencing *shared intentionality* (2005, 2008) as the unique human ability.

⁵ Though often given credit for social constructionism, I leave out Piaget here for his stage theories ultimately rest in his background in biology, which he considers the source of cognition (e.g. Modgil & Modgil, 1982; Pfeiffle, 2008). I feel the credit should go instead to Mead (1934), Lewin (1935), and Vygotsky (1978). Aside from Kristeva (1989), I do not make mention of continental philosophy or the postmodern movement either, in spite of their embrace of the language-is-consciousness position, for I am following rational empiricism here, something most postmoderns reject (cf. Curtler, 1997).

The difference is important since a group of apes may have their attention on the same activity but still be stuck in selfish egocentricity. A good example is the group monkey hunt of the chimpanzees. At first glance, they seem to work in coordinated fashion to isolate and corner an individual monkey, but a closer look reveals that each chimp is hunting only for himself, seeking to be among the first to render the poor monkey and get to the meat or be among the first of the secondary beggars, who usually know who to approach for hand-outs. There is no food-sharing or bringing back the spoils to the village, which, amongst early humans, is the signature of a cooperative culture. Such coordinated hunting strategy, sometimes lasting days or even weeks, and the subsequent sharing of the spoils is what Tomasello means by shared intentionality. It must be noted that the give and take of first level gestural speech requires such cognitive abilities so both the sender and the receiver can imagine the intention of the other. Second level speech, however, in which formal linguistic structures with both semantics and syntax and the ability to speak of the past, future, and the far away demands a degree of cultural cooperation and symbolic passing of traditions for which evolution can not be given credit.

This perspective on human communication and language thus basically turns the Chomskian [genetic] proposal on its head, as the most fundamental aspects of human communication are seen as biological adaptations for cooperation and social interaction in general, whereas the more purely linguistic, including grammatical, dimensions of language are *culturally constructed* and passed along by individual linguistic communities. (Tomasello, 2008, p. 11, my italics)

It is Tomasello's turn toward cultural construction that tends to separate him from the evolutionary biologists. It's strange he still accepts a version of the theory of mind (ToM) perspective. Crudely, a ToM assumes that a fully established mind or self is in each individual and that this self or mind can only *mentally infer* a similar self or mind in others by observing their behavior and elaborating a theory of mind for them based on noting the similarities with one's own behavior. The idea that the self comes with the body seems to be inherent to both behaviorism and sociobiology, but there is no reason to make such an assumption. As neuroscientist and philosopher, Alva Noë (2009) states in another context:

[ToM] takes for granted from the start that all that is available to us is the mere behavior of others; it takes for granted that minds are hidden and private. It also takes for granted that the minds of others are real for us only as a kind of theoretical device to help us manage our dealings with others. (p. 30)

That fact that Tomasello sees shared intentionality as necessary for first level symbol exchange found in gesture and sign (probably carried on for millions of years amongst hominids and shown to be occasionally present amongst great apes and cetaceans brought up in captivity) might have implied to him that a shared social identity could have preceded individual identification. That is, there is no need to posit a ToM by isolated selves if the isolated self-identity is preceded by identification with each other as a tribe, as is indicated in other evo-devo theories (e.g., Bruner, 1987; Mead, 1934; Vygotsky, 1978). This idea is occasionally acknowledged by Tomasello (2014) himself when he cites Vygotsky and Bakhtin as his intellectual antecedents and when he moves into his recent discussions of the now renamed *joint intentionality* and, the next step, *collective intentionality*. The latter apparently concerns humanity after the advent of fully self-referential, syntactically and semantically-driven formal language in symbolically interactive cultural groups. At this point, "cooperative communication became conventional linguistic communication" (2014, p. 5), so differing viewpoints could assume a neutral, objective stance to win adherents. "Because the collaboration and communication at this point were conventional, institutional, and normative, we may refer to all this as *collective intentionality*" (pp. 5-6,

italics in original). Tomasello avoids the “c” word, consciousness, likely because of controversies in that field, but I suggest joint intentionality might be understood as *cultural consciousness*, and collective intentionality as social consciousness; or, better, considering Tomasello’s move into moral philosophy, as *social conscience*.

Perhaps it should not be surprising that this latter concept has been thoroughly resisted, especially in the United States, as the word “collective” is felt to be anathema to the Ayn Rand, Adam Smith sort of individual competitiveness that is the cornerstone of capitalism. Such selfish individualism is the primary assumption of behaviorism and neo-Darwinism too, but the whole notion of an intersubjective collective preceding self-identity as an individual undermines all of these perspectives.

Perhaps predictably, in Tomasello’s most recent book (2015), he applies these principles to an explanation for the conventional morality found in cultural groups. With his background researches, he makes a strong case. His view that joint intentionality and, later, collective intentionality are not only how we discern altruistic morality but are also the foundation for all that makes us uniquely human must be taken seriously.

However, when he assumes that evolutionary cognitive development must have been in place *before* the phylogenetic appearance of formal language, one must be more critical. As above, it is conceivable that *out of necessity* humans *invented* linguistic forms that could refer to the origins of identity in the distant past, envision the far away and the yet to come, and create narrative myths to express meaning to themselves (cf. Barfield, 1977; Dewart, 1989; Nixon, 2010). The cultural invention of, first, gestural representation millions of years ago, and of formal language about 60 to 100 thousand years ago, could have led to later evolutionary changes, or at least to the co-evolution of language and the brain, as in Deacon (1997). This would match Jablonka and Lamb (2006).

4.3 Rochat

Rochat is more radical in his approach, specifically dealing with the evolution and the development of consciousness, and daring to suggest that, as self-conscious persons, we each arise from our own mutuality. In general, his work has been less concerned with the evolutionary background than Tomasello, but his extensive work with infants has led him to postulate that uniquely human self-consciousness results from the mutual interaction of the infant’s body with objects and ultimately with other people. It is an ecological-phenomenological approach that sees the early child as both reactive to the world around it and in an important sense independently creative in its response to it. Self-consciousness is the continuing sense of identity that comes with long-term memory that is, in turn, enabled through the emergence of early speech patterns *learned from others*. In his recent book most relevant to this monograph, *Others in Mind: Social Origins of Self-Consciousness* (2009), Rochat considers both the “evo” part of the evo-devo pairing while also daring to break scientific habit by taking questions of self and consciousness seriously, both in individual development and in the evolutionary emergence of “modern” behaviors in *H. sapiens* (especially after the emergence of formal language structures).

As the title indicates, Rochat is addressing the origins of self-consciousness, not the self as an assumed entity per se. “There is no such thing as a ‘core’ or an ‘individual self,’” Rochat declares. “I propose instead that what develops and is unique to human ontogeny is a sense of self that is *co-constructed in relation to others*” (p. 3, italics in original). Being conscious of one’s self in relation to others is found *only* in human development, and Rochat makes this clear from the beginning. Though once a student of

Piaget, Rochat more takes his cue from such as Dewey (1916), Mead (1934), Goffman (1959), and Vygotsky (1978), when he declares:

I start from the simple fact that without others, *we would not be*. As infants we would not have survived. As adults, we would not have any explicit sense of who we are; we would have no ability, nor any inclination to be self-conscious. (p. 2, italics in original)

In other words we have an overwhelming desire to be with others, to be recognized by them, and to share in social intimacy. The other side of the coin of desire is fear, and for Rochat, “The fear of social rejection is the mother of all fears” (p. 3). One’s sense of self becomes deformed under the umbrage of such rejection, and the earlier it takes place, the more powerful its influence. In short, “[S]elf-consciousness stands for *the representation we hold of ourselves through the eyes of others*.” Continuing with words that could have come from Mead, “[T]his representation is in essence a social construction, as opposed to an individual elaboration. ... [It] originates in relation to others” (p. 3, italics in original).

Very early in this book, Rochat sets out his parameters. The rest of the book is a fleshing out of these ideas, with some philosophical elaboration and some examination of unusual situations and possible applications. It should be noted that, in spite of his theoretic predecessors, Rochat’s views derive from many years of close study of infants, toddlers, and young children, beginning in the early 1980s. By the end of the 1990s, he was working with others on a version of social psychology involving symbolic interaction (Tomasello, Striano, & Rochat, 1999). In short, Rochat’s theories have grounding.

Rochat does not veer off into drawn-out discussions on the nature of consciousness, though he does agree with philosophers like Merleau-Ponty that consciousness, or, better, awareness, exists as embodied experience in a pre-self-conscious manner, what some call phenomenological consciousness. For Rochat (and others) self-consciousness creates the objective self – the self as seen from the imagined perspective of others – that “becomes increasingly external as it refers more and more to the evaluative eyes of others” (p. 11). Such an objectification involves higher mental functions that are not in any way determined by the brain, though one may admit they are limited by it. At such levels, each brain functions amongst a network of brains. Rochat, echoing Chafe (1994), writes:

The brain is indeed adapted and shaped to live in a society of minds. If the brain of an individual can be anatomically described as a distinct entity, it can hardly be described as such at most levels of higher functioning, including self-reflection or self-conceptualization. Most of what the brain allows an individual to perform is done in conjunction with other brains, particularly performances such as thinking and talking, even thinking and talking about the self. This basic fact questions the validity of construing the locus of conscious phenomena in the brain of the individual since most of these phenomena depend on conjugate functioning with other brains. (p. 10)

This is an explicit statement that marks the move into cultural creativity (aka cultural construction) as a source *outside the brain* for the brain’s neural functioning. The focal point and apparent source of all our thinking, reflection, and recognition is the self each of us knows as *I* or *me*. Rochat is not the first to emphasize that this self is created as we become conscious of it from the perspective of others, and that this self-consciousness is projected by our pre-reflective, embodied awareness:

[T]he sense and concept of self cannot be conceived independently of the sense and concept of others. They are mutually defining as the two sides of a coin. The basic intuition is that when we think of ourselves, we always and inescapably have *others in mind*. (p. 14, italics in the original)

Rochat has tested his views by comparing multicultural perspectives, including Melanesian children in Vanuatu, and finds evidence amongst the symbolic speech patterns, ritual behaviors, and taboos for the need to be recognized and included and the deep fear of isolation and rejection. Key to such understanding is always found in language and symbol, as in all cultures.

But only the human animal is able to attain such a full symbolic capacity all the time. And this is concomitant upon the ability to become *co-conscious* with other members of the group. This applies in both evolutionary and developmental stages of consciousness. It must be remembered that Rochat sees these stages first emerging in the individual at a very young age, and, after crossing from one to the next, the emerging self will often slip back to former stages of consciousness throughout his or her life as each new stage is nested in those that went before.

Rochat's list of levels or stages of "consciousness" follows (and these stages are what he makes his views so unique and important): 1. *Non-conscious* states of the mind are by definition unknowable but may be equated with lower life forms or dreamless states of sleep. 2. *Unconscious* states of mind are understood to be mental contents that have been forgotten or repressed or otherwise ignored. Here he ignores the deeper Jungian theory of a collective unconscious in favor of a more Freudian view. 3. *Aware* mind states are just that, awareness without differentiation into mental categories or self-reflection. 4. *Co-awareness* seems to apply to many animals, including warm-blooded mammals; it refers to the simple awareness of the presence of others in the group but without the mind-to-mind links provided by symbols. 5. Consciousness, Rochat notes, derives from the Greek *suneidesis* meaning "communal knowledge" (p. 50), and I must add from the Latin *conscius*, meaning "knowing together". It refers to emotional knowing in the individual being. "It exists and vanishes with the body" (p. 52). 6. *Co-consciousness*, however, is the unique human achievement, which should by now be clear in meaning. "I know with *others in mind*: I become *co-conscious*" (p. 54, italics in original). It need hardly be said that being co-conscious with other minds in a group is a dynamic process, so it must involve shared avoidances as well as shared intentions, which was made clear in my discussion of Tomasello.

It must be admitted that these theoretic stages do not emerge directly from Rochat's research and are, in fact, idiosyncratic. From the perspective of consciousness studies, this list is not likely to receive wide acceptance. The most notable contribution is his concept of co-consciousness: the mutuality of minds that occurs *after* one behaves as a conscious organism, according to Rochat. However, as seen above, the word *conscius* already implies "knowing together" (Latin: con + scio), and it may well be that such *knowing together* precedes the consciousness of self, just as Bruner (1987) indicated.⁶ This suggests co-consciousness might be better understood as, simply, *cultural consciousness*. To the extent that co-consciousness can be equated with cultural consciousness, its boundaries seem to fluctuate as do the individuals in an identifiable group, but such boundaries certainly exceed individual embodiment. So,

⁶ Mead (1934), as often, anticipated this viewpoint. Philosopher Paul Ricoeur later made the strong case for individual subjectivity (self-consciousness) arising from intersubjectivity, a primary identification with others, in *Oneself as Another* (1995). Learning the social codes of language already implies being drawn into otherness (Cassirer, 1944; Deacon, 1997; Kristeva, 1989). Identifying with others *before* we learn to objectively identify our selves with our embodied experience means such positions as the cognitivist *theory of mind* and philosophic solipsism become absurd.

though individual phenomenology *may* “vanish with the body”, co-consciousness, i.e., cultural consciousness does not.

In any case, it can be seen that conscious behavioral learning is in accord with the third dimension of evolution in Jablonka and Lamb (2006). Furthermore, human co-consciousness is made possible only with the emergence into symbolic interaction, which depends on the group, so Rochat’s final stage of individual development matches the fourth dimension of evolution found in Jablonka and Lamb.

This is sufficient coverage of Rochat for now to serve my purpose. It should be clear that Rochat’s views on the origin of self-consciousness lie beyond the individual brain in co-consciousness – which I feel is better identified as cultural consciousness – thus in cultural creativity or construction. For such mutuality of identity to emerge, some form of symbolic communication (or *interaction*), such as language, is necessary as the basis for what might even better be called *symbolic communion*. In this way, we might be seen as the self-creative species, the species that has achieved cultural consciousness at least some of the time. Other times, admittedly, our self-created cultures find themselves hostile to each other (or within each other) and the biggest threat to human existence becomes other human existents.

5. Conclusion

I have undertaken this compressed survey to demonstrate how a line of thinking that I have called cultural creativity, akin to cultural constructivism, began between the polar extremes of environmental determinism, i.e., behaviorism, and genetic determinism, i.e., neo-Darwinism, the latter of which dominates evo-devo theories today in a less deterministic fashion in the guises of sociobiology, evolutionary psychology, and the information processing model of cognitivism. I have traced the line that emphasizes human creativity in the face of nonspecific necessity (perhaps in the nature of an existential crisis) through revisionist evolutionary theories, social behaviorism, social psychology, symbolic interactionism, constructive theories of memory, autopoietic systems theory in biology, and through narrative theories in linguistics. Finally, I have shone a light on recent research that emphasizes the attainment of degrees of freedom via the complexities of symbolic culture – especially in Jablonka and Lamb (2006), Tomasello (2008, 2014, 2015), and Rochat (2009). Such cultural creativity implies the possibility that we have entered the level of consciousness in which we are able to direct our own evolution and development (perhaps in the creative unconscious), but I have also hinted that the failure to rise to such terrible responsibility could be humanity’s undoing.

I would like to bring this survey to close with a very brief look at the implications of accepting and applying this recent research into cultural creativity in the fields of education, politics, and ontology. However, the major authors I’ve cited have directly endorsed none of these implications.

In education, it need only be said that fostering joint or collective intentionality requires a firm mastery of expressive symbolic interaction, especially language, to leave childhood’s behavioral third dimension of Jablonka and Lamb (2006) and enter the symbolic fourth dimension. To attain the independent agency that comes with full self-consciousness requires that we accept our dependence on and responsibility to others with whom we must learn to relate cooperatively or in the rationally based manner of fair-play competition. We need to be taught social conscience. This recalls the suggestions that have been made for decades to do with guided group work or group projects that involve joint intentions or even social engagement projects that call upon collective intentions. Education would have to be based in real experience and built on democratic principles. Sound familiar? It should, but the

progressive theories of John Dewey (1916) and others have never been implemented across the curriculum or throughout the nation. Entering the emerging age of the Internet may change all that.

In politics, to the evident distress of many, the work cited above points to the vital importance of collective action, putting community needs before those of the individual and distributing the wealth fairly but not necessarily equally amongst the population. This appears to be the way that our ancestors first created cultures and self-conscious persons within those communities, with the added necessity of self-referential symbolic communication, of course. The faith in “enlightened self-interest” now appears to be a recent invention based in the misinterpretation of nature as found social Darwinism and used the by the privileged ever since to justify their unequal hoarding of wealth and power. What’s most natural to humans, however, is sharing and living together for the good of all, i.e., cultural consciousness and social conscience.

There are ontological implications of these evo-devo theories of cultural creativity, too. This is not the first time that cultural creativity as opposed to genetics alone has been given credit for the awakening of symbolic human culture (cf. Bergson, 1983; Cassirer, 1944; Dewart, 1989; Greenspan & Shanker, 2004; Richerson & Boyd, 2005). But cultural creativity could not be the *creation of creativity*; creativity did not make its first appearance with culture but in fact must be assumed to be an aspect of evolution, the primary mover of the universe itself (cf. Baldwin, 1894; Bergson, 1911/1983; Capra, 1996; Ho, 2003; Maturana & Varela, 1980). Kauffman (2008) refers to creativity in nature as sacred while Nagel (2012) sees it as implying a teleology, a purpose, in evolution; both identify themselves as atheists. In this way, creativity itself is seen as the autopoietic source of destinies – as the strange attractor of systems theory – and should be respected as such if not held in awe (though A. N. Whitehead (1929/1978) regarded creativity itself as the unconscious but godlike prime mover). Of course, creation and destruction alike may appear from unguided creativity, so it is incumbent on us to educate our children in a manner that valorizes open creative activity over the closed and deterministic, yet calls upon critical thinking and rational balance to guide our creative cultural unfolding.

It goes without saying that further research along these lines will help clarify these ideas.

References

- Baldwin, J. M. (1894). *Mental development in the child and the race: Methods and processes*. New York: MacMillan.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Performance*, 50, 248-287.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Barfield, O. (1977). *The rediscovery of meaning, and other essays*. Middletown, CT: Wesleyan University Press.
- Bartlett, F. C. (1932). *Remembering: An experimental and social study*. Cambridge: Cambridge University Press.
- Berger, P. L. (1966). *The symbolic construction of reality: A treatise in the sociology of knowledge*. Garden City, NY: Doubleday.
- Bergson, H. (1983). *Creative evolution* (A. Mitchell, Trans.). Lanham, MD: University Press of America. First published in French 1911.

- Bigge, M. L., & Shermis, S. S. (2004). *Learning theories for teachers* (6th ed.). Boston: Allyn and Bacon.
- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Upper Saddle River, NJ: Prentice-Hall.
- Bowler, P. J. (2003). *Evolution: The history of an idea*. Berkeley: University of California Press.
- Bridgeman, B. (1990). Intention itself will disappear when its mechanisms are known. *Behavioral and Brain Sciences*, 13, 598.
- Bruner, J. S. (1973). *Beyond the information given: Studies in the psychology of knowing*. New York: Norton.
- Bruner, J. A. (1987). Life as narrative. *Social Research*, 54 (1).
- Bruner, J. A. (1990a). *Acts of meaning: Four lectures on mind and culture*. Cambridge, MA: Harvard University Press.
- Bruner, J. S. (1990b). *The proper study of man*. Cambridge, MA: Harvard University Press.
- Buss, D. M. (1999). *Evolutionary psychology: The new science of the mind*. Boston: Allyn & Bacon.
- Capra, F. (1996). *The web of life: A new scientific understanding of living systems*. New York: Anchor Books.
- Cassirer, E. (1944). *An essay on man*. New Haven, CT: Yale University Press.
- Cassirer, E. (1946). *Language and myth* (S. K. Langer, Trans.). New York: Dover.
- Chafe, W. (1994). *Discourse, consciousness, and time: The flow and displacement of conscious experience in speaking and writing*. Chicago: University of Chicago Press.
- Chomsky, N. A. (1959). Review of B. F. Skinner's Verbal Behavior. *Language*, 35 (1), 26-58.
- Cull, J. (2013). *Living systems: An introductory guide to the theories of Humberto Maturana & Francisco Varela*. Charleston, SC: Printed by Createspace.
- Curtler, H. M. (1997). *Rediscovering values: Coming to terms with postmodernism*. Armonk, NY: Sharp.
- de Waal, F. B. (2008, Jan). Putting the altruism back into altruism: The evolution of empathy. *Annual Review of Psychology*, 59, pp. 279-300.
- Deacon, T. (1997). *The symbolic species: The co-evolution of language and brain*. New York: Norton.
- Dean, C., & Maggert, K. A. (2015, April 1). What do you mean, "epigenetic"? *Genetics*, 199 (4), 887-896. DOI: 10.1534/genetics.114.173492
- Dewart, L. (1989). *Evolution and consciousness: The role of speech in the origin and development of human nature*. Toronto: University of Toronto Press.
- Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York: MacMillan.
- Dobbs, D. (2011, October). Beautiful brains: The new science of the teenage brain. *National Geographic*, 220 (24), 36-59.
- Erikson, E. (1980). *Identity and the life-cycle*. New York: Norton. First published 1959.
- Fletcher, J. A., & Doebeli, M. (2009, Jan 7). A simple and general explanation for the evolution of altruism. *Proceedings of the Royal Society*, 276 (1654), 13-19. DOI: 10.1098/rspb.2008.0829
- Fogel, A. (1993). *Developing through relationships: Origins of communication, self, and culture*. Chicago: University of Chicago Press.
- Freud, S. (2011). *Three essays on the theory of sexuality* (J. Stachey, Trans.) Eastford, CT: Martino Fine Books. Originally published in German 1915.
- Gelman, R. (1978). Cognitive development. *Annual Review of Psychology*, 29, 297-332.
- Giedd, J. N. (2015, May 19). The amazing teen brain. *Scientific American*, 312, 32-37.
- Goffman, E. (1959). *The presentation of self in everyday life*. New York: Doubleday.
- Greenspan, S. I., & Shanker, S. G. (2004). *The first idea: How symbols, language, and intelligence evolved from primate ancestors to modern humans*. Cambridge, MA: Da Capo Press.

- Halbwachs, M. (1992). *On collective memory* (L. A. Coser, Ed. & Trans.). Chicago: University of Chicago Press. Originally published in French 1925.
- Herrnstein, R. J., & Murray, C. (1994). *The bell curve: Intelligence and class structure in American life*. New York: Free Press.
- Hillman, J. On the necessity of abnormal psychology: Ananke and Athene. In J. Hillman (Ed.), *Facing the gods* (pp. 1-38). Dallas, TX: Spring Publications.
- Ho, M. W. (2003). *Living with the fluid genom*. London: Institute of Science in Society.
- Jablonka, E., & Lamb, M. J. (2006). *Evolution in four dimensions: Genetic, epigenetic, behavioral, and symbolic variation in the history of life*. Cambridge, MA: MIT Press.
- Kauffman, S. A. (2008). *Reinventing the sacred: A new view of science, reason, and religion*. New York: Basic Books.
- Kawamura, S. (1959). The process of sub-culture propagation among Japanese macaques. *Primates*, 2 (1), 43-60.
- Kegan, R. (1982). *The evolving self: Problem and process in human development*. Cambridge, MA: Harvard University Press.
- Köhler, W. (1927). *The mentality of the apes*. New York: Harcourt, Brace & World.
- Kottler, M. (1985). Charles Darwin and Alfred Russel Wallace: Two decades of debate over natural selection. In D. Kohn (Ed.), *The Darwinian Heritage* (pp. 367-432). Princeton: Princeton University Press.
- Kristeva, J. (1989). *Language: The unknown – An initiation into linguistics* (A. M. Menke, Trans.). New York: Columbia University Press.
- La Mettrie, J. O. (1748). *L'homme machine*. Paris: Elie Luzac.
- LeFrançois, G. R. (2011). *Theories of human learning: What the professor said* (6th ed.). Belmont, CA: Wadsworth.
- LeGrenzi, P., & Umiltà, C. (2011). *Neuromania: On the limits of brain science*. Oxford: Oxford University Press.
- Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw-Hill.
- Maturana, H. R., & Varela, F. J. (1980). *Autopoiesis and cognition: The realization of the living* (2nd ed.). Dordrecht, NL: D. Reidel Publishing.
- Mead, G. H. (1934). *Mind, self, and society: From the standpoint of a social behaviorist* (C. Morris, Ed.). Chicago: University of Chicago Press.
- Meaney, M. J. (2010). Epigenetics and the biological definition of gene × environment interactions. *Child Development*, 81 (1), 41-79.
- Modgil, S., & Modgil, C. (Ed.). (1982). *Jean Piaget: Consensus and controversy*. London: Praeger.
- Nagel, T. (2012). *Mind and cosmos: Why the materialist neo-Darwinian conception of nature is almost certainly false*. Oxford: Oxford University Press.
- Neisser, U. (1993). *The perceived self: Ecological and interpersonal sources of self-knowledge*. Cambridge, UK: Cambridge University Press.
- Nixon, G. M. (2010). Myth and mind: The origin of human consciousness in the discovery of the sacred. *Journal of Consciousness Exploration & Research*, 1 (3), 289-337.
- Nixon, G. M. (2013). Scientism, philosophy and brain-based learning. *Northwest Journal of Teacher Education*, 11 (1), 113-144.
- Noë, A. (2009). *Out of our heads: Why you are not your brain, and other lessons from the biology of consciousness*. New York: Hill & Wang.
- Pfeiffle, H. (2008). On the psychogenesis of the a priori: Jean Piaget's critique of Kant. *Philosophy and Social Criticism*, 34 (5), 487-498.

- Pléh, C. (2014). Language evolved in two stages: A review of Michael Tomasello, *A natural history of human thinking*. *Evolutionary Psychology*, 12 (5), 979-982.
- Richerson, P. R., & Boyd, R. (2005). *Not by genes alone: How culture transformed human evolution*. Chicago: University of Chicago Press.
- Ricoeur, P. (1995). *Oneself as another* (K. Blamey, Trans.). Chicago: University of Chicago Press.
- Rochat, P. (Ed.). (1999). *Early social cognition: Understanding others in the first months of life*. Mahwah, NJ: Lawrence Erlbaum.
- Rochat, P. (2001). *The infant's world*. Cambridge, MA: Harvard University Press.
- Rochat, P. (2009). *Others in mind: Social origins of self-consciousness*. New York: Cambridge University Press.
- Rochat, P. (2014). *Origins of possession: Owning and sharing in development*. Cambridge, UK: Cambridge University Press.
- Savage-Rumbaugh, S., & Lewin, R. (1994). *Kanzi: The ape at the brink of the human mind*. New York: Doubleday.
- Savage-Rumbaugh, S., Shanker, S. G., & Taylor, T. J. (1998). *Apes, language, and the human mind*. New York: Oxford University Press.
- Skinner, B. F. (1972). *Beyond freedom and dignity*. New York: Bantam.
- Smith, A. (1994). *The wealth of nations*. New York: Modern Library. First published 1776.
- Tomasello, M. (1995). Joint attention as social cognition. In C. J. Moore, & P. Dunham (Eds.), *Joint attention: Its origins and role in development* (pp. 103-130). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.
- Tomasello, M. (2005). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.
- Tomasello, M. (2008). *Origins of human communication*. Cambridge, MA: MIT Press.
- Tomasello, M. (2014). *A natural history of human thinking*. Cambridge, MA: Harvard University Press.
- Tomasello, M. (2015). *A natural history of human morality*. Cambridge, MA: Harvard University Press.
- Tomasello, M., Striano, T., & Rochat, P. (1999). Do young children use objects as symbols? *British Journal of Developmental Psychology*, 17 (4), 563-584.
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press. Original in Russian 1934.
- Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review*, 20, 158-177.
- Whitehead, Alfred North (1978). *Process and reality: An essay in cosmology*. Corrected edition. D. R. Griffin & D. W. Sherburne (eds.). New York: Free Press. Original 1929.
- Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Cambridge, MA: Harvard University Press.
- Woolfolk, A. E. (2012). *Educational psychology* (12th ed.). Boston: Pearson Education.