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External Reviewer report for PhD Candidate Sebasti  n LERIQUE

Thesis: Epidemiology of Representations: An Empirical Approach

Opinion in favour of the defense

This thesis presents the results of two empirical investigations within the framework of Cultural Attraction Theory and situates those within wide-ranging empirical, theoretical, synthetic reviews of relevant literature in cognitive science, philosophy of mind, and cultural evolution. The main contribution of the thesis is to establish and verify methodological approaches for (a) detection of cultural attractors in linguistic data (namely, the life and career of quotations on online websites) (b) revealing the transformational dynamics that linguistic phenomena may undergo towards such cultural attractors.

The thesis constitutes four substantive chapters, followed by a brief conclusion. The first **introductory chapter** surveys the intellectual landscape of cultural evolutionary theory in a broad sense before focusing on the primary theoretical framework deployed in the work: Cultural Attraction Theory. The literature review is sound and demonstrates credible knowledge of the relevant literature in what might be called cultural microevolution, and draws on key recent works by (e.g.) Sterelny, Lewens to characterise the perspectives of the so-called ‘‘California’’ and ‘‘Paris’’ schools of cultural evolution. L  rique casts the thesis firmly within the Parisian school as a proponent of CAT and gives a clear and analytical judgement of: the explanatory boundaries and targets of CAT (particularly that of perceived cultural stability in the face of pervasive transformations); empirical work to date; he then describes the opportunity for cognitive science to provide empirical ways of testing aspects of CAT.

In the review, L  rique follows Acerbi & Mesoudi (2015) in considering CAT compatible with other approaches (‘‘Standard Cultural Evolution’’). The stated justification for the focus thus lies in opportunities to bring experimental psycholinguistic approaches from cognitive science to empirical investigations. Unlike other aspects of cultural evolution that have developed a body of empirical work (‘‘SCE’’ approaches to mathematical gene-cultural co-evolution, cultural phylogenetics, experimental economics, developmental studies, transmission chains), work in CAT has been mostly supported (though not exclusively) by descriptive accounts of the nature of ‘attractors’ and their potential dynamics, or by empirical work re-cast in a CAT framework. The intention in the thesis to develop empirical methodologies that explicitly test predictions derived from CAT: this constitutes an important contribution to research.

The literature review throughout the thesis is current and comprehensive and the bibliography is of required scope. The introduction is wide-ranging and thoughtful but in parts overly discursive and non-selective. For clarity and focus, certain sections could have been eliminated or greatly reduced (for example: niche construction; EES; Ingold’s work on complementarity; Bourdieu’s theory of *habitus*) as they neither add to the developing argument nor are they drawn on later in any meaningful fashion for the interpretation/synthesis of results. In general the introduction may have benefitted from a clearer funnelling towards the aims and research questions. The reader loses sight of the key points at stake throughout the encompassing survey of the cultural evolution landscape. While L  rique

demonstrates a critical aptitude for interrogating experimental paradigms, he effectively problematizes CAT into a corner, begging the question: what job is done by this framework when the targets of investigation are so challenging to observe, define, and model? Less breadth and more depth in this chapter would allow for Lerique to articulate crisply the aspects of CAT that are implicated in the work he proposes.

Chapter Two presents the results of a study that examined how words in quotations change when they are copied across online environments (blogs, websites, etc). This work was published in the high-profile peer-reviewed journal *Cognition* and as such has received rigorous scrutiny from scientific peers. This is an imaginative piece of research that exploits vast digital data sources; these are programmatically examined for the same sentence/phrase (a representation) undergoing serial or parallel copying events in which transformations may take place. The affordances of these phenomena allow Lerique and colleagues to assume that low-level cognitive biases are responsible for any transformations, and to then ask (a) what regularities ('attractors') exist and (b) what cognitive bases may explain these. To conduct this work Lerique will have employed substantive quantitative and computational skills as well as a robust understanding of psycholinguistic processing; skills and knowledge are well in evidence here. Results show that word frequency, age of acquisition, and word length are all implicated in a contractile pattern of word substitutions, and the argument is made that these cognitive efficiency biases are acting as attractors when words are substituted.

Chapter Three builds on the first investigation with a serial reproduction experiment wherein participants reproduced (in written form) quotations and sentences after reading them on-screen. Each participant's production acted as input to the next, and here Lerique tracked the insertion/deletion/replacement patterns of words and chunks through these transmission chains. Again, extensive computational skill and clear experimental design to a high standard were in evidence in this piece of work. The visualisations are useful and innovative. The series of investigations presented is complex and incremental, demonstrating that: transformations are "bursty" rather than gradual; that deletions are the most common change; and that these make way for insertions that are themselves constrained by the efficiency characteristics shown in Ch 2. There could be some conceptual links to usefully draw with coalescent theory in population genetics, but Lerique does not engage with that literature.

To be critical, the methods and results in Chapters 2 and 3 are limited—as presented in the work—in their generalisability. First, there is the usual population problem: both studies examine English and French written language data produced and transformed by WEIRD individuals (Henrich et al 2010). In these empirical chapters the general discussion could more thoughtfully engage with the anthropological critique of psychology, at the very least with the potential outcomes of work in other languages. For example, an isolating language such as Mandarin Chinese does not have such strong efficiency affordances offered by word length: what would we expect here? What about polysynthetic agglutinating languages? Indeed, it is unclear throughout the thesis if Lerique's version of CAT requires a commitment to cognitive biases (and thus attractors) *that are themselves universals* acting on locally instantiated variation, or whether cognitive biases themselves are more locally variable (in which case, at what scale?). This should be made explicit, even if the methods themselves might be limited to certain study populations. Second, the utility of CAT will be tested by empirical application across multiple domains of cultural phenomena, and so beyond language I would invite Lerique's informed speculation on how these methods (particularly those in Chapter 3) might be adapted. Other cultural action sequences in which representational units and chunks are inserted and deleted might include tool manufacture, music and dance, ritual processes, recipes and cooking procedures.

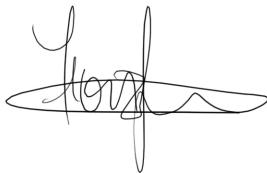
Chapter Four moves on to consider semantics. Lerique correctly asserts that the *meaning* of words and utterances will constitute a critical part of understanding microevolutionary dynamics in language, and that the role of semantics in the previous two studies needs to be considered. This is both welcome and necessary at this point; the two studies were very good models of the power of an experimental approach, but language is in large part for making social meanings, and cognitive biases towards efficiencies will not always (or often) be primary drivers of transformation. This chapter is a synthetic review of literature in Relevance Theory and Enactive (or E-Theory) approaches, commonly

understood as opposing representational and interactional approaches to understanding meaning. Here Lerique provides an overview of work in both domains and considers the utility of both in studies of cultural evolution. The intent is integrative, but the outcome is an eclectic selection of empirical speculations in §4.4 that provide only a starting point to the question of how meaning is constituted in processes of cultural evolution. Lerique considers that CAT gives exceptional autonomy to contentful models of representation, in contrast to Enactive approaches in which meaning is made in the process of interaction. As presented, both theoretical perspectives take some hypothetical fully-realised agent as their actor, when in fact developmentalist approaches that posit infant statistical learning, the constructive affordances of language, and that allow for content to be constructed through the life-course starting from sensory-perceptual basics, circumvent much of the “debate” between these approaches. This chapter presents a host of intriguing ideas, but as a piece of work that can adjudicate the utility of CAT, or propose key empirical methods to do so, it is less successful than the experimental work.

Presentation. Taken as a whole the thesis is very good in its presentation and format. The writing throughout is grammatical and scholarly, though some care could be taken to make messages crisp and clear. I spotted no typographical errors. Figures are clear and graphically legible, consistent throughout, and well described. Results sections are lengthy, but Discussion sections are concise, with high-level commentary directly reflecting on the results just presented. The Conclusion is summative and reflective. In general, the scope of the work, the novelty of the methodological approaches, the commitment to empirical testing of the CAT framework, the computational skills and scholarly knowledge evident, the thesis meets internationally recognised standards for the consideration of PhD. In the British system I would suggest minor corrections pending the outcome of the viva defense, and will be happy to enumerate those after all members of the jury have made their remarks.

My opinion is thus in favour of the defence.

Sincerely

A handwritten signature in black ink, appearing to read 'Fiona Jordan', with a stylized, flowing script.

Fiona Jordan