

I would like to thank the ICCI team for inviting me to take part in the symposium about David Wengrow's book *The Origins of Monsters* (hereafter referred to as TOM), which I read with great pleasure. This book deals with a fascinating topic and, despite its modest size, the scope of archeological and historical records it examines is impressive. One of its biggest advantages in my eyes is that it combines different perspectives—cognitive science, archeology and history—in the search for an explanation of the cultural evolution of particular cultural representations: monsters (also known as composites). I believe that in doing so it sets a standard for high-quality interdisciplinary studies in the area of cultural evolution.

My commentary will have two parts. In the first part I will examine the extent to which cultural epidemiology can account for the cultural evolution of monsters. In particular, I will discuss some claims that Wengrow has put forward in regard to cultural epidemiology as a cognitive approach to culture in general, and the way he has adapted this approach to the particular study of composites. My reservations will concern the way that the author has reconstructed some basic assumptions of cultural epidemiology and the way they have been applied to his subject of study. In the second part I will propose, for the sake of discussion, some hypothetical extensions of the account proposed by the author from the epidemiological perspective. None of my remarks are intended to be strongly critical; my aim is rather to make a few clarifications and discuss some potential directions of development for the account that has been proposed.

Wengrow characterizes cultural epidemiology as the study of how evolved cognitive dispositions and constraints account for the stability and distribution of cultural representations in a population (TOM, p. 3, p. 20). In particular, the author focuses on the ways in which the epidemiology of representations explains how macro-level cultural phenomena are informed by modular cognitive systems (TOM, p. 21). Wengrow points out that composites (beings that combine body parts from different species; TOM, p. 1, p. 26) are minimally counterintuitive representations (i.e., they violate some of the expectations generated by our intuitive biology, while preserving others). Based on standard assumptions of cultural epidemiology, he then claims that such concepts should be universally catchy to human minds and should enjoy a cognitive advantage in the process of cultural transmission (TOM, p. 50). However, one of the main points that Wengrow makes in his book is that composites were quite rare in Paleolithic and Neolithic art, and that they became culturally stable and cross-culturally successful only around 6000 years ago (and later), in the “first age of mechanical reproduction” (the Bronze Age and the Iron Age). The author proposes that various non-cognitive factors (such as the invention of a technology of mechanical reproduction, along with specific cultural, institutional and political components of the first states) may have been relevant for the cultural spread of composites in this period.

Wengrow points out that a role for such factors in the cultural success of composites is not something one would expect under the assumption that the human mind is naturally receptive to counterfactual creatures, and that this therefore poses a puzzle for cultural epidemiology. As he writes: “It implies a strong element of redundancy—a kind of superfluous cultural prosthesis to cognitive predispositions that are already biased towards the reception of such images” (TOM, p. 80). A full-blown version of this argument is also put forward elsewhere in the book: “The distribution of composite figures in the visual record raises a number of intriguing problems for the study of cultural transmission, for which only partial and unsatisfactory solutions have so far been offered. Their impressive transmission across cultural boundaries [...] is consistent with the expectations of an “epidemiological” approach to the spread of culture, which would accord them a special kind of cognitive catchiness. But this approach, in its current form, offers no way of explaining why such images become stable and widespread only with the onset of urban life and state formation, beginning little more than six thousand years ago—a mere blink of the eye, on the timescale of biological evolution [...]” (TOM, p. 88).

Can the epidemiological approach provide only partial and unsatisfactory explanation of the trajectories of cultural evolution of monsters? Is it true that the study of the cultural distribution of composites through the ages “ultimately forces a revision of some of its central assumptions”? (TOM, p. 7; cf. p. 24). There are two points that require more in-depth addressing and clarification before deciding the question of whether the case of monsters really poses a puzzle for cultural epidemiology. The first point concerns the role of minimal counterintuitiveness as a cognitive factor of attraction in the cultural transmission of monsters. (I use the notion of “attraction” to refer to all factors which bias cultural transmission to converge on certain themes or types; I perceive it to be an equivalent of “catchiness”, as used in the book.) Specifically, the minimal counterintuitiveness (or the counterfactuality) of monsters is the only cognitive factor identified and considered in the proposed epidemiological account of the cultural evolution of monsters (e.g., TOM, p. 23, p. 24, p. 28, p. 50, p. 51, p. 78, p. 80, p. 82, p. 111). Although the property of being counterintuitive has been recognized as a recurrent feature of cross-culturally successful representations, it is far from being clear whether being counterintuitive is a *sufficient* condition of cultural stability and cultural success for such representations. A more detailed discussion of other frequent aspects of highly cross-culturally successful representations such as religious beliefs could shed some light on this issue. My second point is clarificatory. Wengrow characterizes the epidemiology of culture as an approach aimed at explaining culture by examining the evolved modular cognitive dispositions and biases that inform and constrain cultural transmission (TOM, pp. 19-24). The epidemiological notion of attraction is understood exclusively in terms of cognitive attraction (TOM, p. 88, pp. 50-51). These, however, are not the views of cultural epidemiologists.

With regards to the first point, some influential research has clearly shown that minimally counterintuitive concepts are more memorable and attention-grabbing and thus have an advantage in cultural transmission (e.g., Boyer & Ramble, 2001; Barret & Nyhof, 2001). Also, minimal counterintuitiveness has been recognized as a typical feature of culturally successful representations such as supernatural beliefs (e.g., Boyer, 2001; Sperber, 2012). Nonetheless, being minimally counterintuitive is not the only cognitive component that matters in the cultural propagation of representations over time. People create and communicate various minimally counterintuitive concepts, but not all of them become culturally stable or widespread. Supernatural beliefs constitute a paradigmatic example of cross-culturally successful minimally counterintuitive beliefs. What is special about religion, in addition to being counterintuitive? Pascal Boyer proposed that “it activates inference systems that are of vital importance to us: those that govern our most intense emotions, shape our interaction with other people, give us moral feelings, and organize social groups.” (Boyer, 2001, p. 135). Elsewhere he made this point even more explicit: “[...] religion as we know it is not just a matter of counterintuitive concepts. Religion is not just about flying mountains, talking trees and biological monsters but also about agents whose mental states matter a lot, about connections with predation and death, about links with morality and misfortune” (ibid., p. 324). Hence I believe that what we can learn about cross-culturally successful representations from studying supernatural beliefs is that they often activate many different mental systems and generate rich inferences (cf. Sperber & Hirschfeld, 2004, p. 45; Boyer, 2003; Boyer, 2001, p. 164). In other words, representations which are culturally widespread are more cognitively relevant than others: they produce more inferences for less cognitive effort (Boyer, 2000, p. 210).

Coming back to biological monsters, such counterfactual representations may be relatively easy to remember, reason about, and communicate to others, but their overall inferential potential may be relatively poor comparing to other counterintuitive concepts, unless some additional characteristics apply. In other words, a degree of relevance associated with the property of biological counterfactuality may not be sufficient to drive cultural transmission in the direction of cultural stability and cross-cultural distribution. Perhaps a change in composites’ degree of relevance through the ages is another factor worth considering in accounting for the patterns in the cultural

evolution of monsters that Wengrow reported. In particular, it may be that composites of the “first age of mechanical reproduction” were built in such ways that they activated more mental systems and produced richer inferences. I will come back to this hypothesis in the second part of my commentary.

Even leaving this aside (and turning now to the second point mentioned above), the epidemiology of representations is more than the study of cognitive factors that inform and bias cultural transmission, or of general patterns of cognitive attraction. One of the discipline’s core assumptions is that two different factors of attraction—psychological and ecological—matter for the explanation of the cultural transmission and cultural stability of particular representations (Sperber, 1996, pp. 113–118). Psychological factors of attraction are individual-level processes, which direct the way people reconstruct and transmit cultural information to converge on certain themes or types (e.g., evolved mental modules, or idiosyncratic psychological properties). Cognitive and affective/emotional factors of attraction belong to this category. Ecological factors are all the features of physical or cultural environments that affect the transmission of cultural information in such a way as to converge on certain themes or types (cf. Sperber, 1996, p. 113; Claidière, Scott-Phillips, & Sperber, 2014, p. 4). Various factors that qualify as “environmental” in a broad sense—natural, economic or cultural—can fall under this label. Importantly, according to the epidemiological approach, it is the interaction between psychological and ecological factors that accounts for most historical changes in the distribution of cultural representations (Sperber, 1996, p. 115). In other words, to explain why a particular type of representation constitutes a cultural attractor in a specific historical context, one must identify all the important factors of attraction for this type of representation, in that context. Because the balance of particular ecological and psychological factors is changing, cultural attractors are not stable and also change over time. As Dan Sperber pointed out: “Cultural attractors emerge, wane, or move, some rapidly, others slowly, some suddenly, over historical time” (1996, p. 115). In a similar vein, Claidière and Sperber noted that “attractors themselves can and do change over time as an effect of the factors that explain them [...]” (2007, p. 92).

This clarification concerning the epidemiology of representations has implications for some specific points made in the book. First, there is no contradiction between the notion of attraction and historical or institutional factors having an impact on cultural transmission (e.g., TOM, p. 51, p. 82, p. 89; pp. 111–112), as the latter belong to ecological factors of attraction. Actually, Wengrow himself frequently speaks of “cultural ecology” in his book (TOM, p. 51, p. 67, p. 106), and is remarkably successful in identifying a range of ecological factors of attraction for images of composites in the “first age of mechanical reproduction”. I will come back to this point at the end of my commentary.

Second, attraction and fittingness are not alternative accounts of the cultural propagation of monsters. If I understand correctly, Wengrow speaks of fittingness in terms of congruence between general esthetic and constructive canons developed in the urbanized world of the first civilized states, and the particular esthetic principles on which composites were made (TOM, p. 59, p. 89). He places this among the factors that facilitated cultural spread of the composites in this historical context. But if so, then fittingness can be rephrased in terms of a cultural factor of attraction. Apparently, two of the types of esthetic principles that Wengrow mentions constitute an instance of two cultural traits that mutually reinforce each other’s cultural transmission (cf. Claidière et al., 2014, p. 4).

Moreover, the author’s observation concerning the plasticity of human cognition, and its openness to being (to some extent) shaped by institutional factors and historical circumstances (TOM, pp. 111–112) is also compatible with cultural epidemiology. As said, the epidemiological approach envisages that psychological and ecological factors are in constant interaction and together create

the cultural space in which cultural representations converge on certain types. For example, Baumard, Hyafil, Morris, & Boyer (2015) proposed that an increase in energy capture per capita between 500–300 BCE affected people's motivational systems in the direction of a preference for long-term versus short-term strategies, which in turn contributed to the cultural propagation of moralizing religions during the Axial Age. Finally, Wengrow's observation that images of monsters are not universally but selectively culturally attractive in particular circumstances (TOM, p. 89) is reconcilable with the epidemiological perspective's emphasis that cultural attractors are context-sensitive and change over historical time.

What I believe follows from these two points is that the changes in the cultural distribution of monsters through the ages, as observed by Wengrow, are not strictly speaking a puzzle for cultural epidemiology, in that the latter always envisages various psychological and ecological factors as important for explaining trends in the cultural transmission of representations. Yet although not necessarily such a puzzle, the cultural evolution of monsters still poses something of a challenge for cultural epidemiology. That biological monsters became cultural attractors in the "first age of mechanical reproduction" requires an explanation in terms of identifying certain forces of psychological and ecological attraction: i.e., particular micro-processes which biased cultural transmission in the direction of a macro-level increase in the frequency of these images during this period.

Therefore, I will next propose two stories that may shed some light on what might have happened in the course of the cultural evolution of monsters to transform them from rare images in the Paleolithic and the Neolithic eras to cultural attractors in the "first age of mechanical reproduction". The first story concerns possible changes in the way composites were represented, and the second story concerns changes in the environment in which they were culturally transmitted. These stories are not mutually exclusive, and should be considered jointly. Some elements of these stories were already presented by Wengrow in his book, while others represent an attempt at elaborating the ideas that have been put forward

Changes in the mode of representation of composites

My first hypothesis is that something about the way monsters were mentally and publicly represented changed during the "first age of mechanical reproduction", and that this can account for the observed increase in their cultural distribution in this period.

The main problem with evaluating this hypothesis is obvious: we cannot be certain about the way people were imagining composites in the Paleolithic and Neolithic periods (this is not easy even for later periods), hence it is difficult to assess which features of composites were *distinctive* of the "first age of mechanical reproduction". My proposal below will be constrained to tracing some common properties of composites in the Bronze Age and the Iron Age, when they already were cross-culturally successful. This is under the assumption that some of these traits may at least partially account for their cultural success in this period. I leave it to the specialists to assess whether these features really distinguish composites of the Bronze Age and the Iron Age from the composites of the Paleolithic Age and the Neolithic Age.

I suggested above that being minimally counterintuitive per se might not be enough to cause the cultural stability and cross-cultural success of a representation. In particular, minimal counterintuitiveness in composites may not have provided them with enough relevance to guide their cultural transmission in the direction of cultural attraction in the Paleolithic and Neolithic times. Perhaps composites of the "first age of mechanical reproduction" were constructed in such

ways that they engaged more mental systems and produced richer inferences than their predecessors. This could explain—at least to some extent—why monsters became culturally stable and widespread around six thousand years ago (and later).

There are several possible scenarios concerning how the relevance of composites could have been altered. They entail either the granting of some new properties onto counterfactual biological creatures, or their increased association with important domains of human life. Again, these scenarios are not mutually exclusive, and could have occurred in various combinations.

One such scenario envisages that around the transition from the Neolithic to the Bronze Age visual components of composites drifted in the direction of the prevalence of body parts of predatory animals. Counterintuitive creatures resembling predatory animals might have effectively triggered mental systems responsible for the detection and avoidance of predatory agents. This in turn might have increased the cognitive relevance of counterfactual representations of this type and given them an advantage in cultural transmission.

Taking this perspective, it is not surprising that the composites in the “first age of mechanical reproduction” were largely made of body parts of predatory animals such as lions, snakes, crocodiles, scorpions, and eagles (or at least, this picture emerges from the sample of composites provided in the book: e.g., TOM, p. 10, p. 17, p. 57, p. 62, p. 84, p. 93, p. 97, pp. 101-102, p. 104). Even if main body parts of some of the composites in this period did not belong to predatory animals, they frequently manifested features potentially dangerous to humans (e.g., horns, claws, fangs, and beaks), and sometimes in exaggerated forms (e.g., TOM, p. 10). Perhaps this relatively high frequency of predatory composites in the “first age of mechanical reproduction” was not random: cultural images of composites which triggered thoughts of dangerous predators might have been more cognitively attractive than composites made of physical parts of other animals. The visual effects of these images might have been reinforced by mythological narratives which frequently presented monsters as dangerous or even life-threatening intentional agents (e.g., Greek myths about the Sphinx, the Gorgon, the Minotaur, or Cerberus). Additionally, successful cross-cultural transmission of such images and stories might have been due to people’s general tendency to be more credulous toward information concerning hazards (e.g., Fessler, Pisor, & Navarrete, 2014). Finally, if monstrous biological creatures invoked concerns of dangerous predators, this might shed light on the reason why some other properties were frequently ascribed to them too. In particular, imagining monsters as powerful protectors (TOM, p. 89, pp. 99-107) could be related or even secondary to perceiving them as a danger (i.e., if you did not believe that monsters were threatening in the first place, how could you ever believe they could protect you?).

There are many other possible scenarios which envisage that composites were associated with various domains of life that were of general importance, and that this would have had an impact on their cultural propagation in the Bronze Age and the Iron Age. For instance, counterfactual monsters might have been associated with moral matters (Wengrow loosely refers to connections between composites and moral processes at the end of the book; TOM, p. 112). It seems that such associations might at least to some extent be traced back in mythology and material culture of the period. For instance, in ancient Babylonia the cultural hero / fish-man monster Oannes (Adapa) was connected to law-making (e.g., TOM: introduction); and a snake-dragon composite was an emblematic animal of Marduk, a god associated with justice and supernatural punishment (e.g., Leick, 2002, p. 116). Maat—the ancient Egyptian winged goddess of law and order—the jackal-headed Anubis, the ibis-headed Thot and the falcon-headed Horus were all engaged in the process of judging the dead in the underworld; whereas a part-lion, part-hippopotamus and part-crocodile monster Ammit whose name translates as “Devourer” was waiting to eat the hearts of sinners (e.g., Meeks & Favard-Meeks, 1996, Figure 16). Also some versions of Greek myths about the Sphinx and the Minotaur present them as punishments that gods sent for misdeeds committed by people.

Besides this association with morality, monsters might have been associated with other aspects of social interactions. For instance, the fact that the new social elites utilized foreign objects and motifs such as composites as their group markers during the period of transformations (e.g., TOM, p. 91) seems to point at a connection between the composites and social group identification. Other possibilities worth considering include associations with human concerns about misfortune—some composites, e.g., Lamashtu, were believed to cause illness and misfortune and/or were invoked in defense against them (TOM, p. 102, p. 89) and with concerns about purity—figures of composites were used in purification rituals (TOM, p. 99) and in defense against pollution (TOM, p. 100). Overall, representations of counterfactual creatures which activated mental systems governing morality, social interactions and contagion might have had an advantage in cultural transmission compared to representations devoid of such features (Boyer, 2003).

Moreover, some properties of monsters might have been altered in response to changes in human subsistence conditions in the “first age of mechanical reproduction”. For instance, in the very beginning of the book we are presented with the story of Oannes (from *Berosos’s History of Babylonia*), who taught people all sorts of knowledge, including writing, mathematics, building cities and temples, and making laws. Because the subsistence of the first civilized states was highly dependent on these kinds of knowledge, composites of this type could have been granted more relevance than mere biologically counterfactual creatures. I believe that this case could be extended to a variety of monsters, as mythology frequently presented them as guardians of highly esteemed goods (e.g., knowledge, powerful objects, and treasure).

In the final analysis, what may be worth considering in its own right is the potential increase in the degree to which composites were associated with religious beliefs and organized worship. Many examples of such connections have been provided above. TOM mentions fantastic animals that had religious significance (p. 17), demonic agents imagined as composites (p. 56), gods and goddesses presented as composites (e.g., Taweret; p. 63), figures of composites utilized in cleaning rites that invoked gods (p. 100), composites with a role in the ideology of sacred kingship (p. 62), and others. Expanded connections with religious systems might have been an additional booster for the cultural propagation of monsters.

In any case, this list is an initial proposal and offers only a few speculative scenarios of how changes in modes of representation of composites might have altered their relevance, and how this might have contributed to their cultural stability and increased distribution in the “first age of mechanical reproduction”. Experts will have more to say on the value of these insights; perhaps they will propose some alternatives.

Changes in the environments in which representations of composites were culturally transmitted

The second story entails that some changes occurred in the environment (widely understood as including natural, economic, political, institutional and cultural conditions) in which composites were culturally transmitted, and that this contributed to their higher cultural distribution and cultural stability around 6000 years ago (and later).

With regards to this point I do not have much to offer, as in his book Wengrow has identified and examined in detail a range of ecological factors of attraction for composites that he argues were specific to the “first age of mechanical reproduction”. Some of the most important factors are:

- Urbanization (TOM, p. 2, p. 59, p. 67, p. 88)

- Expansion of political networks and formation of new states (TOM, p. 2, p. 16, p. 74, p. 88)
- Expansion of commercial networks (TOM, p. 2, p. 8, p. 12, p. 16, p. 59, p. 60, p. 94)
- Emergence of new social elites (TOM, p. 2, p. 8, p. 61, p. 91; pp. 90-94)
- Use of composites as a part of the lifestyle of these new elites (TOM, p. 81, p. 91, pp. 90-94)
- Invention of technology of mechanical reproduction (TOM, p.74-87)
- Establishment of general canons of esthetics and construction oriented so as to combine individual parts and part-whole relations (TOM, p. 49, pp. 54-55, p. 69, p. 89)
- Emergence of an international esthetic style (TOM, pp. 94-99)
- Environments of higher risk and uncertainty (e.g., societal, political and diplomatic instabilities; TOM, pp. 106-107)

As pointed above, Wengrow shares with the epidemiological approach the view that environmental factors of different types should be considered jointly and in interaction with psychological factors (e.g., minimal counterintuitiveness) in formulating a fully-fledged account of the cultural evolution of composites. It might be worth exploring the exact roles that these different factors played in the cultural transmission of monsters, and scrutinizing in detail some of the main pathways of their interaction. For instance, some of the environmental conditions under examination seem to be crucial as they conditioned all the others (in particular, urbanization). Others might have been mutually reinforcing, such as the new principles of esthetics and construction based on ideas of modularity and the urbanized forms of life (e.g., TOM, p. 59, p. 106). Finally, the ways that psychological and environmental factors interacted might account for why composites spread cross-culturally and why some of their particular types were more popular than others. For instance, some fears and anxieties might have been psychologically more salient among members of groups that were living under constant threat of political disintegration and social instability (TOM, pp. 106-107). This in turn might have biased the cultural transmission of composites to converge on themes of protectors (the intensification of societal fears and representing biological monsters as predatory agents might both have contributed to the cultural attraction of protective images of monsters).

In summary, I want to repeat that I found Wengrow's book to be an excellent epidemiologically oriented case study of the cultural evolution of monsters. I am eagerly looking forward to future developments of his account. Identification of all the important causal forces standing behind the cultural dissemination of composites—despite gaps in knowledge and all the messiness of historical and cultural processes—is open to further elaboration. Perhaps this might be an issue for a research project that could engage the close collaboration of archeologists, historians, and cognitive scientists?

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