

Love, Alan C., and William Wimsatt, eds. 2019. *Beyond the Meme: Development and Structure in Cultural Evolution*

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In the introduction to this volume, the editors, Love and Wimsatt, borrow Geertz's (1973) distinction between thick and thin descriptions of culture. The former is rich, detailed and typically qualitative; sacrificing attempts at cross-population generalizations in favor of a full account of specific groups. The latter is typified by the kinds of mathematical models common in contemporary cultural evolution, where individuals are reduced to a few bytes of information, their behavior to a handful of simple algorithms, and so on. While these models are clearly a far cry from human reality, their deliberate simplicity is an attempt to understand the general principles that operate across different groups. Love and Wimsatt see this as a shortcoming of the field, but also as an opportunity for progress: the way forward, they suggest, is through a hybridization of these two approaches. Or maybe just a more strategic use of both? Indeed, one could accuse the editors of hedging their bets here; they simultaneously hint at a new way to do cultural evolution that combines the strengths of thick and thin explanations, yet the example they provide, that of Durham's work on sickle cell anemia (Durham 1991), is instead a compendium of thick and thin work on the same topic.

Regardless, to make more tangible progress on this topic, in 2014 Love and Wimsatt hosted a workshop at the University of Minnesota to which a diverse range of scholars were invited with the stated aim of figuring out how to take cultural evolution "Beyond the Meme." That is, how could cultural evolution be fattened up in

its engagement with human culture, with the largely defunct memetics serving as the suitably emaciated foil for the contributors to push away from. This volume is the product of that workshop. In chapter 1, Wimsatt identifies two key areas in which cultural evolutionary theory is particularly deficient: development and structure. The first refers to the details of the learning process; how certain traits, skills or beliefs rely on the successful acquisition of others, either as precursors or as scaffolds, before they can be learned. This can be contrasted with much cultural evolutionary work that treats trait acquisition as discrete, instantaneous, and typically independent of a structured developmental process. Nonetheless, this critique is not new and many researchers have noted the poverty of the typical depiction of learning in cultural evolution (Sperber 1996). The second refers to the social structures, norms, and institutions that mediate interactions and thereby facilitate and constrain cultural transmission. One of the great successes of cultural evolution is the joining of micro-scale individual cognition with its macro-scale population consequences. What Wimsatt argues is missing is everything in between, which I'll refer to as "meso-scale" structures, like social networks, communication systems, political and educational institutions, and so on. While no one would doubt the existence of these structures, there has been very little attempt to integrate them into a cultural evolutionary framework, and so I think the editors are correct to make this a theme of the volume.

With the above goals in mind, we can ask what would make this book a success. To this end I came up with two criteria. (1) It should persuade the reader that the absence of development and structure in cultural evolution is a real problem, and that through their inclusion there will be tangible intellectual payoffs. That is, simply pointing out that development and structure are features of real human populations is not enough; the book must prove that these are meaningful and harmful deficiencies. (2) The book should provide interested researchers with a clear roadmap for how development and structure could be integrated into their own research programs. These are ambitious desiderata (perhaps unfairly so), but at 500 pages I think it reasonable that readers should ask themselves what they get out of committing to such a tome.

In the context of these criteria, then, let us consider how the chapters contribute to the overall success of the volume. After the initial exposition of the problems at hand, the next three chapters provide rich descriptions of cultural evolution in action, the idea being to furnish the reader with an appreciation of the reality of cultural change to which cultural evolution as a discipline should aspire. So, we read about the role of steering committees and consortia in driving norms in biological sciences (Leonelli) and the internal functioning of a biomedical engineering lab, including the model systems they build (Nersessian). These chapters nicely illustrate some of the key themes from the introduction: Steering committees are clear examples of meso-scale structures and the biomedical model systems both scaffold learning for new students while also constraining the future possibilities for discovery, which is linked to Wimsatt's introductory notion of "generative entrenchment." However, their impact is limited by their narrow scope: while the descriptions are comprehensive, their foci are drops-in-the-ocean of development and structure rather than a broad overview of general processes. The last of these chapters (Janssen) is better in this regard, with detailed dissections of five key developments in twentieth-century physics. The conclusion being

that rather than tearing down prior theories, advances were assembled bit-by-bit, switching out segments of existing theory with new work until the overall edifice became almost unrecognizable. While the breadth is finite, Janssen synthesizes the five case studies to offer a new metaphor for scientific change, that of an arch and scaffold, with old work acting as a scaffold for the new. While the limitations of the metaphor are noted, it has clear implications for cultural change more generally and is one of the more impactful chapters in the volume.

While the above chapters give the reader some sense of the reality of cultural change, it remains unclear the cost we incur by not paying these phenomena more heed. Moreover, they provide no clear pathway for how cultural evolution *could* incorporate these ideas into a general framework. However, that is, at least in the editors' suggestion, where the next three chapters come in: Foster and Evans argue for the use of Directed Acyclic Graphs (DAGs) to construct reticulate cultural phylogenies instead of the tree structures typical of evolutionary biology, and outline the theory to do so in practice. The suggestion of DAGs as the basis for cultural phylogenies is astute given their widespread study across disciplines, however the chapter would benefit from an example of this in practice to hammer home how DAGs improve our ability to make inferences about cultural histories. As it is, the reader is encouraged to try this for themselves with little guarantee that it will produce meaningfully different results to current practices. Next, Bedau suggests that the patent record can be employed as a model system for cultural evolution in the same way *Drosophila* is used for genetics or *Arabidopsis* for epigenetics. The argument for cultural evolutionary researchers making more use of the patent record is strong: the record is rich, detailed and readily available. It also already includes data of the parentage of each entry as they cite other records as influences. As such the cultural evolutionary study of patents should be much smoother than that, say, of technologies in small-scale societies. That said, the formality of

the patent system may also be its weakness; compared to the institutionalized regularity of the patent system, much cultural change occurs in a lawless Wild West, and so patents, while easy to study, may not be representative. The last chapter (Abrams) describes an agent-based cultural evolutionary model of groups of Balinese rice-farmers, along with their religious beliefs and the complex environmental effects of their farming practices. While interesting, I do not see how this chapter offers much that researchers working on other cultural evolutionary topics could draw on. Moreover, even the combined jurisdiction of all three chapters is modest compared to the field as a whole. So, while they do offer local methodological advances, they fall short of delivering a comprehensive roadmap for future work.

The remaining six chapters dig deep into specific topics to see how researchers are wrangling with issues of structure and development. The first, and perhaps the best, is a discussion of the transmission of stone tool technologies (Tostevin). This chapter attempts to get past the discrete nature of many cultural evolutionary approaches to learning and to understand the continuous development of the complex skills behind stone tool manufacture. In reading this chapter I was struck by its overlap with Perreault's recent book *The Quality of the Archaeological Record* (Perreault 2019). Both Tostevin and Perreault argue that the way archaeologists engage with artefacts has a fundamental inability to answer questions about the beliefs, behavior, and/or cognition of the artefact producers. Moreover, both suggest that the way forward requires synthesizing information from across sites and technologies, rather than producing detailed descriptions of specific tools which, following Shea (2014), Tostevin refers to as NASTIES (that is, Named Archaeological Stone Tool IndustriES). Here the two depart, though. Whereas Perreault argues that archaeology should focus on different questions entirely, Tostevin outlines a new framework—the Behavioral Account of Cultural Transmission (BACT), which draws on detailed descriptions of the learning process—that he argues can provide

insights into past behavior and cognition given appropriate data. This framework involves distinctions between declarative knowledge (*connaissance*) and implicit know-how (*savoir faire*), as well as the different perspectives of the demonstrator (*emic*) and observer (*etic*). Whether this framework will pay off in the way Tostevin imagines remains to be seen. From my point of view, it is an admirable attempt to synthesize work from a diverse range of fields, and the introduced distinctions (knowledge vs. know-how, emic vs. etic perspectives) are important, but I worry its complexity will prevent any firm conclusions from being reached about archaeological assemblages; so much is included that almost any outcome seems possible under a wide range of conditions. Moreover, while I think Tostevin is right to argue against the essentialist categorization of stone tool NASTIES, his framework uncritically adopts similarly discrete categories for individual cognition (imitation, emulation, and so forth), as opposed to a more gradualist conception of transmission fidelity, which I think will hold it back. Nonetheless, it represents one of the more comprehensive attempts to really achieve the book's aims.

The next three chapters cover the cultural evolution of language (Mufwene), writing (Maiocchi), and technological scaffolding in education (Martin). All are interesting (particularly the chapter on writing), but none really attempts to create a framework that advances their study within a cultural evolutionary approach, rendering them somewhat inert. The penultimate chapter on social identities (Smaldino) takes a cultural evolutionary approach to the notions of group identity and identity signaling. This is a worthy task, as demarcated social groups are a clear example of the kinds of structure for which the editors advocate. However, rather than showing how collective identities can be incorporated into cultural evolutionary theory in general (or why they should be), the chapter instead provides a functional account for why such groups (and their signals) exist in the first place. By Smaldino's account, they serve to ensure that people

cooperate with likeminded others, thereby avoiding the costs of having to negotiate the terms of cooperation at every instance. While persuasive, it nonetheless remains unclear what the implications are for someone working on topics other than coordination and cooperation.

The final chapter (Andersson, Törnberg, and Törnberg) is perhaps the most critical, and therefore the most useful, of the volume. It asks why understanding cultural evolution is so hard in the first place, pointing out that despite tremendous advances over the past half century, we are still far from being able to make accurate predictions (let alone successful manipulations) of cultural dynamics. The authors answer this question by borrowing the distinctions of complexity and complicatedness from complexity science: complex systems are those whose behavior is governed bottom-up by the myriad interactions of micro-scale subunits (for instance, weather), while complicated systems are characterized by a detailed top-down design and hierarchical structure (for instance, cars). Culture, the authors argue, is both complex and complicated (a state described as “wicked”), which puts it beyond the scope of any current approaches. Indeed, the conclusion seems to undermine the editors’ goals of understanding culture through a combination of thick and thin approaches, as it states that culture is far thicker than even the thickest approaches currently available. Having read through a series of chapters that attempt to hybridize elements of thin and thick approaches, the reader receives from this chapter a sucker punch that leaves them questioning the utility of the entire endeavor.

This reflection brings us back to the questions asked by this review: does this volume persuade the reader that the inclusion of development and structure in cultural evolution is important and/or practical? While I think that steps are made in this direction (and many chapters are interesting in and of themselves), the answer is, overall, no. As someone whose work falls on the thin end of the anthropological spectrum, I finish the volume with an appreciation of how development and structure can be brought to bear on specific problems, but with little sense of how (or even why) I should do so in my own research. The irony is that one of the contributors (Leonelli) offers a roadmap for how these goals could perhaps be better served: steering committees are able to create long-term change in scientific practices by taking groups of like-minded individuals and arranging them into stable social structures that exert force over funding and policy-making bodies. However, before this can be successful, there needs to be more concrete examples (replete with scaffolding for novices) for how cultural evolution can be led into this uncharted territory. The chapters by Janssen (arches and scaffolds), Foster and Evans (reticulate phylogenies via DAGs), Bedau (patents as model systems) and Tostevin (the Behavioral Account of Cultural Transmission) come closest to this in that they offer detailed proposals for future work. However, their combined domains are a modest subset of the overall field; so much ground is left undisturbed. A more broad-ranging proposal is what is needed to take cultural evolution beyond the meme.

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