

***Memetics vs. Human Extension: Round One – A Meme by Any Other Name ...***  
**Gregory Sandstrom, European Humanities University, Lithuanian Science Council<sup>1</sup>**

**More than Memetics**

This Collective Vision article will make a brief comparison of the ‘extended phenotype’ theory and the ‘extended mind’ hypothesis, while also drawing on the ‘human extension’ work of Marshall McLuhan. The aim is to probe the notion that human beings can and do ‘extend’ and that ‘human extension’ and the ‘extended mind’ are appropriate language for application in social sciences and humanities (SSH). This marks an alternative to the biologically-biased term ‘memes’ and the ideology of memetics, as well as the outdated ‘universal Darwinism,’ which the originator of memetics, Richard Dawkins, generally advocates.

As Andy Clark and David Chalmers write, “the mind extends into the world” (1998). Similarly, as Richard Menary notes, “The extended mind begins with the question ‘where does the mind stop and the rest of the world begin?’” (2010,1). Indeed, this is similar to the problem that Dawkins attempted to face with ‘memes’ and their ‘phenotypic effects,’ the latter which he says “are its consequences in the outside world” (1982, 109), a claim that is actually made more forcefully by Daniel Dennett, than by Dawkins.<sup>2</sup> McLuhan is well-known for his ‘extensions of man’ (here called ‘human extension’) approach, which in short says that “all human artefacts are extensions of man[kind]” (1988, 116), thus reifying the extended mind hypothesis for SSH.<sup>3</sup> And most recently, an international network of more than 50 scholars, including Clark, is applying the work on extended mind and extended cognition in a project called ‘extended knowledge’ (Pritchard et al. 2013).<sup>4</sup>

Admittedly, quite a few contemporary voices still use the terms ‘memetics’ (e.g. Heylighen 1992, Blackmore 1999, Aunger 2000, Aunger 2003, Blute 2005, Heylighen and Chielens 2008, Di Carlo 2010) and ‘meme,’<sup>5</sup> the latter which is usually used synonymously with ‘viral media’ to describe that which is digitally extending on a mass scale in various societies and globally. This usage of ‘memes’ does not necessarily imply any particular worldview or a specific universal Darwinist ideology; some people just see the term ‘meme’ as a catchy word with a simple, narrow meaning. Yet the claim in this article is that memes are a scientific misnomer, invented superficially (and perhaps

---

<sup>1</sup> This research was made possible by a grant from the Lithuanian Science Council for work on “Humanities and the Limits of Scientific Explanation: the Anthropic Principle in Risk Societies.”

<sup>2</sup> “The original and important point Dawkins makes under the label of ‘the *extended* phenotype’ is that there is no good reason to suppose that the phenotype stops at the skin (or bark or what-not), and that there are many aspects of life which we can account for straightforwardly if only we suppose that it does not.” (Daniel Dennett, “Afterword,” *The Extended Phenotype: The Long Reach of the Gene*, Oxford University Press, 1999.)

<sup>3</sup> Yes, admittedly, this is putting a lot of trust and value in McLuhan’s ‘wired age’ vision.

<sup>4</sup> <http://www.extended-knowledge.ppls.ed.ac.uk/>

<sup>5</sup> A “unit of information residing in a brain ... a meme should in principle be visible under a microscope as a definite pattern of synaptic structure ... the meme would not be localizable on a microscopic slide, but still I would want to regard it as physically residing in the brain. This is to distinguish it from its phenotypic effects, which are its consequences in the outside world” (Dawkins 1982, 109).

frivolously, as a rhyme) by a biologist/ethologist with social epistemology-apathy that distorts the study of human culture.<sup>6</sup> Memes and memetics simply do not fulfil the scholarly quality or rigour that one expects from SSH thinkers and Dawkins' crude conceptualisation in the cultural realm vastly understates and does injustice to the complexity and diversity of the human life-world.

The contention here is that languages, technology, artefacts and even 'viral media' are more effectively and coherently explained, described and explored in-depth using the extended mind hypothesis (Sheldrake 1988, Clark and Chalmers 1998, Sterelny 2004, Wilson 2004, Logan 2005, 2008, Clark 2008, Adams and Aizawa 2008, Menary 2010, Sterelny 2010, Theiner 2011, Kerr 2013, Palermos and Pritchard 2013, et al.) and human extension (cf. McLuhan 1964, 1967, McLuhans 1988, McLuhan and Constantineau 2010, Sandstrom 2011, 2013a, 2013b), than the extended phenotype and the broader neo-Darwinian evolutionary framework in which it is embedded. The contention that memes 'jump around' via Darwinian mechanisms, independent of responsible human choices and actions only provides a natural science-condescending mockery of SSH, instead of making possible fruitful interdisciplinary collaboration. When a cultural artefact is said to 'go viral' (i.e. to spread out = extend<sup>7</sup>) it is nowadays often called a 'meme,' but this is more a current fashion than a robust or promising explanatory scholarly framework.

### **Epistemological Biologism<sup>8</sup>**

Many people have criticized the idea of 'memes' (Bloch 2000, Atran 2001, Midgley 2001, Poulshock 2002, McGrath 2004, Distin 2005, Edmonds 2005, Burman 2012, Thagard 2013) so that is not my primary task here. Instead, I would like to highlight an alternative way of thinking to 'memetics,' which perhaps might eventually trickle-up into SSH fields or even be found to connect with their deepest and most precious roots. That alternative is the language of the extended mind hypothesis and human extension, the latter which can be traced to Marshall McLuhan's *Understanding Media: The Extensions of Man* (1964), in which he credited R.W. Emerson with the conceptualisation of extension,<sup>9</sup> and that in turn goes back via the *res extensa* to René Descartes and the beginnings of 'modern science.' But first, let me speak briefly about memes and memetics to provide context for social epistemology.

The failure of 'memes' as a scholarly project<sup>10</sup> stems largely from the faulty basis on which it was built, as a kind of naturalistic<sup>11</sup> imperialism in the Academy, closely linked

---

<sup>6</sup> "My enthusiasm for it [memetics] was never, ever as a contribution to the study of human culture" (Dawkins, Interview with Jim Holt, 2004).

<sup>7</sup> Here the terms 'spread out' and 'extend' are used synonymously, as in the etymology of the Latin terms 'extendere' and 'extensio' – to stretch out, spread or lengthen.

<sup>8</sup> Ludwig von Bertalanffy defines 'biologism' as: "considering mental, sociological and cultural phenomena from a merely biological standpoint." ("An Outline of General System Theory." *The British Journal for the Philosophy of Science* 1, no. 2, (1950): 134-165)

<sup>9</sup> "The human body is the magazine of inventions, the patent-office, where are the models from which every hint was taken. All the tools and engines on earth are only extensions of its limbs and senses." (Emerson, "Works and Days", 1870)

<sup>10</sup> For example, this is demonstrated in the short-lived and now defunct *Journal of Memetics* (1997-2005). See Edmonds 2005.

with socio-biology and later evolutionary psychology. Richard Dawkins, a biologist making grand claims about cultural and human-social extensions, who coined the term ‘meme’<sup>12</sup> (1976), obviously had not explored the history of mimesis<sup>13</sup> in SSH. Dawkins’ attempt to ‘discover/invent’ a cultural term for viruses that are imitated, copied or ‘replicated’ (cf. replicationism) represents an intentional reduction of culture, humanity and ideas merely to physical forms. This seems to say more about Dawkins’ desire to buttress a universal Darwinist worldview than to articulate a coherent or convincing new science.<sup>14</sup>

As Kate Distin says, “the key distinction between genes and viruses just does not arise in culture ... Dawkins has made the mistake of overextending his meme hypothesis in an attempt to embrace what is an inessential detail of biological evolution.” (2005, 77). Dawkins’ ‘memes’ are less than or other than human; they are conceived as alien parasites on human culture and in human minds. The self-styled science of memetics is therefore not actually a human science (or science of human beings) at all. It is instead an ideology of viruses and contagion more suitable for the field of epidemiology,<sup>15</sup> than social epistemology.

This paper sets the table for topics far more complex and dynamic than ‘memetics’ — creativity, knowledge generation and transfer, innovation diffusion (cf. extension theory), decision-making, human development, cognitive distribution, futurology, collective and individual learning, and many others. It asks in SSH: what is/are the appropriate unit(s) of extension? In other words, what are examples of things that human beings ‘extend?’ One example is the website TED.com and its slogan: “ideas worth spreading.” For TED, the notion of ‘spreading’ (i.e. ‘extending’) ideas made more sense than saying “memes worth spreading.” This should not be taken as a snub at memes, but rather shows yet another way the term is irrelevant. The main point is that it is both important to discover what kinds of ideas are worth spreading, what makes them worth it, and then of course to inquire how to spread them via media, when and to whom, which is where McLuhan’s electronic-information epoch ideas are most valuable and prescient.

With Dawkins’ publicised aim to turn ‘religion’ into a ‘virus of the mind,’ he went beyond the boundaries of natural sciences, beyond his scholarly competencies, following

---

<sup>11</sup> The diverse definitions of ‘naturalistic’ make the concept communicatively problematic. There is an ambiguity in suggesting that anyone who is a natural scientist or who connects their ideas in feedback with natural sciences must therefore ideologically be considered a ‘naturalist,’ just as saying that anyone who is a social scientist or who connects their ideas with social sciences must therefore ideologically be considered a ‘socialist.’ As a social scientist, I reserve the right to be both an ideological non-naturalist and also a realist, even while ‘socialism’ is re-conceptualised in post-Cold War lexicon. Thanks to Orestis Palermos for pointing out this semantic difficulty.

<sup>12</sup> “The new soup is the soup of human culture. We need a name for the new replicator, a noun that conveys the idea of a unit of cultural transmission, or a unit of imitation ... I want a monosyllable that sounds a bit like ‘gene.’ I hope my classicist friends will forgive me if I abbreviate mimeme to meme” (Dawkins 1989, 192).

<sup>13</sup> E.g. Gabriel Tarde’s *Les lois de l’imitation (The Laws of Imitation)* of 1890 or René Girard’s work, starting with *Deceit, Desire and the Novel* (1961, English translation 1965).

<sup>14</sup> “the meme was never scientific to begin with” (Burman 2012, 78)

<sup>15</sup> Recently, Dawkins defined a ‘meme’ as: “anything that goes viral.” Interview with Olivia Solon, *Wired Magazine*, June 20, 2013 <http://www.wired.co.uk/news/archive/2013-06/20/richard-dawkins-memes>.

the path of an ideologue, rather than of a credible public intellectual. Indeed, he has lingered in a low-level natural scientific decadence for quite a number of years promoting his particular brand of selfish-gene naturalism and anti-theism, becoming a cartoon embodiment of the silliness of ‘memes’ along the way. Nevertheless, it is the view of this paper that there is a fascinating SSH conversation to be held once one accepts that genotypes and phenotypes can only extend so far, and that entities or units other than just genotypes and phenotypes can be said to ‘extend,’ when one elevates above Dawkins’ disenchanting biologism.<sup>16</sup> As Mary Jane West-Eberhard says about genes, could be said about memes: “The gene does not lead, it follows” (in Dobbs 2013).

### **Elevating from Biologism to Social Epistemology**

In order to overcome the memetics fallacy, it is important to address the complexity, diversity, value and meaning of human existence for SSH at a higher level than biology, chemistry or physics. We need to rise to more elevated/elevating realms of knowledge, including human society, culture, economy, language, politics, religion, philosophy, etc. Distin prepares the way for this quite effectively: “I think that this discussion could meaningfully be transposed into one that did not contain the word ‘meme’ at all” (2005, 14). Likewise, Burman shows us how there is more involved than a simple word-rhyme with gene: “The original meme, in other words, was a rhetorical flourish intended to clarify a larger argument” (2012, 77).

The larger argument is that more than just genotypes or phenotypes are/can be involved in the language of extension; minds, bodies, ideas, memories, knowledge and perhaps even the human spirit are also potentially ‘extensible.’ The only reason to conclude otherwise would be if one wished to defend ideological materialism, Darwinism or mechanism,<sup>17</sup> believing that “mindless, motiveless mechanicity” (Dennett 1995, 76) ultimately distinguishes and defines our lives in the Universe. Indeed, this was the predicament that Descartes left us in by establishing the dichotomy that only matter extends (*res extensa*), while mind is un-extended (*res cogitans*). Many people have sought ways to overcome Descartes’ dualisms during the past 350+ years.

Now in the electronic-information epoch, with computers and the Internet, we may finally move beyond the Cartesian split to include energy, information and mind in addition to matter, as sources and processes of ‘extension.’ What do we see and hear actually happening around us and in us: mind is extending, thoughts are extending, words, ideas and images, music and videos are extending, performances are extending; persons are extending themselves digitally. We are extending as human beings. This

---

<sup>16</sup> Franz M. Wuketits defines ‘biologism’ as: “The extension of biological concepts, models, and theories to other fields, for example, the explanation of social phenomena in humans using biological templates.” (*Evolutionary Epistemology and its Implications for Humankind* Albany: State University of New York Press, 1990, 218)

<sup>17</sup> “We are neither the slaves of our genes nor rational free agents creating culture, art, science, and technology for our own happiness. Instead we are part of a vast evolutionary process in which memes are the evolving replicators and we are the meme machines” (Susan Blackmore “The Power of Memes.” In *Scientific American* 283, no. 4 (2000): 54).

happens in addition to the extensions of humankind in tools, artefacts, structures and institutions.<sup>18</sup>

The important part to emphasise is that human beings/minds do not simply ‘evolve’ into the (external) world according to the old Darwinian or neo-Darwinian cognitive models. There is a necessary willingness (internal) to ‘extend’ ourselves that turns social-cultural intentions into reality through responsible choices and actions. The scholarly field of social epistemology is well-positioned to study these intentions, choices and actions via their (oftentimes empirically verifiable, but not empiricist) effects and consequences.

It is here that the Dawkinsian-universal-Darwinian (DUD) approach displays its teleological vacuum; ‘memes’ are believed to naturally ‘evolve,’ to unroll without mind, without will or control. But in SSH fields, ideas are thought to require minds (and bodies) to extend; they spread out and holistically involve the will, power and purpose of individual persons and groups or networks, both locally and now more often also globally. Human extension is therefore not just a ‘random’ or ‘chance’ (cf. stochastic) process of unpredictable material and technological diffusion, but rather a creatively unique psychosomatic<sup>19</sup> process that involve goals, aims, plans and directions. This awareness responsibly signifies the realm of *telos* or final causality, which has been dumped overboard in most natural-physical sciences (NPS, which DUD language represents), but which is still essential and unavoidable in SSH, where reflexive human beings belong and thrive.

Moving beyond Descartes, Darwin and Dawkins, a more fruitful conversation can be built on the topics of extended mind and extended knowledge. This requires giving precedence back to reflexive thought in SSH, instead of reducing SSH theories about change-over-time merely to ‘blind variation and selective retention’ (Campbell 1970) or aping positivistic or naturalistic scientific methods. With an alternative now available, we can once again discuss non-Darwinist approaches in SSH that may enable us to redefine the crucially important fundamental unit of selection/extension (e.g. G. Snooks’ post-Darwinian ‘strategic selection’, 2003) instead of selling the ‘humanistic’ realm out to deterministic and mechanistic ideologies.

Having an alternative to universal Darwinism and memetics is therefore a game-changer, which allows new light to be shed on human-social origins and processes. As we follow the evidence where it leads, let us then pause to consider just how much ideology has been allowed to enter 19<sup>th</sup> and 20<sup>th</sup> century NPS. Isn’t Dawkins’ concept of ‘meme’ just an ideological ploy made up to argue for his preferred brand of cultural ‘renewal’ (cf. the ‘Brights’ movement) and to liberate a supposedly ‘new’ form of atheism or agnosticism, according to the biases of biologistic talk?<sup>20</sup> Is it possible to successfully wrestle back

---

<sup>18</sup> “The wheel is an extension of the foot; the book is an extension of the eye; clothing, an extension of the skin; electric circuitry, an extension of the central nervous system” (McLuhan 1967, 31-40).

<sup>19</sup> “All media are extensions of some human faculty – psychic or physical” (McLuhan 1967, 26).

<sup>20</sup> “The readers for whom I am mainly writing are my professional colleagues, evolutionary biologists, ethologists and sociobiologists, ecologists, and philosophers and humanists interested in evolutionary science” (Richard Dawkins “Preface”, *The Extended Phenotype: The Long Reach of the Gene*, Oxford University Press, 1999).

from sociobiologists and universal Darwinists our legitimate territory to build ideas and spread knowledge that cannot be studied using only the tools and methods available in NPS, which is the strategy that memetics and universal Darwinism use? Either way, it is openly recognised and understood that this is not a small claim: that ‘memes’ and other evolutionistic ideological devices (e.g. natural selectionism) can either now or eventually be legally, properly or convincingly evicted from several regions of the Academy where they have been improperly and superficially welcomed and hosted.

### **Invitation to Human Extension in Social Epistemology**

Human Extension and the extended mind hypothesis overcome memetics by actually aiming and planning to overcome memetics (among other ideologies); making a plan and fulfilling it is something that ‘memes’ alone cannot do, as they are said to lack will or mind. They are supposedly non-persons, non-agents, unintentional, unguided, physically reducible viruses that contaminate, control or simply bother human beings. In short, there is actually no ‘self’ as SSH sees ‘selves,’ for a meme to ‘self-replicate’ according to Dawkins’ magical, made-up theory.

Human extension and the extended mind hypothesis on the other hand go beyond the self-less idea of ‘memes’ by focussing on human beings and our actual extensions of mind and body in society and culture. We make and (sometimes) actualise plans by extending our minds and bodies, our-selves, towards particular goals or ends, not just as the result of all-determining (external, outside) environmental pressures on us.<sup>21</sup> By studying our internal, goal-oriented, intentional (but sometimes also unintentional) human extensions, we can collectively learn about how we, you and I extend ourselves in the environments in which we live, and in doing so how we shape those environments while we are also shaped by them.

The contention is therefore that human extension and the extended mind hypothesis have implications for philosophy, including epistemology, phenomenology, ontology, politics and ethics, and also have relevant overlap with anthropology, psychology, sociology, science and technology studies (STS), economics, and indeed all ‘anthropic’ (Fuller 2005, Sandstrom 2013b) disciplines.<sup>22</sup> The other option is to slip backwards to the 1970’s, using Dawkins’ memetics ideology and claiming that anything that ‘extends’ culturally or socially must automatically (by universal Darwinist fiat) be categorized as a ‘meme,’ which to this reporter and others seems superfluous, rather than nearly an adequate or helpful solution (Edmonds 2005).

One caveat should be given nearing the end of the paper: I do not claim to speak for all people in the extended mind or extended knowledge camp(s) by opposing memetics. At least one advocate of the extended mind hypothesis still supports this ideology, Canadian

---

<sup>21</sup> Thanks to Eric Kerr for his helpful insight and question about this regarding the extended mind hypothesis.

<sup>22</sup> Clark and Chalmers suggest this in the conclusion to *The Extended Mind* (1998): “There are obvious consequences for philosophical views of the mind and for the methodology of research in cognitive science, but there will also be effects in the moral and social domains.”

physicist, former student of and collaborator with McLuhan, Dr. Robert Logan.<sup>23</sup> Likewise, others still accept the so-called ‘evolution of culture’ (e.g. gene-culture co-evolution, technological evolution, etc.) like Australian philosopher Kim Sterelny, which I reject. It may even be the case that naturalism is so ideologically embedded (particularly in ‘western’ philosophy) that it is thought to be the only possible framework in which extended mind and extended knowledge theorists currently envision the conversation. Nevertheless, I do not presume to speak for everyone who promotes human extension, even if the topic of memes and memetics seems to provide a rather clear-cut case to raise common voice against biological imperialism in SSH.

There is nevertheless still much to be done to establish the extended mind hypothesis and human extension as mainstream approaches in SSH, which is why this contribution is called only ‘Round One.’ Responses and feedback, both critical and constructive are welcome to enhance and amplify the discussion. Does the world also agent-like ‘extend’ into our minds and bodies, as we extend as agents with reflexive and responsive personhood into the world? What about the occasionalist divine extension or spiritual extension ideas (which fit surprisingly well with Indigenous knowledge approaches) of Nicholas Malebranche, Anne Conway and Henry More (Blank 2013)? Much more thought is needed on how the environment is actively involved in driving and forming us as societies/nations/groups; how we extend and are extended upon.

Some of the main questions for SSH researchers when integrating human extension and the extended mind hypothesis: how does it or how *can* it/I/we extend? How are we involved in extending ourselves, our minds, bodies, ideas, thoughts, experiences, memories, to others and with others and how do we receive and encounter the cognitive extensions from other people in our lives? How are we already extending ourselves and how might we possibly extend for the benefit of self, family, neighbour, society, humanity? These types of questions seem to open up much more space for discussion in the realm of social epistemology (and STS, media studies, etc.) than the other option of settling into a reductionist, universal Darwinistic gene’s-eye or meme’s-eye view of the cultural life-world.

This short article has tried to carve out discourse space for the extended mind hypothesis and human extension by pushing back against the ‘rationale’ of Dawkins’ memetics. Much more concentration on the positive-reflexive message of human extension is possible and has already begun. Dawkins has labelled this Collective’s leading inspiration, Steve Fuller, as an ‘enemy of reason,’ apparently because Dawkins rejects the democratisation of scientific authority via the Internet (cf. Fuller’s notion of ‘proto-science’, 2010). It is of course ironic that Dawkins labels Fuller this way, when it is quite obvious both that Fuller is at a much deeper and broader philosophical level than Dawkins and shows his respect and dignity to most religious persons (anthropic worldview, 2005) while Dawkins does not, and also because memes have been deemed just as ‘pseudo-scientific’ by others as has IDT.

---

<sup>23</sup> “All cultural artifacts, institutions, belief systems and manifestations are also memes that evolve and, hence, are cultural replicators — cultural replicators evolve and things that evolve are cultural replicators” (Robert Logan, 2008).

If Dawkins and his activist followers persist in trying to advance such a biologically-biased metaphor as ‘memes’ in SSH and cultural studies for their ideological purposes, it would be quite reasonable to broadly consider Dawkins as a decadent, scientific ‘opponent of wisdom,’ at least in so far as humanity and social epistemology is the main concern.<sup>24</sup> However, if the supposed ‘memes’ that have contaminated his brain with ‘memetics’ and universal Darwinism could one day miraculously jump away from Dawkins, and leave him alone, perhaps there is hope he will eventually (learn to) change his mind<sup>25</sup> ... and extend, elevate. But would that demonstrate a victory for memetics or human extension; that to change does not necessarily mean to ‘evolve?’

**Contact details: [gregory.sandstrom@ehu.lt](mailto:gregory.sandstrom@ehu.lt)**

## References

- Adams, Frederick and Kenneth Aizawa. *The Bounds of Cognition*. Oxford: Blackwell, 2008.
- Atran, Scott. “The Trouble with Memes: Inference Versus Imitation in Cultural Creation.” *Human Nature* 12, no. 4 (2001): 351–381.
- Aunger, Robert. *The Electric Meme: A New Model of How We Think*. New York: Simon and Schuster, 2003.
- Aunger, Robert, ed. *Darwinizing Culture: The Status of Memetics as a Science*. Oxford: Oxford University Press, 2000.
- Backmore, Susan. *The Meme Machine*. Oxford University Press, 1999.
- Blank, Andreas. “Henry More on Spirits, Light, and Immaterial Extension.” *British Journal for the History of Philosophy* 21, no. 5 (2013): 857-878.
- Bloch, Maurice. “A Well-Disposed Social Anthropologist’s Problems with Memes.” In *Darwinizing Culture: The Status of Memetics as Science*, edited by Robert Aunger, 189-204. London: Oxford University Press, 2000.
- Blute, Marion. “Memetics and Evolutionary Social Science.” *Journal of Memetics* 6, 2005. <http://bit.ly/1bapI6W>.
- Burman Jeremy Trevelyan. “The Misunderstanding of Memes: Biography of an Unscientific Object, 1976–1999.” *Perspectives on Science*, 20, no. 1 (2012): 75-104.
- Campbell, Donald T. “Blind Variation and Selective Retention in Creative Thought as in Other Knowledge Processes.” *Psychological Review*, 67 (1960): 380-400.
- Chalmers, David and Andy Clark. “The Extended Mind.” *Analysis* 58 (1998): 10-23. <http://bit.ly/1dhAc7h>.
- Clark, Andy, Duncan Pritchard and Krist Vaesen. “Extended Cognition and Epistemology.” *Philosophical Explorations: An International Journal for the Philosophy of Mind and Action* 15, no. 2 (2012): 87-90.
- Clark, Andy. *Supersizing The Mind*. Oxford University Press, 2008.

---

<sup>24</sup> “These days, Dawkins makes the news so often for buffoonery that some might wonder how he ever became so celebrated” (David Dobbs, 2013).

<sup>25</sup> “[W]e must acknowledge the possibility that new facts may come to light which will force our successors of the twenty-first century to abandon Darwinism or modify it beyond recognition” (Richard Dawkins *A Devil’s Chaplain: Selected Writings*. London: Weidenfeld & Nicholson, 2003, 81).

- Dawkins, Richard. "Universal Darwinism." In *Evolution from Molecules to Man*, edited by Douglas S. Bendall, 403-425, Cambridge University Press, 1983.
- Dawkins, Richard. *The Selfish Gene*. Oxford University Press, 1976, 1989.
- Dennett, Daniel. *Darwin's Dangerous Idea*. New York: Simon and Schuster, 1995.
- Di Carlo, Chris. "How Problem Solving and Neurotransmission in the Upper Paleolithic led to The Emergence and Maintenance of Memetic Equilibrium in Contemporary World Religions." *Politics and Culture*, 2010. <http://bit.ly/1k5E2Wv>.
- Distin, Kate. *The Selfish Meme: A Critical Reassessment*. New York: Cambridge University Press, 2005. <http://bit.ly/1eiiWUt>.
- Distin, Kate. "Cultural Evolution – The Meme Hypothesis." 1-17, 1997. <http://bit.ly/1cLZYT0>.
- Dobbs, David. "Die, selfish gene, die." *Aeon Magazine*, December 03, 2013. <http://bit.ly/1bfuU6>.
- Downey, Greg. "We hate memes, pass it on." 2008. <http://bit.ly/IPm2Bj>.
- Edmonds, Bruce. "The Revealed Poverty of the Gene-Meme Analogy – Why Memetics Per Se has Failed to Produce Substantive Results." *Journal of Memetics*, 9, no 1, 2005. <http://bit.ly/1bJNmr6>.
- Edmonds, Bruce. "Three Challenges for the Survival of Memetics." *Journal of Memetics*, 6, 2002. <http://bit.ly/1baaYoH>.
- Fuller, Steve. *Science: The Art of Living*. Montreal: McGill-Queens. 2010.
- Fuller, Steve. *The New Sociological Imagination*. London: Sage, 2005.
- Heylighen, Francis. "Selfish Memes and the Evolution of Cooperation." *Journal of Ideas* 2, no. 4 (1992): 77-84.
- Heylighen, Francis and Klaas Chielens. "Cultural Evolution and Memetics." *The Encyclopedia of Complexity and System Science*, 2008.
- Kerr, Eric. "Are You Thinking What We're Thinking? Group Knowledge Attributions and Collective Visions." *Social Epistemology Review and Reply Collective* 3, no. 1 (2013): 5-13. <http://bit.ly/1gBoCJI>.
- Logan, Robert. *The Extended Mind: The Emergence of Language, the Human Mind and Culture*. Toronto: University of Toronto Press, 2008.
- Logan, Robert. "The Extended Mind Model of the Origin of Language and Culture." In *Evolutionary Epistemology, Language and Culture*, edited by Nathalie Gontier, Jean Paul van Bendegem and Diederik Aerts, 149-168. Dordrecht, the Netherlands: Springer, 2006.
- McGrath, Alistair. *Dawkins' God: Genes, Memes, and the Meaning of Life*. London: John Wiley & Sons, 2004.
- McLuhan, Eric and Wayne Constantineau. *The Human Equation*. Toronto: BPS Books, 2010.
- McLuhan, Marshall and Eric McLuhan. *Laws of Media: The New Science*. Toronto: University of Toronto Press, 1988.
- McLuhan, Marshall. *The Medium is the Massage: An Inventory of Effects*. San Francisco: Hardwired, 1967.
- McLuhan, Marshall. *Understanding Media: The Extensions of Man*. Toronto: Signet, 1964.
- Menary, Richard, ed. *The Extended Mind*. London: M.I.T. Press, 2010.

- Midgley, Mary. "Why memes?" In *Alas Poor Darwin: Arguments Against Evolutionary Psychology*, edited by Steven Rose and Hilary Rose. London, UK: Random House, 2001.
- Palermos, Orestis and Duncan Pritchard. "Extended Knowledge and Social Epistemology." *Social Epistemology Review and Reply Collective* 2, no. 8 (2013): 105-120. <http://bit.ly/18QC3R1>.
- Poulshock, Joseph. "Evolutionary Theology and God-Memes: Explaining Everything or Nothing." *Zygon* 37, no. 4 (2002): 775-788.
- Rowlands, Mark. *The New Science of the Mind*. Cambridge, MA: MIT Press, 2010.
- Rupert, Robert. *Cognitive Systems and the Extended Mind*. New York: Oxford University Press, 2009.
- Sandstrom, Gregory. "Human Extension as an Innovative Methodology for Positive Socialisation." *Socialinis Ugdyimas* 34 (2013a): 13-24.
- Sandstrom, Gregory. "Peace for Evolution's Puzzle: The Arrival of Human Extension." In *Evolution Almanac: Development within Big History, Evolutionary and World-System Paradigms*, edited by Andrey V. Korotayev and Leonid E. Grinin, 267-288. Volgograd: Uchitel, 2013b.
- Sandstrom, Gregory. "McLuhan, Burawoy, McLuhan: Extending Anthropoc Communications – On the Human Equation, the Extended Case Method and Human Extension." *E-Compós* 14, no. 3 (2011): 1-20.
- Sandstrom, Gregory. "The Problem of Evolution: Natural-Physical or Human Social?" In *Charles Darwin and Modern Biology*. Institute for the History of Science and Technology, Russian Academy of Sciences, 740-748, 2010.
- Sheldrake, Rupert. "Extended Mind, Power, & Prayer: Morphic Resonance and the Collective Unconscious – Part III." *Psychological Perspectives* 19, no. 1 (1988): 64-78.
- Snooks, Graeme D. *The Collapse of Darwinism or the Rise of a Realist Theory of Life*. Lanham-Oxford: Lexington Booms, Rowman & Littlefield Group, 2003.
- Sterelny, Kim. "Minds: Extended or Scaffolded?" *Phenomenology and the Cognitive Sciences* 9, no. 4 (2010): 465-481.
- Sterelny, Kim. "Memes Revisited." *British Journal for the Philosophy of Science*, 57 (2006): 145-165. <http://bit.ly/1cwtX7B>.
- Sterelny, Kim. "Externalism, epistemic artifacts, and the extended mind." In *The Externalist Challenge*, edited by Richard Schantz, 239-254. New York: de Gruyter, 2004.
- Thagard, Paul. "Why Memes Are a Bad Idea." *Psychology Today*. 2013. <http://bit.ly/1fgOXsK>.
- Theiner, Georg. "Writing in Mind." *Avant*, 4, no. 2, 2013. [www.avant.edu.pl/en/](http://www.avant.edu.pl/en/).
- Theiner, Georg. *Res Cogitans Extensa: A Philosophical Defense of the Extended Mind Thesis*. Frankfurt: Peter Lang, 2011.
- van Wonderen, Stijn. "Genes, Memes and Temes: Paradoxes in Meme-Theory and the Dangers of Memes." 2012. <http://bit.ly/JyHPxK>.
- Wilson, Robert A. *Boundaries of the Mind*. Cambridge: Cambridge University Press, 2004.