

Epidemiology of Representations: an Empirical Approach (original title may change)

Abstract

Recent years have seen several attempts to unify cognitive science and social science. The fields of Social cognition and Cultural evolution, involving an increasingly diverse range of disciplines, have emerged as promising approaches over the past decade. My thesis is concerned with a subject formalised by Dan Sperber in the mid-nineties: in a series of innovative articles gathered in Sperber (1996), the author suggests what is now known as Cultural Attraction Theory, aiming to provide the cognitive and social sciences with a common framework to address interdisciplinary questions. Cultural Attraction Theory starts from an ontology made only of “mental representations” (those from cognitive science) and their expressions in the outer world, “public representations”. By proposing to study the distribution of public representations that circulate in a society, it provides a framework in which knowledge from cognitive science and anthropology can be combined to explore the interactions between evolution and culture (as exemplified in Baumard, André, and Sperber 2013).

Over the last decade, the approach has benefited from several theoretical developments with genuine mathematical models (Claidière and Sperber 2007; Claidière, Scott-Phillips, and Sperber 2014). A growing community also explores these questions with empirical approaches. Artificial transmission chains in the laboratory, for instance, have been used extensively to study iterated language evolution, as Tammariz and Kirby (2016) review. That paradigm has also been used to study the evolution of short audio loops (MacCallum et al. 2012), of risk perception (Moussaïd, Brighton, and Gaissmaier 2015), and of abstract visual patterns transmitted by apes (Claidière et al. 2014). Another approach is the meta-analysis of large numbers of anthropological or historical works on a given subject to rebuild the evolution of a representation as it happened. This technique has been used by Morin (2013) in his study of how painted portraits change over the centuries, and by Miton, Claidière, and Mercier (2015) in their examination of the practice of bloodletting. A third approach crawls online content and communities in order to study the spread and propagation of representations in human networks. While earlier works were based on atomic propagation and exposure models where simple entities such as URLs and innovations were the central object (see Cointet and Roth 2007 for a discussion), this stream of research is increasingly modelling linguistic representations as deep objects with complexity of their own, improving on simpler virus-like models. Several works have now studied large quantities of meaningful sentences, showing that their propagation can depend heavily on social context (Bakshy, Karrer, and Adamic 2009), semantic content and grammatical style (Danescu-Niculescu-Mizil et al. 2012), as well as on competition between items (Weng et al. 2012).

The wide array of disciplines studying these complementary questions, and the variety of techniques used in the process, testify to a major obstacle: collecting relevant data in usable amounts to analyse cultural evolution is challenging. The works cited above develop several strategies to face the problem, yet must invariably leave aspects of the question aside: transmission chains usually operate on very simple representations; recompiling historical and anthropological works uncovers trends with many explanations

competing for causality; models of online content propagation overlook cognitive levels of explanation by and large.

The guiding rationale for my thesis is the following: by taking advantage of current computing and web technology, and increasing interdisciplinarity, one can recombine the advantages of these different techniques into approaches that expand the range of questions available to empirical studies of cultural evolution. In the process, matters which had until then remained at the theoretical level become concrete problems that can be challenged or must be faced to make progress. In my work I focused on one particular type of linguistic representations: short written utterances, up to a few sentences long. These are both widely available for empirical study — as they are widespread in online social network data and relatively straightforward to collect in controlled experiments —, while at the same time extremely varied and versatile.

do this in three chapters. the first are detailed case-studies. the third is the development of the problem that we face for the next steps.

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