Institutions as Mechanisms of Cultural Evolution: Prospects of the Epidemiological Approach

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Abstract

Studying institutions as part of the research on cultural evolution prompts us to analyze one very important mechanism of cultural evolution: institutions do distribute cultural variants in the population. Also, it enables relating current research on cultural evolution to some more traditional social sciences: institutions, often seen as macro-social entities, are analyzed in terms of their constitutive micro-phenomena. This article presents Sperber's characterization of institutions, and then gives some hints about the set of phenomena to which it applies.

Culture evolves through the advent of cognitive causal chains, which span across individuals and their environment, and which distribute mental representations and public production in the population and its habitat. Institutions are characterized by the specific causal chains that distribute representations. These chains include representations that cause the recurrence of a series of events and thus regulate the distribution of a set of representations to which they themselves belong. Saying that some cultural phenomenon is an institution is, in this theoretical framework, explaining that some representations that are part of the cultural phenomenon cause it to endure.

This technical characterization applies to what is usually understood as institutions, from marriage to money. It also opens the way for the analysis of complex phenomena in cultural evolution, such as the maintenance of cultural niches and the distribution of labor.

Keywords

cultural epidemiology, cultural evolution, institutions, regulative representations, Dan Sperber

The processes of biological evolution have lately been shown to include many factors other than the transmission and selection of genes. Niche construction and phenotypic plasticity, for instance, play an important role in evolution (see, e.g., Odling-Smee 2003). Cultural evolution is also a process that involves a rich set of phenomena, some of which may be specific to human behavior and cognition. This is what Sperber has been pointing out, arguing that the study of the causes of cultural evolution should take into account the psychological and environmental factors that determine the distribution of representations in a population of individuals and its habitat. In particular, he has argued that memetics (Dawkins 1982) was a misguiding simplification of the processes of cultural evolution, because cultural transmission cannot be reduced to a copying process. Sperber (e.g., 2000) has mainly focused on the psychological factors that stabilize the distribution of representations, emphasizing the constructive cognitive biases in cultural transmission. But his criticism of memetics is also to be understood as an invitation to continue studying the "peculiarities of cultural propagation" (Sperber and Claidière 2006: 20). While population thinking provides a good means for naturalistically analyzing cultural phenomena, the further assumption that selective retention is the unique mechanism of cultural evolution is false. Sperber and Claidière (2006: 20) write:

Cultural propagation . . . is achieved through many different and independent mechanisms, none of which is central and none of which is a robust replication mechanism. Looking to biology for fine-grained analogies between biological and cultural evolution may be a source of insights but it should not take precedence over looking to the cognitive and social sciences for a better understanding of the actual mechanisms and processes involved.

Looking to theories in cognitive science, Sperber has emphasized the relevance of the work on evolved domain-specific competencies, which are causally implicated in the process of cultural transmission. What about the relevance of the social sciences? A priori, the study of cultural evolution needs not start from scratch, since it has been the topic of investigation of the social sciences, which have accumulated knowledge and know how. Cultural evolution is based on social interactions, and these social interactions are partly determined by the social structures in which they take place. Richerson and Boyd (2005: 8) recognize the importance of these facts when they write: "Individual psychologies may interact in interesting and complex ways, and we have to be careful to make sure that such structure finds it way into our theories [of cultural evolution]."

Social scientists have investigated both social interactions and structures. Yet, current frameworks for the study of the evolution of culture, designed to naturalize the social sciences,[1] are often at odd with traditional theories of "the social." Bringing the results of the social sciences to bear on current work in cultural evolution is not an obvious task. The title of this article, however, is meant as an enticement in that direction: social scientists talk a lot about institutions, but current models of cultural evolution accord little explicit attention to them.[2]

Institutions have been the subject of attention in models of gene-culture coevolution, where institutions provide the niches: constructed environments that change the selective pressures for biological evolution (e.g., Bowles et al. 2003). For instance, "variance-reducing institutions," such as monogamy and food sharing among non-kin, can suppress within-group competition and enable group selection, which in turn allows the evolution of biological bases of altruistic behavior. In these studies, institutions figure in the explanans of accounts of biological evolution. Institutions can also be the explanandum, as when Richerson and Boyd (2005: 229–235) explain how "tribal social instincts" ground and shape modern institutions.

Institutions, however, also have an effect on cultural evolution, in the sense that they can determine the distribution of cultural items in the population. Institutions, I want to argue, constitute mechanisms of cultural evolution.

An Operational Characterization of Institutions

In the social sciences literature as in lay usage, the term "institution" covers a large set of phenomena. It refers to social constructs, which traditionally include marriage, money, established customs, and organizations founded for social purposes. Institutions are thought as being both culturally relative and largely independent from any particular individual's action. They are thought of as social structures or mechanisms that implement a social order. In the New Institutional Economics, institutions are social constraints on (economic) behavior, which takes the form of legal rules or social norms; institutions define the structure of incentives and thus constitute the "rules of the game" (North 1990).

At first sight, the notion of institution implies an ontological commitment to social entities, which does not immediately comply with the naturalistic goal of current models of the evolution of culture (see Note 1). Moreover, "institution" is used to characterize a wide variety of social phenomena, and it could be concluded that this large extension of the word does not recover a type of phenomena that is worth of any dedicated theorizing. The temptation is then to explain away institutions as entities that belong to folk sociology: there is, in the last analysis, nothing other than transfer of information among individuals, flow and transformation of representations and production of material artifacts and public behavior.

Another possibility, however, is to try to grasp what is meant by "institution" in the terms of the theories of cultural evolution, using a technical characterization. The theoretical strategy consists in specifying a characterization of institutions that is operational—i.e., that furnishes some criteria

for singling out and analyzing social phenomena as being institutions, or "institutionalized"—and that grasps as much as possible what is usually meant by "institution." This strategy has at least two advantages. First, it translates a common understanding of social phenomena into a specific scientific problem and its consequent research agenda. Research can then illuminate what is usually meant when talking about institutions. Second, it could provide to studies in cultural evolution a means for integrating, and thus benefiting from, work in the social sciences that either focus on institutions with their own analytical terms, or take the social nature of institutions for granted.

Barnes (1983), Searle (1995), and Sperber (1996) have proposed operational and sufficiently adequate characterizations of institutions. Their shared underlying idea is that institutions are social mechanisms that include retroactive action: institutions include the cause of their own maintenance in time. The common trait of the otherwise diverse phenomena that are usually thought of as institutional is the inclusion of a social mechanism that has some effect on itself and that results in self-maintenance. Furthermore, Sperber's characterization is tailor-made for the study of cultural evolution. Relying on it and on the epidemiology of representations (on the basis of which Sperber's characterization is spelled out), I will argue that explaining institutions away is neither necessary nor desirable to account for the evolution of culture.

The epidemiology of representations is a theoretical framework for the naturalistic study of cultural evolution. It questions how mental representations and public productions are distributed the way they are, and what are the causes of the distributions. Public productions are "any kind of object in the environment that humans can produce and perceive": bodily movement, utterances, written symbols, works of art, tools, etc. Public productions include public representations, which are productions that are intended to generate mental representations in the people that perceive them. Mental representations are biological states or events in individuals' bodies, which are individuated by psychologists in terms of their semantic properties. With this naturalistic ontology, Sperber states: "widely distributed, long-lasting representations are what we are primarily referring to when we talk of culture" (Sperber 1996: 57). The epidemiology of representations seeks to explain cultural phenomena in terms of the mechanisms through which representations stabilize in a population, and thus qualify as cultural. These mechanisms are implemented in cultural cognitive causal chains, which are defined in three steps (Sperber 2001: 304):

Cognitive Causal Chain: A causal chain where each causal link instantiates a semantic relationship.

Social Cognitive Causal Chain: A cognitive causal chain that extends over several individuals.

Cultural Cognitive Causal Chain: A social cognitive causal chain that stabilizes mental representations and public productions in a population and its environment.

Social cognitive causal chains can stabilize representations when they involve many people in time and space and produce representations with similar contents. The telling of a tale from parents to children across generations is an example of a relatively simple cultural cognitive causal chain. Other chains may be more complex and involve many different representations related in different ways, such as the cultural cognitive chains that constitute institutions.

Sperber (1996: 76) characterizes an institution as "the distribution of a set of representations which is governed by representations belonging to the set itself." This characterization enables "unpacking" institutions, as macrosocial entities, in terms of microphenomena. It leads to the description of the causal chains that are constitutive of institutions: cultural cognitive causal chains which distribute, among others, regulative representations that regulate the distribution of all the representations and all the public productions (i.e., practices and artifacts) involved in the institution.

Sperber's examples of institutions are French civil marriage (1996: 29), the Malinowski Memorial Lecture (1996: 76) and a Chrismas tale (2007: 262). French civil marriage, he explains, involves representations about how the marriage ceremony is to be performed, as included, for instance in the "Code Civil." Then, there are representations about particular individuals, say Pierre and Marie, being married. These are produced when the civil officer pronounces Pierre and Marie united by marriage, and when this original representation is restated by people telling that Pierre and Marie are married. The Malinowski Memorial Lectures are yearly lectures delivered at the LSE by speakers chosen for their contribution to the field of anthropology. The lectures are regulated through representations about the invitations to be sent to a speaker and an audience, representations specifying the course of events that constitute a particular Malinowski Lecture—where the lecture can take place, how long it must last—and representation about the ensuing publication of the lecture given by the speaker. A tale can propagate solely because people remember it well and like to tell it. The propagation of a Christmas tale, however, is (also) constrained by a social norm: it must be told at the eve of Christmas. If the distribution of a tale implicates a regulative representation that prescribes when the tale must be told, then we have an institution.

Institutions involve at least two levels of representations: a higher level of regulatory representations and a lower level of representations whose content and distribution is in accordance with regulatory representations. In the above examples, higher-level representations are representations about some course of action, such as the representations regulating the marriage

ceremony, prescribing the locations, the things to be said, etc. More generally, higher-level representations describe types of lower-level representations, practices, and artifacts, and the conditions under which versions of them can be produced and distributed (Sperber 1996: 30). Higher representations need not represent the institutions themselves, and most institutions are not comprehended by any single individual.

Understanding the role of institutions in cultural evolution then consists in describing the causal chains that link the mental representations and the public productions of the institutions together, and accounting for the causal effect of the regulative representations. For instance, regulatory representations often have some normative and prescriptive content, as in the Code Civil, which prescribes a course of action for the ceremony and the duties and rights of married couples. It is by complying with such prescriptive representations that people produce again and again the social cognitive causal chains in accordance with the prescriptive regulatory representations. However, regulatory representations are characterized by their regulatory effect rather than by their regulatory content. Some representations can have prescriptive regulatory content without regulatory effect, as when a political scientist explains how things should be done, but does not have the sufficient authority or power to get his prescriptions implemented. Reciprocally, some representations can have regulatory effects without preliminary explicit prescriptive content; this is the case with the fundamental institution that money is. Money can function as money because tokens are thought to be advantageously usable in economic transactions. It is the sufficiently large distribution of this representation that has regulatory effect: when a sufficiently large number of interacting people use some tokens as means of economic transaction, i.e. as money, then the tokens can actually function as money. Thus, the regulative content of beliefs about economic transactions and money tokens coevolve with the distribution of the

beliefs. Understanding the role of institutions in cultural evolution, I would add, also implies looking at the larger cultural consequences of their existence on the evolution of culture (see Figure 1).

The Cultural Effects of Institutions

Institutions are ecological factors of cultural evolution, in the sense that it is the specific distribution of some representations in the environment that accounts for the further distributions. But of course, institutions are also based on psychological facts such as the human ability to understand instructions and to collaborate. The causal power of representations regulating institutions depends in part, therefore, on psychological factors. Moreover, the causal power of these representations always only *partially* accounts for the maintenance of the institution through time. A belief, for instance, can be cultural (i.e., well distributed) because of several causes, its institutional character being only one of them. There can be psychological factors such as the belief being easy to remember, and also ecological factors such as the people being interested in the maintenance of the institution having coercive material power.

Representations of the life of Jesus are distributed both because there are salient, memorable events in the story of his life, and because there are several regulative representations specifying means of distributions of the representations—e.g., reading some passage of the New Testament during mass. Beliefs are more or less institutionalized in the sense that they depend more or less on instituted means for their propagation. Sperber (1996: 97) notes that mathematical beliefs need large institutional support in order to be distributed, because their diffusion "meets extraordinary cognitive difficulties." Yet, psychological factors remain essential because the conviction of the truth of the mathematical beliefs, which is why mathematicians hold the beliefs, is the result of their understanding—a psychological process. More generally, cultural phenomena are more or less institutional dependent on the causes of their distribution: they are institutional to the extent that the self-maintaining processes described in the previous section accounts for the distribution.

Saying that some cultural phenomenon is an institution is, in this theoretical framework, explaining one of the main causes of its existence: the phenomenon exists because some representations that are part of it cause it (partially, but significantly) to endure. There is no a priori constraint on the content of institutional representations, although, a posteriori, it may appear that certain types of representations tend to be more institutionalized than others. For instance, the distribution of most perceptual beliefs does not rely on institutions. With Sperber's characterization of institutions, it is tautological to say that institutions have an effect on cultural evolution. The real, empirical, question is how much of cultural evolution
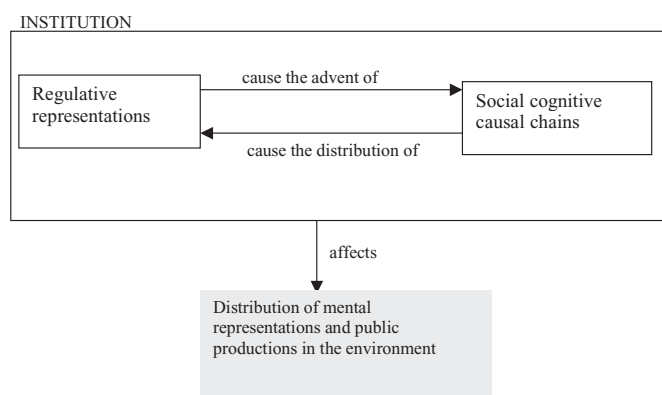

INSTITUTION

Regulative representations — cause the advent of → Social cognitive causal chains

cause the distribution of

affects

Distribution of mental representations and public productions in the environment

Figure 1.
Institutions as social cognitive causal chains, which distribute representations through the regulatory effect of representations included in the chains.

is due to institutions. How much of culture can be accounted for in terms of self-maintaining processes? Another important question is the *adequacy* of the technical criterion of self-maintenance for characterizing institutions: does it eventually apply to the cases that we usually take to be institutions?[3] Here are some preliminary considerations that suggest that the epidemiological approach to institutions is both adequate and has explanatory power.

The role of regulative representations, including representations with normative content, is not accounted for in the models of cultural evolution that focus on imitation. Yet, people marry the way they do not solely because they imitate others, but also, and maybe more importantly, because they comply with a set of procedures that is specified by other representations. Money is among the most important cultural representations, and it is characterized as a social institution: the tokens that constitute money are valuable only because of the institutional fact that they can be used to acquire valuable things. The institution arises not only because people do as the others do. People use money not solely because they imitate the people that have done so, but because they think that money is valued by those with whom they have economic interactions. Here again it is the regulative power of a mental representation—"the others value money"—that operates. Institutions produce and distribute many of the typically cultural representations: marriage and money are by themselves examples worth of great attention. Contrary to mechanisms of imitation, which cause homogeneous distributions of representations, the cultural distribution characteristic of institutions is differential: "the distribution of some representations in certain ways causes other representations to be distributed in other ways" (Sperber 1996: 76).

Institutions stabilize representations, and provide the guarantee of their own stability. This can be seen in the legal system: representations of incentives are being distributed— e.g., "murder leads to imprisonment"—and their institutional support (the state administration) provides the guarantee that the representations are actually informative about the expected payoffs of possible actions. A legal system is an institution: it includes regulative representations of the courses of actions to take in different cases (laws and law enforcement procedures), and it includes representations that regulate the distribution of representations (e.g., the idea that ignorance of the law is no defense to criminal prosecution and the proliferation of legal experts; the obligation to have a trial before an accused can be judged guilty and the recurrence of trials).

The epidemiological approach to institutions has some affinity with the philosophical literature on convention (starting with Lewis 1969), where conventions are characterized as means through which coordination is achieved. For instance, representations carrying information about how to solve a co-ordination game (e.g., by informing about how others did coordinate in the past) can have regulatory effects and stabilize a type of behaviors. Cultural epidemiology elicits a causal and empirical approach to conventions, which have been analyzed essentially in terms of rational solutions to coordination games.[4]

In evolutionary biology, the construction of parts of one's environment has been coined niche construction; the term has also been adequately applied to humans' construction of their environment (Odling-Smee et al. 2003, Ch. 6; Sterelny 2003, Ch. 8). Institutions are such constructs, social constructs, which provide a relatively stable environment—they are niches. They determine the development of individuals and their situated behavior by providing regularities and affordances (action possibilities). For instance, an employment generally comes with its specific tasks, tools, and methods. These provide a relatively stable environment, which is more or less strongly regulated, and thus institutionalized. Such institutional niches can constitute the essential environment of workers as creative as mathematicians. The practice of mathematics is constrained and enabled by institutional answers to questions such as: What are the mathematical problems to deal with? What are the tools to use (pen and paper, rulers and compasses, computers)? What are the accepted proof methods? (Heintz 2007, Part 3). In New Institutional Economics, institutions are likewise taken as the framework within which, and through which, economic actors decide (North 1990).

Institutionalization is a common mode of fixing parts of the cultural environment. Many cultural particularities are stabilized partly because they are used as means for identity formation. There is, in these cases, a process of self-maintenance: people adopt the cultural features to manifest their identity, and the identity itself exists because people have adopted the cultural features. Some institutions regulate much more than the distribution of their constitutive representations. Systems of reputation are such institutions. For instance, the modes of attribution of prestige and visibility to scientists and their work are institutionalized in journals' reviewing processes and other assessment procedures. In turn these reputation systems constrain and structure the flow of scientific representations. Institutions can also regulate social structures, including the distribution of labor. To take scientific institutions as example again, the disciplinary divide of the sciences distribute specific cognitive tasks to scientists. They regulate specialization, the acquisition of expertise and eventually the distribution of cognitive labor. Institutions seem to be pervasive in societies, and they may intermingle in more or less complex ways—institutions can regulate the production of other institutions, there can be hierarchies of embedded institutions, etc.

Conclusion on the Multiple Mechanisms of Cultural Evolution

Accounts of institutions have their own place in a theory of the evolution of culture. Institutions are constituted by specific types of cultural cognitive causal chains, which distribute representations in a self-regulated manner.

Institutions figure among the multiple mechanisms of cultural evolution. The social sciences' insights on institutions can bring some understanding about cultural evolution, which shall help go beyond the simplifications of some Darwinian models. Sperber has much emphasized the role that psychology must take in any account of cultural evolution. In this article I have drawn attention to another aspect of Sperber's work, which is, I believe, not yet sufficiently exploited: its opening to the work of the social sciences (including the insights from traditional theories). Cultural epidemiology enables integrating findings from psychology and the social science, through a population-thinking theoretical framework. The goal is to exploit the framework so as to make the most of both disciplines—psychology and the social sciences—for explaining the evolution of culture.

Notes

1. This is especially true of Sperber's epidemiology of representations (1996, Ch. 1), but it also characterizes Richerson and Boyd's (2005: 5) notion of culture as information acquired through social transmission: Macro-social entities do not figure as explanans. Some other works on the evolution of culture may appeal to social entities in a more holistic fashion.

2. The neglect of institutions is indicated by the fact that "institution" does not figure in the index of major books on cultural evolution such as Cavalli-Sforza and Feldman (1981), Boyd and Richerson (1985), Blackmore (1999), Dunbar et al. (1999), or Levinson and Jaisson (2005). "Institution" is also absent from books that consider the impact of culture on human cognition such as Tomasello (1999) and Sterelny (2003). "Institution" appears in the indexes of Sperber (1996) and Richerson and Boyd (2005), but this adds up to less than ten book-pages on the topic! New Institutional Economics and Evolutionary Economics are research fields in which both institution and cultural evolution are central, but their research is not yet well integrated with theories of cultural evolution and does not include a firm exemplar of what an institution is. Searle (2005: 1) thinks that "in the institutional literature there is still an unclarity about what exactly an institution is."

3. For instance, the evolutionary economist Ulrich Witt (2003: 220) defines an institution as "a unique behavioral regularity spread out among individuals or a pattern of diverse, but coinciding, possibly even mutually dependent, behavioral regularities. It is displayed whenever the involved individuals are faced with the same constituent situation of choice". This definition seems to encompass too many phenomena: for instance, people living where cars are driven on the right tend to look left when they cross a street, but this behavior is not an institution. Other behaviors can spread through cultural transmission without being institutions; e.g., superstitious practices such as not walking under a ladder.

4. Cultural epidemiology is "infra-individualist" (Sperber 1997): rather than analyzing the reasons that could be held by the individuals for their decisions, cultural epidemiology focuses on the actual cognitive processes (specifying input and output) that lead to behavior. It is thus distinct from rational choice theory or methodological individualism.

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