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Why a deep understanding of cultural evolution is incompatible with shallow psychology

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Human, cognition, interaction, and culture are thoroughly intertwined. Without cognition and interaction, there would be no culture. Without culture, cognition and interaction would be very different affairs, as they are among other social species. The effect of culture on mental life has always been a main concern of the social sciences and, after a long period of almost total neglect, it is more and more taken into consideration in cognitive psychology. The effect of cognition, and in particular of the ability to attribute mental states to others, on interaction has become a important topic of investigation in developmental and social psychology. Little attention, on the other hand, is paid to the effect of cognition on culture. All would agree, of course that the human mind is what makes human culture possible. Quite generally, however, the mind is seen as a mere enabler of culture, a pure opportunity with no constraints attached, nothing that might contribute to shaping, or at least to biasing cultural contents.

Against this neglect of cognition, I will argue that understanding the mind is doubly important to the study of culture. Psychological considerations are crucial both to a proper characterization of what is cultural and to a proper explanation of cultural phenomena.

Most anthropologists may be too savvy to still talk of the mind as a “blank slate”, but they too often meet any discussion of psychological factors in culture with a blank stare. Most evolutionary theorists who see cultural evolution as an analogue of biological evolution by natural selection postulate rather than investigate the few particulars of the human mind

that may be relevant to them. They are too often content to assume that human capacities for imitation and communication are reliable enough to justify treating cultural items as replicators.

Some evolutionary theorists interested in gene-culture co-evolution have however recognized the relevance of psychological factors involved in decision or preference of a kind typically studied by social psychologists. Boyd and Richerson and their collaborators in particular have investigated biases in cultural transmission based, for instance, on preferences for more frequent traits, or for traits possessed by successful individuals (Boyd and Richerson 1985, this volume; Richerson and Boyd 2005). Other researchers (e.g. Atran 1990, 2002; Boyer 1994, 2001; Hirschfeld 1996, Sperber 1996) have focused on the role of domain-specific cognitive mechanisms in cultural evolution (see also Tooby and Cosmides 1992). The difference between Boyd and Richerson's approach and ours is, I believe, one of emphasis rather than a general disagreement. Still, cognitive factors – and hence deeper psychological levels than those involved in preferences – do deserve emphasizing, because they are crucial to the kind of fine-grained explanation of cultural facts that anthropologists rightly seek to provide.

Representations and cognition

Cognitive psychology and cultural anthropology deal with representations (whether or not the word is used) in the broad sense where a representation is whatever carries meaning or content. Can this broad notion of representation be made precise enough to help bridge the gap between the cognitive and the social sciences? Here is a way to go.

Something (a brain state or an artifact for instance) is a representation if it is produced by some information processing device (a mental mechanism, an individual, an organization, or a robot for instance) so as to contain information about some event or state of affairs, information to be used by some other cognitive device (or the same device at a later time). The notion so understood applies equally well to mental representations inside people (or other animals, or intelligent robots) and to public representations, i.e. artifacts

such as utterances or pictures produced to communicate among people. This notion does not presuppose that a representation must have internal structure, let alone language-like articulation. It does not impose any condition on the spatial and temporal location of representations, continuous or fragmented, inside or outside brains (other than what follows from the fact that representations are produced and used by cognitive devices and therefore must be within their reach – they don't just hover in social space).

Here are a couple of examples of representations so understood. It has recently been discovered (Rizzolatti et al. 1996) that specific neurons (so-called "mirror neurons") in the F5 area in the premotor cortex of macaques discharge when and only when either the monkey grasps a piece of food or observes the same action performed by another individual. This activation represents (in the sense intended here) the action of grasping a piece of food: it is produced by cognitive mechanisms of perception or motor control; it contains information about the occurrence of certain kind of event; it has the function of making this information available to other cognitive mechanisms in the individual that may be involved in prediction, coordination, or competition. When Joan, asked where is the nearest bus stop, points in a certain direction, her pointing represents the direction of the nearest bus stop: it is produced by a chain of cognitive mechanism linking her understanding of the question, her knowledge of the location of the nearest bus stop, and her ability to produce interpretable gesture; it contains information about the direction of the nearest bus stop, and it has the function of making this information available to the person who asked for it.

This broad notion of representation dovetails with a broad notion of cognition. Cognition broadly understood refers to a set of processes that have as a function to secure specific 'content', or 'semantic' relationship between their inputs and their outputs. Some semantic relationships (e.g. entailment, contradiction, synonymy, similarity of content) obtain among representations. Other semantic relationships (e.g. truth, fulfillment) obtain between representations and what they are about, i.e. events or states of affairs. By this definition, cognitive processes must have representations as input and/or as output.

Perception has the function of realizing a true-of relationship between a distal stimulus and the mental representation that identifies this stimulus. For instance, Ann's perceiving that the doorbell is ringing is both caused by the ringing of the doorbell and is true of that event. Inference has the function of realizing a follows-from relationship between two sets of representations, its input premises and its output conclusion. Ann's inferring from the ringing of the doorbell that someone wants the door open is a causal process that takes as input the general representation that what normally causes doorbell to ring is the action of people wanting the door open and the specific representation that the doorbell is ringing. Remembering has the function of realizing a near-identity-of-content relationship between two representations, distant in time, of the same event or state of affairs. Ann's remembering that she had ordered a pizza has among its causes her having mentally represented her action of ordering a pizza at the time at which she did so, and produces a representation similar in content to that earlier representation. Motor control has the function of realizing a fulfillment relationship between a mentally represented goal and the effect of an action. Ann's opening the door is both caused by her goal of opening the door to the person presumably delivering the pizza, and fulfills that goal. This matching of causal and semantic relationships is what characterizes cognition (and explaining step by step how this matching is realized can be seen as the central goal of the cognitive sciences).

Cognitive Causal Chains (CCCs) and Social Cognitive Causal Chains (SCCCs)

Since a representation, to be a representation, has to be produced by a cognitive process and used by another one, there cannot be such thing as an isolated atomic cognitive process. Every cognitive process has, as its input and/or output, the output and/or input of one or several other cognitive processes.

Cognitive processes are linked to one another in causal chains (that can branch in complex ways). I call such chains Cognitive Causal Chains, or **CCC**s for short. The chains of events that goes from the perception of the doorbell ringing and the memory of having ordered a pizza to the action of opening the door to the person delivering the pizza is an

example of a CCC. Cognitive psychologists typically don't look at a full individual CCCs but work on only one type of link in such chains: perception, memory, inference, or motor control for instance. Still, their work helps us understand CCCs that are going from the stimuli of individual perception to the immediate outcome of individual actions. Cognitive processes are not however limited to individual processes, and nor are CCCs.

What makes a process cognitive is that it has as its function to produce an output that stands in a specific content relationship to its input. This includes not only processes in the brain but also interactions between the brain and the rest of the body, between organisms or artifacts and their environment, or among organisms and artifacts. Much of this and more has been convincingly argued and illustrated by defenders of the "distributed cognition" approach (in particular Hutchins 1995, this volume).

Chains of cognitive processes can extend across individuals and have a social character. In the simplest cases, the behavioral output of some individual's CCC may serve as a perceptual input for other individuals' CCCs and link them in a single Social CCC or **SCCC** for short. Here are two rudimentary examples.

Mary, Peter and Paul are walking in a single file. Mary is leading the way, followed by Peter, followed by Paul. Mary's steps, then, have not only the function of carrying her in a certain direction but also that of indicating to Peter where to tread, and Peter's steps have the same function vis-à-vis Paul. The CCC that controls Mary steps extends through Peter's perception and decisions to Peter's steps and similarly from Peter's to Paul's. In other terms, the coordinated action of Mary, Peter and Paul is controlled by a SCCCs with most of the information flowing from Mary, to Peter, to Paul (there might also be some typically acoustic-channel feed-back information from Paul to Peter to Mary).

Ann calls the local pizza store to order a pizza. John takes the order, pass it to Mary, who prepares the pizza, and to Bill who takes the pizza to Ann's door. Bill rings the bell, Ann's hears the doorbell ringing, remembers she has ordered a pizza, and so on. The individual CCC described earlier of Ann's hearing the doorbell and opening the door could only exist as a fragment of a longer SCCC such as this one. To satisfy her desire to have a

pizza delivered, Ann has to recruit the attention, cognitive processes, and work of others. At the same time, she herself is recruited by Bill to open the door, and, more importantly, by the pizza store as a source of income.

As such examples illustrate, each SCCCs is characterized by a specific flow of information across people, behaviors, and artifacts. It is not just information, however, but also people and objects that are being moved and altered by SCCCs. In fact, there can be no flow of information without physical processes that carry it out. These bodily and environmental changes are as essential to explaining the flow of information as the flow of information is essential to explaining them. A process that has a cognitive function may have other functions as well. It can be simultaneously cognitive and emotional, metabolic, motor, social, cultural, or economic, and the cognitive function need not be the most important one.

Whatever their main function, all SCCCs involve processes inside individual organisms, processes in the environment of organisms, and processes at the organism-environment interface.

Inside organisms, we find the causal chains that construct, elaborate, maintain, and use mental representations, and that go, in particular, from stimulation of afferent nerve endings to impulses from efferent nerve endings. The links in these causal chains include first and foremost brain and other nervous system processes, but also a variety of other bodily processes.

At the organisms/environment interface we find the production by organisms of a variety of items including events such as bodily movements, and traces or products of these events, in particular artifacts, and the impact of these items on other organisms. To describes all these items (events and objects), I talk of “public productions” (they are “public” in the sense that, unlike mental state and event, they can be perceived by other organisms, not in the narrower sense that they can be perceived by everybody: a whisper in somebody’s ear is public in the sense here intended).

Public productions may undergo changes in the environment that are not, or not wholly, controlled by their producers and users. They may undergo a more or less rapid

decay (quasi immediate for speech, much slower for writings, for instance); they may undergo a development of their own, as do biological artifacts such as domestic plants and animals; they may change in ways related to other environmental changes, as do traps that close on their prey, or measure instruments that indicate past or present environmental conditions. Most of these environmental processes do not have a cognitive function (with some exceptions, e.g. changes in measure instruments) and therefore are not in themselves links in SCCCs, but they are aspects of such links and help explain their effectiveness, their fragility, their penetrability by outside information or by 'noise'.

Cultural Cognitive Causal Chains (CCCCs)

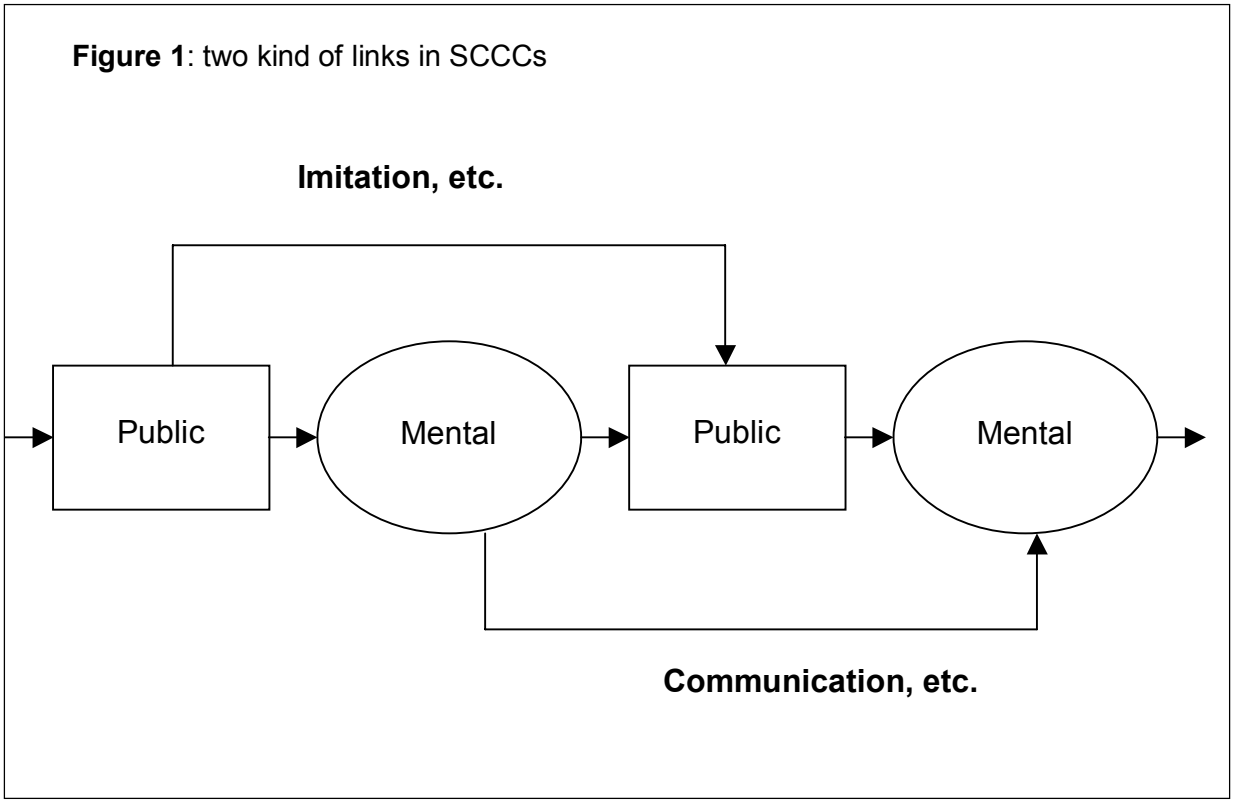
Most SCCCs are relatively short. They involve few people coordinating in the cooperative or competitive pursuit of some goal. In such coordination, information changes as it flows along the chain, according to the stage reached in the pursuit of the goal. More generally, information processed along an individual or a social CCC may be different at every juncture even though, by the very definition of a CCC, it is both causally and semantically connected with information processed at previous junctures. This is no mystery: only some cognitive processes have as a function to preserve in their output the content of their input: remembering, for instance, is a preservative process but hypothesis formation or decision are not.

Some SCCCs do have the function of preserving across individuals the content of mental representations or the form of public productions. A typical example of a SCCC that preserves the content of mental representations is provided by communication. Communication between two people involves two complementary cognitive processes, one of expression and one of interpretation. The communicator expresses a mental representation by producing some public representation. This representation is then interpreted by the receiver, yielding, if all goes well, a mental representation similar enough to the one that had been expressed by the communicator. A typical example of a SCCC that preserves the form of public productions is provided by imitation. An individual observes the

behavior of another individual and mentally represents it in a manner such that she can then exploit this representation to produce herself a similar behavior.

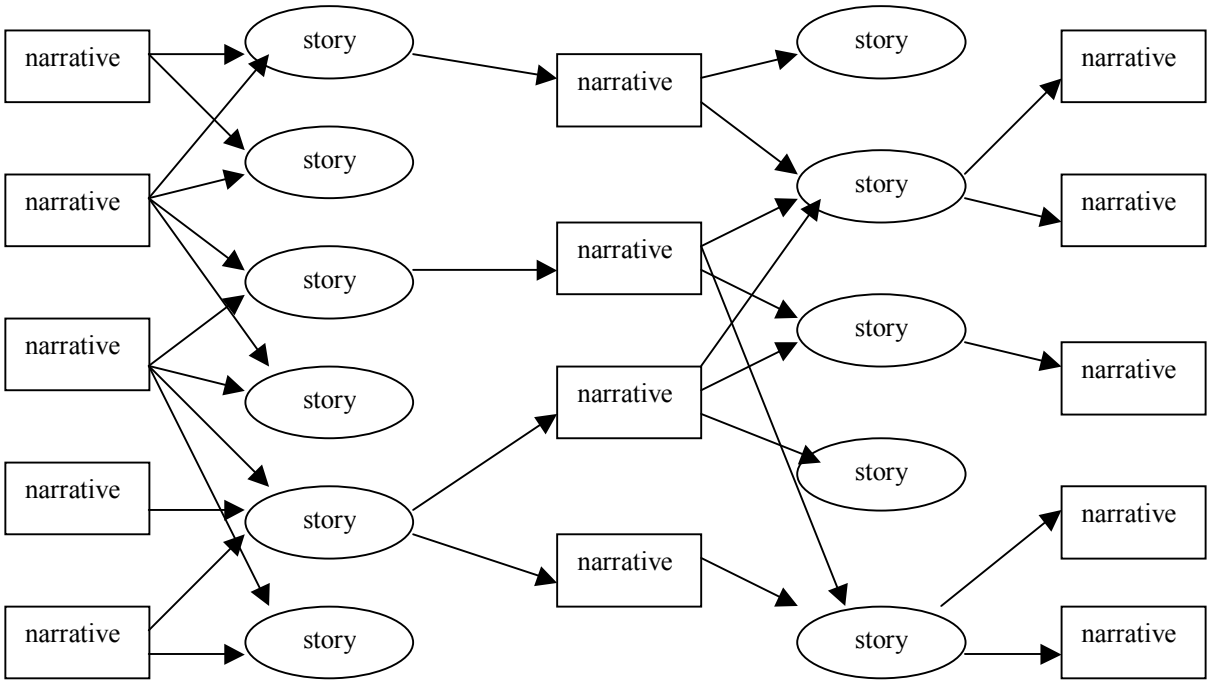
Preservation of mental content and preservation of behavioral form from one individual to another are often linked. Typically, the receiver in a process of communication not only constructs a mental representation similar to that of the communicator, she also acquires the ability to produce a new version of the public representation she has interpreted. Typically, the imitator, in order to imitate, constructs a mental representation of the behavior to be imitated similar to that of the individual he is imitating. (I hedge with "typically" because a receiver's interpretive abilities may not be matched by her expressive abilities, for instance, when communication takes place in a second language well understood but poorly spoken by the receiver; similarly, an imitator may use a mental representation of the behavior quite different from that of the individual he is imitating, as in the case a parrot imitating human speech). Thus imitation and communication can overlap as in fig. 1.

Figure 1: two kind of links in SCCCs



SCCC that have the function of preserving mental content, behavioral form, or both, may extend across many individual and through a social group, distributing throughout this group similar mental representations or public productions. Such representations and productions are cultural and the SCCCs that distribute them are cultural CCCs, or **CCCC**s for short. CCCCs are quite diverse. Fig. 2 presents a simplified fragment of a CCCC distributing a folktale via oral transmission. Some involve large numbers of successive face-to-face interactions, some involve a few one-to-many communications, some involve staged public events such as rituals, some involve fabrication of specific artifacts, and so forth. CCCCs vary in the degree to which they rely on permanent artifactual features of the environment, from books to churches, from musical instruments to the Internet. They vary in the extent to which they are mutually supportive: some extend indefinitely almost on their own, such as the CCCC that distributes the “God bless you!” response to a sneezing. Others, such as those that distribute elements of an ideology (e.g. the dogma of Trinity) or of a discipline (e.g. Cantor’s proof), flourish only in the middle of related CCCCs.

Figure 2: Simplified fragment of the CCCC of a folktale: the content of several public narratives heard over time is remembered as a single mental story and may be retold as a public narrative, contributing to the cultural distribution of the tale.



While the idea that thoughts or practices can be contagious is an old and common one, SCCCs and CCCCs (with the possible exceptions of rumors) are not objects recognized by common sense, nor are they part of the social sciences' toolkit. Notwithstanding, I have argued (1999) that they are what social life is made of, and that things (objects, events, mental states, and so forth) are social to the extent that they owe their properties to their being embedded in SCCCs and that they are cultural to the extent that they are shaped and stabilized by CCCCs. I have suggested moreover that a properly naturalistic approach to social and cultural phenomena centrally involves identifying the causal factors and mechanisms that shape these causal chains and explaining the macro-regularities and changes of social and cultural life in term of these micro-processes. Even though this particular idiom is mine (and, I hope to show, is useful), it is a variant of a more

general type of approach to society and culture that I call “epidemiological” and that is found for instance, even if not under that name, in the work of Cavalli-Sforza and Feldman (1981), Dawkins (1976) and memeticists inspired by his ideas (Blackmore 1999; Aunger 2002), Durham (1991), or Boyd and Richerson (1985).

All epidemiological approaches to cultures consider cultural phenomena as a population of mental and/or artifactual items distributed in a biological population (in particular a human population) and its habitat, and seek to explain the evolving distribution of these cultural items. Epidemiological approaches themselves are forms of “population thinking” applied to cultural phenomena (and discussed under this label in Richerson and Boyd 2005). While all these epidemiological approaches share some basic presuppositions that put them at odds with more standard holistic and anti-naturalistic approaches that are common in the social sciences, they differ in the way they explain the distribution and evolution of cultural items and in particular in the role they give to fine-grained psychological factors in their explanations. I am arguing that a cultural epidemiology that does not interface with psychology makes as little sense as would a medical epidemiology that would not interface with pathology. In particular, postulating that preservative processes in the human mind are reliable enough to explain cultural stability rather than investigating whether they really are is as shallow as would be to postulating without further investigation that all diseases are infectious and carried by only one type of pathogenic agent.

Fidelity and stability

How stable are cultural things? Less than is commonly assumed, especially in the case of “traditional societies,” too often taken to change very little over generations. Cultures are in constant flux, and this is true at all levels, from micro-interactions to societal institutions. Still, nothing is cultural without a modicum of stability over social time and space. What makes some item a token of a cultural type is that it is similar enough to other tokens of the type to be identified as such. Members of a cultural group do recognize different word tokens as being the same word, narratives as being of the same tale, food on their plate as being the

same dish, individual haircuts as exemplifying the same hairstyle, performances as being the same ritual, individual attitudes as expressing the same values, and so on. Of course, all the tokens recognized as being of the same type need not be identical, but their resemblance to one another in relevant respects – even if mere "family resemblance" à la Wittgenstein, even if exaggerated – must be sufficient for this quasi-unanimous recognition to be possible. This relative resemblance of tokens of a type across social space and time gives a measure of the stability of cultural types and of the stabilizing effect of their CCCCs. Some types, e.g. proverbs, are extremely stable; others, e.g. dress fashions in modern societies, much less so (from which we can infer that their respective CCCCs work differently).

How can CCCCs stabilize cultural contents and forms? The answer may seem obvious: CCCCs are concatenations of preservative processes of memory, imitation and communication, and, so the explanation goes, these processes must have sufficient fidelity at the micro scale to bring about the stability we observe at the macro scale. Cultural stability is then seen as the proof of the reliability of human memory, imitation and communication. At this point, students of cultural processes may feel that the inferred high fidelity achieved by these preservative processes is all that is relevant to them. Moreover, if all this is correct, cultural items are indeed replicators (even if, unlike genes, they don't directly generate their replica). Given that these replicators exhibit great variety, and given that the waxing of some (linguistic devices, religious practices and ideas, techniques, fashions, and so on) is at the expense of the waning of others, the three conditions for Darwinian selection of heritability, variability, and competition are met. As suggested by Dawkins and embraced by Dennett, Aunger, Blackmore (see Aunger 2000) and so many others, culture can be described as a process of "memetic" evolution comparable to genetic evolution, with, in both cases selection as the main driving force. The study of the precise mechanisms that make such fidelity possible can be left to other scholars, now or when they will be up to it, just as a population geneticists may leave the details of chromosome replication to molecular biologists.

This attitude is well illustrated in the recent review by Mesoudi, Whiten, and Laland (2004) of arguments in favor of a selectionist approach to culture. They suggest that "our

current understanding of culture is comparable to that attained by biology in 1859" and that, just as Darwin's own ignorance of the mechanisms of biological inheritance did not stop him from successfully developing and applying his theory, what they take to be our comparable ignorance of the mechanisms of cultural inheritance should not inhibit us from applying evolutionary models. They express the hope that some future "cultural 'Watson and Crick'" (Mesoudi, Whiten, and Laland:p.9) will discover the cultural counterpart of DNA. I believe we know enough to know that there is no cultural DNA to be found.

Cultural transmission is achieved not by a single mechanism of replication but by a variety of mental and social mechanisms. These mechanisms are intensely studied and in good part understood. Consider the work done on "imitation" in the past fifteen years (Hurley and Chater 2005; Tomasello and Carpenter 2005). Among the several processes that result in the re-production[2] of a behavior, we now must distinguish (at least) stimulus enhancement, emulation, and, within imitation proper, imitation of behavior and imitation of goal (if the latter can properly be described as "imitation" at all). Work on verbal communication in linguistics, pragmatics, psycholinguistics, and sociolinguistics reveals a great variety of submechanisms interacting in complex ways; non-verbal communication involve yet other mental and interactional mechanisms such as joint attention (see Astington, Clark, Enfield, Gaskins, Gergely and Csibra, Goldin-Meadow, Goodwin, Keating, Levinson, Liszowski, Pyers, Schlegloff, Tomasello, this volume; see also Sperber and Wilson 1995).

If, instead of postulating that they must be faithful enough to explain cultural macro stability, one looks closely at the micro processes involved, what is immediately striking (and abundantly confirmed by experimental work) is that outputs of memory, imitation and communication are quite generally transformations of the inputs, so much so that the rare case where the output is identical to the input are best seen as limiting cases of "zero transformation". Much of these transformations is in the direction of entropy: information is lost in the process of transmission. Part of these transformations is biased so as better to fit the current mental or motor schema and goals of the user. This is hardly surprising. It is not just that imperfection is to be expected. It is, more importantly, that the finality of individual

memory, imitation and communication processes is not to preserve information per se (and even less to preserve it so as to secure cultural stability). Rather a relative degree of preservation of information is a means towards a variety of ends.

When Jill tries to remember what happened at the last council meeting, it is in order better to prepare the coming one, and, for this, all she needs is the parts of the gist of what was said on issues that are likely to come up again. When you read this chapter, you do so in order, not to store in your mind a copy of its contents, but to extract from it what may be of relevance to you. When Peter tries to copy the way in which he saw Henrietta prepare a soufflé, he does so in order, not to duplicate her movements, but to produce at a soufflé to his liking. Only when the goal of preservation is best served by strict replication, as when forging a banknote or dancing in a chorus line, is an effort made to avoid any departure from the model.

To generalize: in preservative processes, information is transformed in two directions: entropy and relevance. Part of this transformation results from the imperfection of these processes, part of it results from their finality. Incidentally, it would be a mistake to assume that transformation towards entropy is always and entirely an aspect of the imperfection of preservative processes: eliminating irrelevant information is a contribution to overall relevance.[1]

Most cognitive processes are constructive. They don't just re-encode input information; rather, they construct new mental representations by drawing jointly on new inputs and on memorized information and by typically going beyond a mere addition of the two. Even preservation of information is to a large extent achieved by processes that reconstruct rather than merely replicate the information to be preserved. Reconstruction is often more efficacious than replication because it can better handle fragmentary or degraded inputs. It is also more parcimonious because it makes it unecessary to register information in full in order to make it available when needed.

Preservative and constructive processes, far from being mutually exclusive, typically overlap. Preservation, and in particular the re-production of cultural information, can be more

or less replicative and more or less reconstructive. Why does it matter? Because replication and reconstruction provide different explanations of stability in chains of re-production, and therefore in culture. With replicative processes, an error of replication at some juncture is preserved in further replications: it becomes the model until the next copying error. If such copying errors are very frequent (as they are in human memory, imitation and communication except that describing them as "copying errors" is misleading, since these are not copying processes), this compromises both heritability and stability.

On the other hand a reconstructive process of transmission can combine transformations at every micro step with macro stability. Why? Because reconstruction, unlike replication, just as it can easily depart from the model, can also easily return to the model even if it had been modified in earlier re-productions. This occurs for instance when in so-called "imitation of goal", the imitator produces an action that succeeds in achieving a goal that the model in fact missed. By not copying the model's actual actions, the so-called imitator of a goal may in fact reconstruct a cultural skill and become better at it than the model. More generally, constructive processes in members of the same population may draw on the same inputs and converge on the same outcome, that is, they may result in the re-production of some cultural representation or practice whether or not they were intended to achieve such re-production.

If I am right, a good part of the explanatory weight in the explanation of cultural stability and evolution should move from mechanisms of inheritance and selection to the mechanisms of contruction and reconstruction and to the cognitive and environmental factors that cause these mechanisms to have converging outputs.

Environmental and psychological factors of stability

Let me start with environmental factors, they are less controversial and will help us put psychological factors in perspective. The effectiveness of public productions as links in CCCCs depends on their respecting, or, even better, taking advantage of environmental constraints. Some of these constraints are very general and help explain cross-culturally

recurring aspects of public productions. Buildings that don't properly respect earthly gravity tend to fall down and are unlikely to stay up long enough to be imitated. Hence all culturally stable architectural forms obey basic physical principles. The domestication of animals is constrained by their biology, and so is their artificial selection. Hence the practice of animal husbandry exhibit strong commonalities across cultures. Other environmental factors are more local. The slope of roofs is influenced by local weather conditions. Llama husbandry differs from camel husbandry not just because the cultures where they are practiced are otherwise different but also because llamas differ from camels; and so on.

Much of the environment which contributes to shaping human culture is itself cultural. The process described by biologists as "niche construction" (see Odling-Smee, Laland, and Feldman 2003) is indeed extraordinary developed among humans. The evolution of cooking is made possible by that of agriculture, the evolution of some forms of hunting by the domestication of dogs, the evolution of furniture by that of housing, the spread of spam by the evolution of the Net, each time novel environments bringing together new opportunities and new constraints.

Here is a couple of simplified illustration of the role of environmental factors in CCCCs. When moving around and away from their settlements, humans have typically followed footpaths. The presence of paths in the environment was an obvious factor in stabilizing patterns of movements and mental representations of space, but the converse is also true. For how are footpaths themselves stabilized? By the erosion caused by people walking the path. Walkers, knowing that a path goes where they want to go, look for the path and follow it and thereby contribute to others following it in turn. Imagine a footpath going first through a sand dune, and then through a narrow pass between rocks. In the sand dune, the path is quite unstable, and many people don't bother to follow it at all, thereby adding to its instability. In the pass, on the contrary, the path, borrowing a natural passage, remains stable. Walkers' behavior on the sand dune exhibits greater variety, but then they converge towards the pass because of this environmental difference. The environmental factors that

affect cultural representations and productions are themselves affected to a greater or lesser extent by these human productions.

Consider, as a second brief illustration, the case of a standard artifact: a pair of scissors. Different users produce, with greater or lesser dexterity and efficiency, movements that are all tokens of the same type. The cultural practice of using scissors is more informed by the physics of the scissors than by imitation. Some people may have had only clumsy people to imitate, and have become scissors virtuosos, and conversely. Again, much of our cultural practices is stabilized by the affordances and constraints of cultural productions.

What is true of environmental factors of cultural stability and evolution is true also of psychological factors: they are important, they are diverse, some are more constraining than others, and they themselves are modified by the CCCCs in which they are involved.

Psychological factors involved in cultural evolution are partly innate[3], partly the result of cognitive development. Human beings are innately equipped with psychological dispositions and abilities that cause them, from birth on or when biological maturation permits, to allocate greater cognitive resources to specific stimuli and to approach them in different ways. For instance infants pay more attention to speech sounds than other noises, and they try and extract from them certain kinds of regularities that are different from the kind of regularities they extract from, say, outdoor noises. For the most part, these innate endowments are learning mechanisms. They have, that is, the function of allowing the acquisition of information about the environment and of further abilities and dispositions that may enrich, complement, or even displace and overturn innate ones. At any time in cognitive development, individuals are processing new inputs with what their abilities and dispositions have become at that time, and not – need one say this? – with just their innate capacities.

Specialized learning mechanisms are factors of cultural stabilization. I have illustrated this claim in other in other writings (Bloch and Sperber 2002; Sperber 1996; Sperber and Hirschfeld 2004) and so have Atran (1990, 2002), Boyer (1994, 2001), and Hirschfeld (1996) (see also Hirschfeld and Gelman 1994). Here I will give just one illustration drawing on the recent work of Shaun Nichols.

Nichols (2004) extends the epidemiological approach to culture by looking at the role affect mat play in stabilizing norms. Not all social norms elicit affective reactions, but those that do are likely to be regarded, ceteris paribus, as more important, and also to be best remembered (the relationship between in particular negative affect and remembering being well established). Nichols proposes that "normative prohibitions against action X will be more likely to survive if action X elicits (or is easily led to elicit) negative affects." To provide empirical evidence for this claim, Nichols looked at Erasmus's extremely influential On Good Manners for Boys (first published in Latin in 1530) to see which of the hundred of norms it contained have survived, and which have become obsolete. There is independent evidence that the Human Mind is equipped with a disposition to regard certain kinds of substances, in particular body products such as faeces or vomit (Rozin, Haidt, and McCauley 2000) as disgusting. Nichols' hypothesis is, more specifically, that the prohibition of actions eliciting such "core disgust" is more likely to survive than other manner norms (Nichols 2004).

Nichols 'hypothesis is not in contradiction, of course, with the common anthropological observation that humans differ in what they consider disgusting and that cultural norms in such matter do vary (e.g. belching is seen as disgusting in some culture and acceptable or even required in others). The idea, rather, is that variation is less likely – or, equivalently stability more likely – when it comes to core disgust. Indeed, it would take even a strong relativist a certain dose of bad faith to claim to be equally surprised or unsurprised by the fact that one of Erasmus's rule: "If given a napkin, put it either over the left shoulder or the left forearm" is obsolete (even though napkins are not), and by the fact that another of his rule, "Withdraw when you are about to vomit," is still very much in force. Less anecdotally, among the actions prohibited by Erasmus, almost all those that elicit core disgust are still prohibited, while only about a third of the actions that don't elicit core disgust still are.

Nichols' work can be naturally expanded by distinguishing more than innate core disgusts on the one hand and relatively variable cultural norms concerning disgusting things on the other. Core disgusts may themselves exhibit some degree of individual and cultural

flexibility, and the cultural forms of these emotions may stabilize in a more profound manner than explicit norms of behavior. For instance, attitudes to bodily odors, found quite disgusting in some culture and not in others, may get fixated before adulthood and therefore evolve more slowly than norms about proper ways of attenuating these bodily odors (with deodorants, perfumes, mouthsprays and so on), regarding which people can change attitude in their life time. The degree to which an innate disposition can be modified by culture and therefore can itself be a source of cultural variability depends on its role in cognitive and affective development. In other terms a richly anthropological perspective has to be associated with a developmental perspective.

Conclusion

Holism in the social sciences starts from the correct coarse observation that everything is connected to everything else, but alas arrives nowhere. Methodological individualism and interactionism have in various ways looked at social life with a magnifier, revealing details and providing novel insights into the bigger picture. I am advocating using also a microscope. Social life is a web of causal chains that are better described not as supra-individual or as inter-individual but as both infra- and trans-individual. Individual- and societal-level observable effects are caused by the aggregation of micro-processes few of which are open to easy observation or introspection. Half of these micro-processes are mental. Thanks to the development of the cognitive sciences, our understanding of infra-individual (or “subpersonal”, see Dennett 1969) mental processes is rapidly changing and growing. In particular, it is becoming clear, or so I argue, that, to an important extent, cognition enables culture through domain-specific constructive mechanisms. Mechanisms of imitation and communication, however remarkable and important in humans, do not yield the kind of heritability that by itself would explain cultural stability. This is why a deep understanding of culture and its evolution is incompatible with shallow psychology.

Endnotes

[1] A striking example of this is provided by the experiments of Van der Henst, Carles, and Sperber (2002). They found that 57% of people with digital watches asked for the time by a stranger in the street, rather than just reading aloud what their watch indicates (a purely preservative process) make the effort of rounding to the nearest multiple of five the time precise to the minute they read on their watch, thus providing a less informative but more relevant answer.

[2] I write throughout “re-production” rather than “reproduction” because I am talking of the new production of the token of a type, whether or not it is achieved by means of “reproduction” in the usual sense of copying.

[3] Cognitive dispositions, like all phenotypic traits, are determined by the interaction, during their development, of genetic and environmental factors. Cognitive dispositions are “innate” to the extent that the environmental factors needed for their development are not themselves cognitive inputs. So, knowledge of English is certainly not innate, but the ability to learn English or any other human language may be, even if this ability might fail to develop because, for instance, of severe nutritional deficits. “Innate” so understood (see Samuels 2002) does not mean determined solely by the genes – nothing is – and does not either mean present at birth (whether development ends intra or extra utero is irrelevant).

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Figure 1: two kind of links in SCCCs

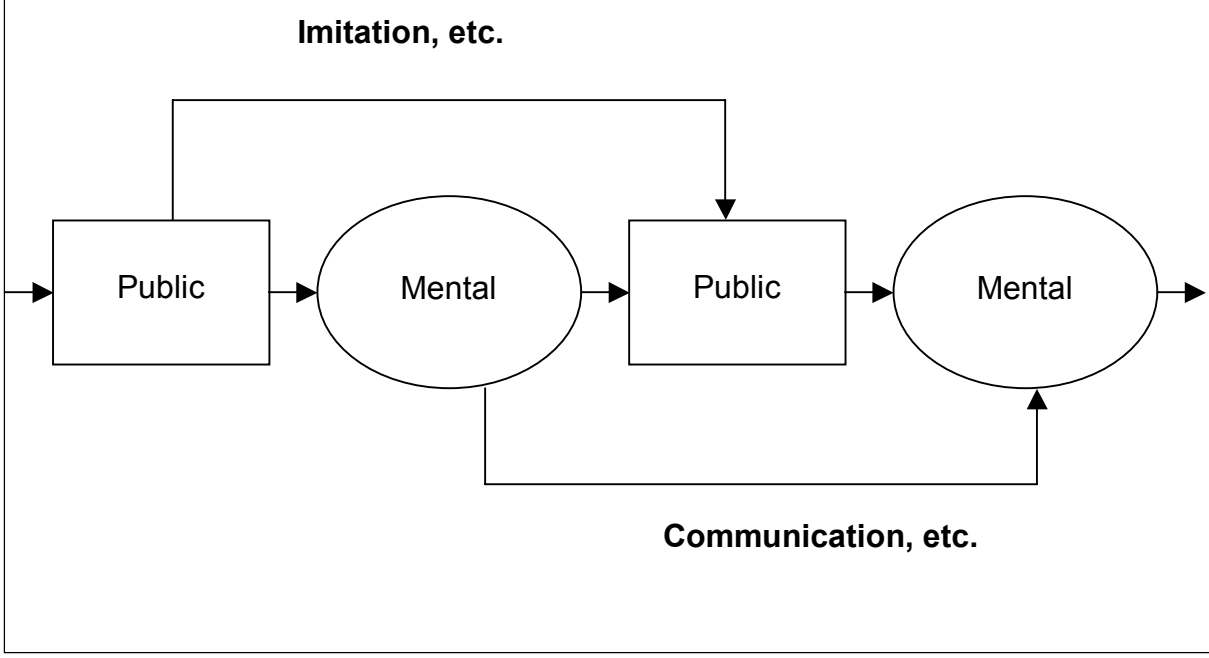

Figure 2: Simplified fragment of the CCCC of a folktale: the content of several public narratives heard over time is remembered as a single mental story and may be retold as a public narrative, contributing to the cultural distribution of the tale.