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## Invasion of the Mind Snatchers. On Memes and Cultural Parasites

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### RESUMEN

El último libro de Dennett está lleno de ideas infecciosas que luchan por captar la atención del lector, saltando casi de la página, e intentando anidar en su indefenso cerebro. ¿O esto no es así? En este artículo discuto la utilidad del *punto de vista del ojo del meme* para entender la cultura. Después de rechazar la visión del mundo denominada “panmemética”, intento resolver una ambigüedad que aparece en los escritos sobre evolución cultural planteando la cuestión *¿cui malo?*: ¿quién o qué está siendo dañado cuando decimos que algún meme actúa como un “parásito”? A continuación, abordo un desafío del *tipo del de Millikan* para reforzar la explicación que Dennett da de los memes. Finalmente, discuto brevemente por qué ciertos sistemas de creencias irracionales (p. ej., las creencias sobre la brujería en la Europa de los primeros tiempos de la edad moderna) son ejemplos prominentes de parasitismo cultural.

PALABRAS CLAVE: *memes, parásitos culturales, irracionalidad, sistemas de creencias, brujería.*

### ABSTRACT

Dennett’s latest book is full of infectious ideas that are jostling for the reader’s attention, almost leaping from the page, intent on nestling in his or her hapless brain. Or is it? In this paper, I discuss the usefulness of the *meme’s eye view* to understand culture. After rejecting the worldview called “panmemetics”, I try to resolve an ambiguity in the literature on cultural evolution by asking the *cui malo?* question: who or what is being harmed when we say that some meme is “parasitical”? I then address a *Millikan’ challenge*, in order to strengthen Dennett’s account of memes. Finally, I briefly discuss why certain irrational belief systems (e.g. witchcraft beliefs in early modern Europe) are prime examples of cultural parasitism.

KEYWORDS: *Memes, Cultural Parasites, Irrationality, Belief Systems, Witchcraft.*

*From Bacteria to Bach and Back* [Dennett (2017)] is a cornucopia of thinking tools, concepts, metaphors, intuitions pumps, and strange inversions. It is, by the author’s own lights, a complex informational structure,

built out of digitized chunks of information, whether as ink blots on paper, pixels arranged on a screen, or as a stream of acoustic waves (there is an audiobook version available). It is a book full of infectious ideas that are jostling for the reader's attention, almost leaping from the page, intent on nestling his or her hapless brain.

Or is it? Is this way of talking about ideas useful at all? If there is one thing about this brilliant book that has irritated even sympathetic reviewers, it is Dennett's continuing love affair with memes. After all these years, he still refuses to get off this particular hobby horse. In this commentary, I would like to make some suggestions to strengthen the meme concept, in particular the hypothesis of cultural parasitism. This is a notion that has both caused excitement among enthusiasts and raised the hackles of critics. Is the "meme" meme itself an annoying piece of malware, which has infected and corrupted the mind of an otherwise serious philosopher? Or is it an indispensable theoretical tool, as Dennett believes, which deserves to be spread far and wide?

In the literature on cultural evolution, the notion of cultural parasitism shows up in an assortment of different guises. In accordance with the "embargo" [p. 207] described by Dennett, however, they are not usually called "selfish memes", but instead are variously described as "rogue cultural variants", "extreme traditions" or "maladaptive traits" [Boyer (1994); Morin (201); Richerson & Boyd (2005)]. In any event, I think there is some confusion about what should count as a "parasitical" cultural item. What exactly do such selfish memes parasitize on? Dennett himself, at some points, seems to conflate the interests of the genes and the personal interests of the human host. Memes can thwart our genes, sure enough, but can they also subvert *our* personal interests? Is it possible for memes to develop novel purposes of their own, which cross-cut human purposes? To show how this is possible is a more difficult challenge, but I think it can be met.

## I. PANMEMETICS

Early enthusiasts of the new science of "memetics" proposed a radically new way to look at human culture. In their topsy-turvy world, culture is not the product of human intelligence and creativity, but a collection of viruses colonizing our brains to further their own reproduction [Aunger (2002); Blackmore (2000); Stanovich (2005)]. In this somewhat sinister worldview, our minds are little more than fertile breeding

grounds for swarms of selfish little agents, or as Dennett once provocatively phrased it, a “dung heap in which the larvae of other people’s ideas renew themselves” [Dennett (1995), p.202]. As Susan Blackmore wrote about the *gestalt switch* of memetics: “Instead of thinking of our ideas as our own creations, and as working for us, we have to think of them as autonomous selfish memes, working only to get themselves copied. ... This is a scary idea indeed” [Blackmore (2000), pp. 7-8].

Dennett’s current account, in particular his use of Godfrey-Smith’s (2009) Darwinian spaces to make sense of the “de-Darwinizing” of culture and the conscious domestication of memes, moves away from panmemetics, perhaps more clearly than his earlier *Darwin’s Dangerous Idea*. Even though memes initially evolved by blind and unguided evolution, claims Dennett in his new book, many were gradually domesticated by their hosts, who became more reflective and self-conscious about them. As culture gradually moves in the direction of the “intelligent design” corner of the Darwinian space (top-down, foresighted, directed), the meme’s eye view loses traction and becomes less interesting. Let me try to spell out the differences between the two approaches, as I see them. First, unlike Dennett’s account in *BBB*, panmemetics leaves little or no room for human autonomy and creativity. Panmemetics suggests that we are not in control of our thoughts; if anything, the reverse is true. In the words of Robert Aunger: “Do we have thoughts, or do they have us?” [Aunger (2002), loc. 120] A second and related problem with panmemetics is that it threatens to level all distinctions between harmful and useful cultural inventions. If human culture as a whole is seen as just swarms of viruses bent on exploiting our brains as a breeding ground for their own reproduction, we no longer have any theoretical resources to distinguish between good and bad memes, between beautiful folk songs and annoying earworms, between science and superstition. To dismiss any idea as a “virus” that has “infected” people then becomes a hollow rhetorical ploy. Moreover, as Dennett points out, this view implicitly buys into the false assumption that biological viruses are always harmful, while in fact the overwhelming majority of them are neutral, and some may even be beneficial to their host. Dennett, by contrast, makes a distinction between three categories of memes, based on an analogy with biological symbionts [Dennett (2001)]: some are mutualists (enhancing the fitness of the host), others are commensals (neutral to the host), and the rest are parasites (fitness-reducing).

This seems like a good idea, but it raises the question: what exactly is the point of reference with respect to which the interests of the me-

metic symbionts are defined? In the biological realm, when we are talking about the interests of parasite and host, ultimately we are talking about the interests of their respective genes. But in the cultural domain, we seem to have a triangular relationship: the interests of our genes, those of our memes, *and those of ourselves*. If we are talking about cultural parasites, we therefore have to ask: *cui malo?* Who or what is being harmed in this *ménage à trois?*

## II. CUI MALO?

In his discussion of memetic symbionts, Dennett seems to use genetic fitness as a reference point, but sometimes he shifts to personal interests. For example, in his discussion of dancing memes, he described mutualism as the possibility that the memes “offered some benefit to the genes of the proto-dancers” [Dennett (2017), p. 232]. Consistent with this approach, Dennett has written earlier that “the most obvious meme example” of a parasite is “the meme for celibacy (and chastity, I might add, to close a notorious loophole)” [Ibid. (1995), p. 367]. But elsewhere Dennett seems to use our personal judgments as a reference point rather than biological fitness, as when he poses the question: “Is [cultural item] x a good worth preserving and bequeathing or a bit of parasitic junk?” [Ibid. (2017), p. 247].

But the two reference points, though they often align, are not identical. For instance, contraceptives are clearly detrimental to our biological fitness, and therefore “parasitical” with regard to our genes’ interests. But I may still decide to use them, after careful reflection, because they allow me to fulfil my personal life goals. In that sense, the meme for birth control is indeed “worth preserving and bequeathing”, as far as I’m concerned, though my genes would beg to differ. In fact, most of the ideas of modern culture are “parasitical” from the gene’s eye view, because they tend to lower fertility. Richerson and Boyd highlighted the tension when they quipped that “[i]f you want to improve your kids’ genetic fitness, for goodness sake don’t help them with their homework!” [Richerson & Boyd (2005), p. 178]. No sensible person except the crudest pop-sociobiologist would heed this advice and keep his kids away from school. What is good for me may be bad for my genes. Conversely, memes that enhance my biological fitness may actually be detrimental to my personal interests. Think of the pro-natalist ideologies of some religious sects, which command their members to spawn as many children

as possible, strictly forbidding any form of birth control. Although such ideologies serve the interests of the hosts' genes (and the future membership of the sect), they do not necessarily make for happy and fulfilling lives (especially not for women).

So which memes are the real parasites? What reference point should we choose to flesh out the analogy with biological symbionts? Of course, there is no single correct answer to this, as it depends on the sort of question you are interested in. If you are trying to reconstruct the origins of language and culture itself, you will be interested in the interaction between memes and genes. Why did the genes allow memes to flourish in the first place? As Dennett writes, the earliest memes "must have included enough mutualists and commensals among the parasites not to kill off their hosts" [p. 283]. But if we are talking about celibacy or contraceptives, which are much later cultural inventions, I think memetics has little explanatory work to do, because these are not products of blind cultural evolution. Forms of culture that are "parasitical" from the perspective of my genes may be the outcome of deliberate decisions and 'intelligent design'. In the case of contraceptives, the rationales are not floating freely, but firmly anchored in human minds: *we* developed birth control technologies, and we chose to use them in full knowledge of their effects. We didn't need the memeticist to tell us that humans sometimes act against their reproductive interest.<sup>1</sup> But how about memes that subvert or harm our *personal* interests? If the Catholic idea of celibacy can be regarded as a "parasite", perhaps that is not so much because it lowers reproductive success – so do contraceptives – but because it relies on notions of sinfulness and sexual repression that tend to cause frustration and unhappiness.

Even theorists who are comfortable with the notion of unauthored cultural design have been suspicious of this idea, or have given the hypothesis only scant attention. Dennett's *Breaking the Spell* (2006) famously opens with the provocative vignette of zombie ants that are infected with a parasitical lancet fluke, as an analogy for religion. Many regarded Dennett's analogy as nothing more than vacuous rhetoric to please the New Atheist crowd, with no theoretical import [e.g. Atran (2002), p. 240]. The concerns of these critics are not directly addressed in Dennett's chapter XI on common objections against memes (though they are a variant of the objection "Memes add nothing to what we already know about culture"), so I want to tackle them here.

### III. THE ARGUMENT AGAINST CULTURAL PARASITES

The only way for a meme to spread is to be registered by human senses. Some may occasionally fly below the radar of conscious awareness, but they always have to be *perceived* somehow. Memes are then selected by human minds. Some are ignored or forgotten, while others are retained, because they are more salient, attractive, beautiful, titillating, or otherwise deemed valuable by their hosts. Durham (1991) called this “preservation by preference”.<sup>2</sup> But this raises the question: if human beings are the ones who do all the perceiving and selecting and evaluating, shouldn't we expect memes to serve *our* interests? As Ruth Millikan develops the argument:

Part of what they have been selected for is their ability to be reproduced accurately through the medium of human minds. But this does not subvert their essentially human purposes. ... The memes have merely fed these interests a much richer diet than if each person had to invent all of his own amusements, or invent all of the entertainments he uses to invoke the gratitude and appreciation of others. ... Side effects and mishaps resulting from use of these [basic cognitive] mechanisms will surely occur, but there is no reason to suppose that they systematically produce memes with purposes of a different kind from those either of the genes or of the psyche [Millikan (2004), pp. 18-19].

If Millikan is correct, memetic purposes will always be reducible either to genetic purposes or to individual preferences and intentions.<sup>3</sup> Recipes, words, beliefs, dances, ways of making pots and folk tunes have evolved to appeal to our taste buds, tickle our fancy, or suit our needs. People want canoes that don't sink, melodies that are moving, and hand axes that are efficient – and cultural evolution delivers them. Perhaps we cannot take credit for all that smart design, but the ‘purposes’ of the memes are still pretty much our own purposes too.

I believe that Millikan's point is an important one, and I don't think Dennett has discussed it yet. In many cases, memetic purposes will be derivative of human purposes, which is another way of saying that meme talk will be superfluous. Is ‘ $E=mc^2$ ’ a meme? In some sense, certainly. It's a discrete and digitized cultural item, and an extremely successful one at that. But it's not very informative (though neither strictly false) to be told that the meme of  $E=mc^2$  ‘has exploited the brains of millions of physicists as well as lay people as vectors for its own dissemination’. For the same reason, I think Dennett gets carried away a little bit when he

writes at some point that “perhaps we should think of astronauts going to the moon as the meme’s way of getting into the next generation of science nerds” [p. 255]. But of course, astronauts make conscious decisions to go the moon, and even if NASA uses space travel as a propaganda tool to get more funding and attract budding scientists, these are deliberate intentions formed by the leaders of NASA. The ‘memes’ of space travel have been well domesticated and de-Darwinized indeed.

But Dennett’s work on language and the evolution of consciousness shows that there are plenty of other cases where the meme’s eye view is very enlightening indeed, and where Millikan’s point does not apply. True, human beings are the selectors on whom the cultural fate of the memes depend, but that does not mean that people have any clue about their *reasons* for selecting. People are often not aware of the aggregated small effects of their actions, or even that they are acting in the first place. In his book *The Secret of our Success* Henrich [Henrich (2015), pp. 102-104], writes how the Mapuche tribe in Chile detoxify their corn by sprinkling it with wood ashes. What is fascinating about this cultural adaptation is not only that it was not invented by any human designer, but that the consumers are not even aware why they are adding the wood ash. When asked, they just answer that “it’s our custom”. But it stands to reason (or does it?) that the real reason has to do with detoxification. In other words, the purpose of the procedure does not seem to be derivative of human purposes, as it is not represented anywhere. So where should we anchor it except in the memes themselves?

#### IV. BELIEF SYSTEMS AND OTHER PARASITES

If people can be completely clueless about the adaptive rationale of their cultural inventions, it is perfectly possible that they unwittingly create forms of culture that are actually detrimental to them. Dennett is fond of examples like addictions, earworms, bad habits, and guilty pleasures. These cultural parasites arise out of a form of interpersonal conflict: some part of us likes them, but another part doesn’t [Ainslie, (2001)]. For instance, in the case of a cigarette addiction, my present self is at war with my future self. Smokers want to lead a long and healthy life, but still they keep lighting cigarette after cigarette, because their long-term interest is overruled time and again by a short-term craving.<sup>4</sup> Earworms provide another example. In an unguarded moment, I catch myself humming a tune that I actually hate. That is to say, ‘I’ may find the

tune irritating, but some part of my brain finds it irresistible (the tune must have appealed to *some* part of me, or else I wouldn't be humming it).

The majority of interesting cases of cultural parasites, however, involve misbeliefs of some sort, such as religion. I think David Haig was right when he wrote about selfish memes: “The place to look for sophisticated adaptation and selfishness will be in coherent ideologies, large ‘asexual’ meme complexes that are transmitted as a unit with high fidelity of transmission” [Haig (2007), p. 63]. I want to explore the evolution of misbeliefs here, because it allows me to address another objection against the idea of cultural parasites.

Most misbeliefs that are dreamed up by human beings are quickly weeded out again because they are blatantly false: either the evidence against them is widely available, or they are simply inconsistent. But among this category of false beliefs, there may be some that are more resilient to refutation and critical scrutiny than others. All else being equal, memetic evolution will select those misbeliefs that are more difficult to falsify, that are too obscure to be open to epistemic scrutiny, or that are more resilient in the face of destabilizing evidence, mainly because they are linked with immunizing strategies or escape clauses [Boudry, Blancke, & Pigliucci (2015); Dennett (1990), (2006)]. Another strategy of the memes might be to develop taboos around critical scrutiny, or to profit from practical barriers preventing investigation [Talmont-Kaminski (2013)]. Evolution will also tend to select the kind of beliefs that motivate “credibility-enhancing displays” on the part of the hosts (e.g., willingness to make sacrifices to the gods), which make them more likely to infect others [Henrich, (2009)].

In this scenario, believers are still “selecting” the memes, but they are unwittingly setting in motion a novel evolutionary dynamic, beyond their conscious control. This gives rise to certain systems of misbelief – such as religion or ideology – that become more and more resilient, and better at exploiting our cognitive foibles in ingenious ways. In other words, the memes become better at *deceiving* us. The philosopher Stephen Law compared irrational belief systems with “intellectual black holes” in which “unwary passersby can find themselves ... drawn in” [Law (2011), p. 10]. No-one designed those black holes, or at least no-one needs to understand their forces of gravitational attraction. It's just that the holes with the strongest gravitational field survived the selection tournament, and the others disintegrated.<sup>5</sup>

This brings me to the other objection to the idea of “selfish memes” in the context of human irrationality. Many critics seem to be



under the impression that memetics pretends to offer an alternative explanation of irrationality. For instance, Lewens dismissively writes that “[w]e do not need memetics to expose the widespread existence of various forms of irrationality, weakness of will, self-deception, false consciousness, subconsciously motivated action, and so forth” [Lewens (2015), p. 31]. Lewens is right that psychologists and behavioral economists already have plenty of resources to explain various sorts of human irrationality [see also Sterelny (2006)]. We don’t need the memeticists to tell us that. But memetics – or the meme’s eye view – is helpful to explain the evolution of complex *systems* of misbeliefs. These are complex and cumulative cultural adaptations which exploit our cognitive foibles in ingenious and unpredictable ways, and which cannot be simply derived from basic psychology.

In his curious book *Sick Societies*, Robert Edgerton (1992) collected numerous examples of self-destructive, dangerous or wasteful behavior from the anthropological record, almost all of them based on (supernatural) misbeliefs. Unfortunately, many social scientists and anthropologists pay little attention to such harmful practices, in part due to the influence of functionalism, which assumes that cultural beliefs and practices must somehow be beneficial to the group, and that every part plays a role within the larger whole. For functionalism, these harmful practices are hard to make sense of, but not for memetics. Together with the historian Steije Hofhuis, I have recently applied the meme’s eye view to witch hunts in early modern Europe [Boudry & Hofhuis (2018)]. Our ambition is not to explain why people are susceptible to supernatural beliefs in the first place; psychologists and scholars of religion already have such explanations [Boyer (2001)]. Instead, we want to explain why early modern Europe saw the rise of a particularly vicious strain of supernatural beliefs, which contained many features that seem ‘designed’ for maximal contagiousness: the notion that witches gathered at night in large sabbaths, that they could travel on flying brooms (thus crossing distances to neighboring villages), the pact with the Devil, the belief that witchcraft was a *crimen exceptum* for which torture was justified, etc.. Many historians and social scientists have been struck by the apparently clever design of the belief system that wreaked havoc in early modern Europe, and they have been looking for culprits behind the scenes who might have stood to benefit from the witch hunts, but no plausible candidates have been identified. The meme’s-eye view, however, can explain why the witch hunts benefited no-one in particular, except for the witchcraft memes themselves.

In a similar way – though I am less familiar with this topic – memetics can probably contribute to the study of addictions. It is possible that certain substances and practices are designed by blind evolution (not by human authors) to be particularly addictive and irresistible. Such a parasitical cultural tradition may start out with a single person engaging in some idiosyncratic behavior (e.g., chewing a tobacco leaf), which may then evolve into a bad habit, which may then be copied by others. In the ensuing selection tournament, the parasitical memes become better at *exploiting* our weaknesses (by homing in on the right preparation, dose, and ways of administering the drug). In this case, again, memetics does not explain why people have certain temptations in the first place (we already knew that) but it can explain how certain addictive practices can evolve to push our pleasure buttons in exactly the right way, even if they were not designed by anyone. After all, even drug dealers and manufacturers may have had little understanding of what makes a drug so addictive, especially in the early stages of cultural evolution [Delius (1991)].<sup>6</sup>

## V. SCIENCE OF MEMETICS?

Do cultural parasites exist? I've tried to explain how it is possible for some cultural items not just to reduce our biological fitness, but also to harm our personal interests. Along the way, I have addressed some other objections raised against memetics, to complement the ones mentioned in chapter XI of Dennett's *From Bacteria to Bach and Back*.

In my own work on pseudoscience and systems of misbelief, I have for a long time been suspicious of memes. I agreed with the skeptics that memetic explanations were mostly vacuous, reframing ordinary facts and patterns in more frivolous terms. But I have been drawn to a type of explanation which, I think, is conceptually indistinguishable from a memetic one. On the one hand, I was struck by the resilience of certain systems of misbelief against external shocks. It seems as if pseudosciences and ideologies are equipped with their own immune systems, warding off critical questions and apparent refutations, and pre-empting critical scrutiny. On the other hand, I was also struck by the apparent sincerity of most proponents of these belief systems. The majority of these people are not impostors, but seem to have sincere convictions [Boudry & Coyne (2016)].

But in that case, where does the cultural design come from? If you start using functional language to describe how belief systems survive –

“strategies” or “defense mechanisms” – you have to be able “pay your theoretical debts”, as Dennett has argued since long [Dennett (1983)]. Rather than focusing on the believers and their intentions, it is useful to imagine a competition between different belief systems: the ones that are too brittle and vulnerable to refutation will perish, while the more resilient ones with the right survival kit will flourish [Boudry & Braeckman (2012)]. But this, of course, is just the meme’s eye view.

I’m still not convinced that we need a whole new science of memetics, and I still think it is easy to get carried away with meme talk. Milikan’s challenge shows that the explanatory scope of memetics is limited: definitely more so than panmemetics, and perhaps also more than Dennett thinks. To the extent that cultural design is the outcome of human preferences and choices – even aggregated choices of many people over long time spans – memetic purposes will be derivative of human ones. Cultural evolution will get us what *we* wanted, although it will fulfill our desires in a better and richer way than we could have accomplished on our own. But sometimes memes can develop purposes of their own, and sometimes they may do so in a way that subverts the personal interests of their hosts. These are the memes that truly deserve to be labeled ‘cultural parasites’.

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#### NOTES

<sup>1</sup> The ultimate explanation is probably a form of adaptive mismatch. Evolution by natural selection has equipped our brains with dispositions, desires, and intentions, which under ancestral conditions would usually bring about high reproductive success, but which ‘fail’ in modern environments. Many people nowadays choose not to reproduce, by using contraceptives or leading a celibate lifestyle or making a monogamous commitment to a partner of the same sex. Conversely, most of us also forego opportunities for reproductive success that would make our genes extremely happy, such as (for males) visiting sperm banks.

<sup>2</sup> In the case of “selection by imposition”, someone else forces us to adopt a meme.

<sup>3</sup> One thing that Millikan does not take into account, however, is that preferences are themselves shaped by cultural evolution [Dennett (1995), pp. 329-330].

<sup>4</sup> Aristotle already wrote about this struggle between short-term desires and long-term interests in *On the Soul*: “Since appetites run counter to one another, which happens when a principle of reason and a desire are contrary and is possible only in beings with a sense of time (for while mind bids us hold back because of what is future, desire is influenced by what is just at hand: a pleasant object which is just at hand presents itself as both pleasant and good, without condition in either case, because of want of foresight into what is farther away in time), it follows that while that which originates movement must be specifically one, viz. the faculty of appetite as such [...], the things that originate movement are numerically many” [Aristotle, 350BE/1991 Book 3, §10] Thanks to David Haig for directing me to this quote.

<sup>5</sup> It is, of course, possible that some black holes have been devised by clever architects. In Kurt Vonnegut’s *Cat’s Cradle*, the prophet Bokonon confects bittersweet lies for his flock to make them happy. But for a variety of reasons, this hypothesis is implausible as an origin story of religion.

<sup>6</sup> In the case of cigarettes, of course, there is an obvious beneficiary: the tobacco companies. Someone else stand to gain. In that respect, the meme’s-eye view is less useful.

#### REFERENCES

- AINSLIE, G. (2001), *Breakdown of Will*. Cambridge University Press.
- ARISTOTLE (350BE/1991), *De Anima*. Buffalo: Prometheus Books.
- ATRAN, S. (2002), *In Gods We Trust: The Evolutionary Landscape of Religion*. Oxford: Oxford University Press.
- AUNGER, R. (2002), *The Electric Meme: A New Theory of How We Think*. Cambridge Univ Press.
- BLACKMORE, S. J. (2000), *The Meme Machine*, Oxford: Oxford University Press.
- BOUDRY, M., BLANCKE, S., and PIGLIUCCI, M. (2015), “What Makes Weird Beliefs Thrive? The Epidemiology of Pseudoscience”. *Philosophical Psychology*, 28(8), pp. 1177-1198.
- BOUDRY, M., and BRAECKMAN, J. (2012), “How Convenient! The Epistemic Rationale of Self-validating Belief Systems”, *Philosophical Psychology*, 25(3), pp. 341-364. doi: 10.1080/09515089.2011.579420
- BOUDRY, M., and COYNE, J. (2018), “Disbelief in Belief: On the Cognitive Status of Supernatural Beliefs”, *Philosophical Psychology*, 29(4), pp. 601-615. doi: 10.1080/09515089.2015.1110852
- BOUDRY, M., & HOFHUIS, S. (2018), “Parasites of the Mind. Why cultural Theorists Need the Meme’s Eye View”, *Cognitive Systems Research*, 52, pp. 155-167. DOI: 10.1016/j.cogsys.2018.06.010

- BOYER, P. (1994), *The Naturalness of Religious Ideas: A Cognitive Theory of Religion*, Berkeley (Calif.): University of California Press.
- (2001), *Religion Explained. The Evolutionary Origins of Religious Thought*, New York: Basic books.
- DELIUS, J. D. (1991), “The Nature of Culture”; in M. S. Dawkins, T. R. Halliday & R. Dawkins (Eds.), *The Tinbergen Legacy* (pp. 75-99). Dordrecht: Springer Netherlands.
- DENNETT, D. C. (1983), “Intentional Systems in Cognitive Ethology: The ‘Panglossian Paradigm’ Defended”; *Behavioral and Brain Sciences* 6 (03), pp. 343-355.
- (1990), “Memes and the Exploitation of Imagination”, *The Journal of Aesthetics and Art Criticism*, 48(2), pp. 127-135.
- (1995), *Darwin’s Dangerous Idea: Evolution and the Meanings of Life*, New York: Simon & Schuster.
- (2001), “The Evolution of Evaluators”; in A. Nicita & U. Pagano (Eds.), *The Evolution of Economic Diversity* (pp. 66-81): Routledge.
- (2006), *Breaking the Spell: Religion as a Natural Phenomenon*, New York, N.Y.: Viking (Penguin).
- (2017), *From Bacteria to Bach and Back: The Evolution of Minds*: Penguin Books, Limited.
- DURHAM, W. H. (1991), *Coevolution: Genes, Culture, and Human Diversity*; Stanford University Press.
- EDGERTON, R. B. (1992), *Sick Societies: Challenging the Myth of Primitive Harmony*, New York & Toronto: Free Press.
- GODFREY-SMITH, P. (2009), *Darwinian Populations and Natural Selection*; Oxford: Oxford University Press.
- HAIG, D. (2007), “The Gene Meme”; in M. Ridley (Ed.), *Richard Dawkins: How a Scientist Changed the Way We Think* (pp. 50-65).
- HENRICH, J. (2009), The Evolution of Costly Displays, Cooperation and Religion: Credibility Enhancing Displays and Their Implications for Cultural Evolution. *Evolution and Human Behavior*, 30(4), pp. 244-260.
- (2015), *The Secret of Our Success: How Culture is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*; Princeton University Press.
- LAW, S. (2011), *Believing bullshit: How not to get sucked into an intellectual black hole*. New York: Prometheus.
- LEWENS, T. (2015), *Cultural Evolution: Conceptual Challenges*, OUP Oxford.
- MILLIKAN, R. G. (2004), *Varieties of Meaning: the 2002 Jean Nicod Lectures*: The MIT Press.
- MORIN, O. (2015), *How Traditions Live and Die*; Oxford University Press.
- RICHERSON, P. J., and BOYD, R. (2005), *Not by Genes Alone: How Culture Transformed Human Evolution*; Chicago (Ill.): University of Chicago press.
- STANOVICH, K. E. (2005), *The Robot’s Rebellion: Finding Meaning in the Age of Darwin*; University of Chicago Press.

- STERELNY, K. (2006), "Memes Revisited"; *The British Journal for the Philosophy of Science*, 57(1), pp. 145-165.
- TALMONT-KAMINSKI, K. (2013), *Religion As Magical Ideology: How the Supernatural Reflects Rationality*; Routledge.