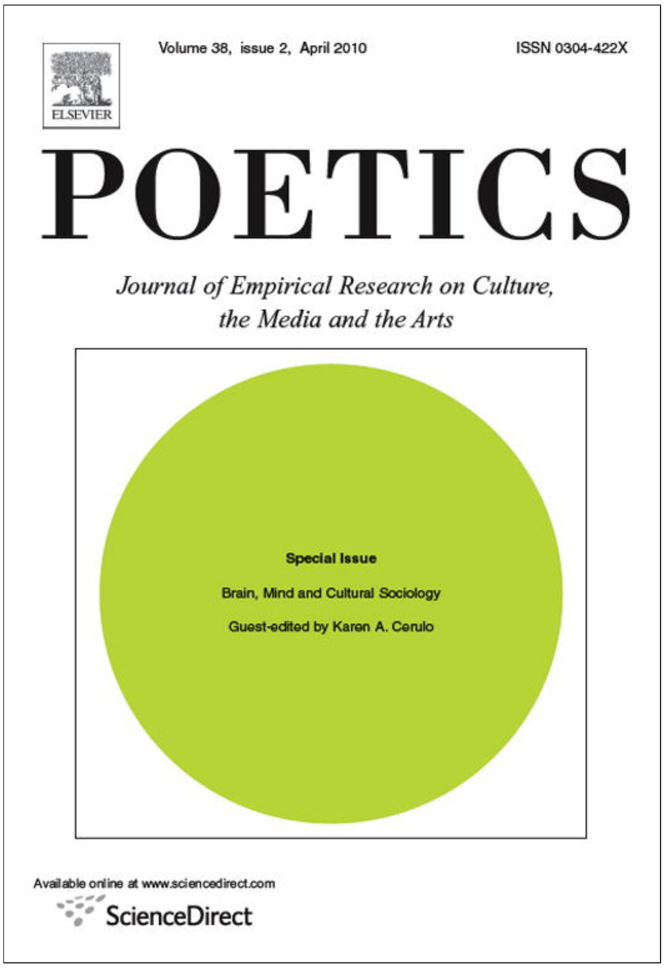
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Life's a beach but you're an ant, and other unwelcome news for the sociology of culture

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Abstract

The sociology of culture has happily been able to get by without any strict definitions of culture, but most of us seem to assume that culture is some sort of complex cognitive web (say of signs or symbols) that is largely shared across persons and mirrored in aspects of their interiority. I argue that this is unlikely, because of what we know about the limitations to our cognitive powers. I present a selective review of such results and make a few arguments for the implications regarding our understanding of culture.

1. The idea of culture as complex web

One of the most delightful things about "culture" as a concept is that it is infinitely plastic. It *can* be narrowly defined, but generally is not, especially in sociology, where culture may mean something like "everything that was here when you were born," or "everything that is human that you can't touch and three-fourths of what you can." If culture includes most of what is recognizably human in the sublunary sphere, everyone can say what they want about it and no one can be terribly wrong. And indeed, one finds very few obviously wrong claims in our approach to culture: we generally talk about the part of culture that we are particularly interested in (perhaps symbols, or values, or material objects, or heuristics), and propose that these are very important, but rarely rule anything else out.

Yet in practice, I maintain, there *is* something wrong with two of our loosely but widely held ideas of culture. These theses are (first) that culture is a complex web of meanings[1] and (second) that the best way to examine these meanings would be to "get into the heads" of actors. Thus we assume that the macrocosm of culture is contained in, or mirrored in, the microcosm of actors.

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[1] There has been a change, as Paul DiMaggio (1997: 264) puts it, from culture as a "seamless web" to one of more "complex rule-like structures." For my purposes, however, the commonalities in these views are more important than the differences.

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Now it is somewhat frustrating that these theses are, if anything, rarely explicated and defended. Most contemporary treatments of the idea of culture-as-a-web-of-symbols are non-committal, reviewing the range of definitions of culture and tending to avoid taking a clear position (see the nice discussions of Wuthnow, 1987; Shore, 1996: 44; for a critique Archer, 1996: 2).[2] These theses, if not defended, are still strongly implied by a great deal of work that is actually done in the sociology of culture, work that involves probing informants as to how they make connections between subjective elements and attempting to reconstruct the culture from the connections they make.

I propose that these two theses—culture as a complex web of meaning and culture as inside the minds of actors—cannot both be correct, for the simple reason that our minds are not good at holding lots of connected things in them. If one wants to define culture as something complex, then it is not going to be inside of people (see Swidler, 2000), because people are extremely simple. I attempt to support this point with an obviously one-sided review of work in other fields, but also with a critical examination of our own understandings. I do not attempt to provide a theory or model of culture, or of how we use culture, but simply try to establish a set of bounds within which any plausible theory should sit. Other articles in this issue, however, do make important contributions along these lines.

2. How complex is social life?

> "As a general rule, people, even the wicked, are much more naive and simple-hearted than we suppose. And we ourselves are, too."
>
> –Dostoevsky

2.1. Not complex or complex knots?

We begin with the complexity of social life. Even if nature is not perceived as a "blooming, buzzing confusion," then social life is a screeching, honking, throbbing mess alternating between suicidogenic boredom and heart-pounding treachery. To properly contextualize a single action to a naive observer should take days and days. The world of our actions certainly must be complex, and since these actions are ours, must not this complexity be in us?

This simple logic seems to lay at heart of much of our self-theory: the complexity of our actions calls for a complexity in the actors. But there are well-understood ways in which simple elements can lead to apparent complexity. Perhaps most pleasant are those associated with fractal patterns. A cauliflower displays a very beautiful and in a way complex pattern, but it is actually generated by some very simple rules involving two spirals. It was Herbert Simon (espec. 1962) who realized that this was the master key to unraveling complexity in social life (and for a recent formulation, see Abbott, 2001). An army, say, is a lot like the cauliflower in that its complexity of organization owes a great deal to repeating the same structural principles at a host of nested levels. This is the same principle that leads coastlines to look incredibly complex and intricate, but to be easily simulated with a three-line computer program.

A second way that complexity arises from simple elements is through interaction. The famous "butterfly principle" is that a set of only three dynamic equations—each one simple and

[2] The thinker most generally associated with this view is Geertz (1973: 89, 92), though Geertz himself emphasized that culture was outside individuals, not inside them. The most explicit recent definition along these lines is that of Sewell (2005: 165f): "Culture may be thought of as a network of semiotic relations cast across society . . ." He proposes, however, that this indicates a generally low level of coherence.

deterministic—leads to behavior of a system that seems to us extremely complex (we call this ''chaos'') (Ekeland, 1988). A related form of complexity has been emphasized by Harrison White (1992). Almost nothing is as simple as a piece of string—it is nearly one-dimensional—and yet almost nothing is as frustratingly complex as a few pieces of string tangled together.

Thus we know that in principle it is possible to have something complex, something like a web, without the things making this up being at all complex. Thus the apparent complexity of our social environment does not imply that there is any corresponding degree of complexity in ourselves.

2.2. *Complex environments or stupid brains?*

Indeed, when we think more clearly, we may realize that the complexity of social life has to be understood as very strong *prima facie* evidence for our fundamental simplicity. To make this point, let us imagine that we are nematode worms. One of these—*C. elegans*—has received a great deal of attention recently as it has become the workhorse of neurological investigation, just as the fruit fly was for disturbing genetic experiments. Now, if we were not only nematodes but in fact nemotodologists by trade—worms who turned all their wormy intelligence towards a complete description of worm life—we would quite probably emphasize the irreducible complexity of the worm mind, worm culture and worm life.

Now the problem is that the neurological system of this little fellow has 302 neurons, and humans have pretty much mapped out the whole thing. Of course, we can't ignore the serious fact that there is still a gap between the mechanical operation of this system and the interior subjective life of the worm; but this interior life must be pretty simple by our reckoning, whatever it is. To us, the nematode brain is simple. To the worm, should he attempt a serious nematodology, it would prove bafflingly complex. Complexity in this sense is not an attribute of environments or objects, but rather a relationship between minds and objects. The environment that strikes one animal as complex may be simple to another.[3]

I propose, then, that our well-founded belief that the riddles of the cultural and social world are too much for us to unravel points to our fundamental cognitive poverty. I go on to review evidence pointing to our cognitive limitations.[4]

3. How smart are we?—Cognitive limitations

Herbert Simon (1996) famously used the metaphor of the ant on the beach to describe human action—although the path taken by an ant seems complex, the ant is in fact quite simple. The complexity of its path comes from the nature of the environment, and not from the nature of the ant. Simon understood this principle to account for our successful behavior given our remarkably bounded rationality. That is, we have severe limitations in terms of what we can remember, what we can process, and our capacity to understand our own processing.

In a justly famous piece, Miller (1956) proposed that we see a common ceiling to our capacity for certain types of cognitive tasks: he argued that different streams of research all pointed to the

[3] For example, knots that humans can easily solve are frighteningly and frustratingly difficult for the chimpanzee (Köhler, 1925 [1917]).

[4] Readers in other disciplines, especially those associated with behaviorist psychology, may have started with an altogether different set of problematic ideas about the mind. They may need to appreciate the complexity and prestructured capacities of human intelligence; just as the simplicity of our minds is relative to the complexity of the environment, so my argument about simplicity is relative to the assumptions of cultural sociology.

conclusion that we could only hold around seven things in mind at a time (for example, telephone numbers that have not been committed to long-term memory), or make seven reliable distinctions (we have a sensory channel capacity of around 2.5 bits) and so on. He recognized that these limits varied greatly by persons and especially with training. Since then, a great deal of work has further explored the range of our various processing capabilities but has not led to rejection of his thesis: the bounds on our generic capacity for domain-free processing are low, although we seem to have the capacity to go orders of magnitude higher for specific tasks.

3.1. Memory

As Miller (1956) stated, we have a rather hard time keeping a number of different things, with which we are previously unfamiliar and which stand in no particular order to one another, securely in our heads. This ''short-term'' memory is where we manipulate things that we are thinking of, storing them temporarily and then forgetting them when the manipulations are over. Just as a computer processor might have only four or five registers in which it keeps a number at any time, committing all others to external memory till needed, so (thought Miller) we seem to have something vaguely similar—a small number of slots for things-in-process. When we store things in our long-term memory, we are taking them out of the short-term storage units. We are aware of the time taken to retrieve a memory from the longer-term storage when we have to wait until we remember the name of the man with the moustache who was also in *Easy Rider*.

More recent research does not confirm Miller's view—it was optimistic, and most studies find that we lose the capacity to keep more than four things in mind (Cowan, 2000).[5] Miller's view of a single, dedicated area for such short-term storage has been replaced with an emphasis on a set of processes that have this function, with different tasks being done differently (Schacter, 1990). Thus working memory may be functionally more closely related to other forms of reasoning than it is to long-term memory (see, e.g., Gabrieli, 1998: 96), or it may refer to a fixed number of flashlights which we can shine on elements in long-term storage (Jonides et al., 2008). But the basic point, that our working memory is quite limited, has stuck. To get more than a few things in our heads, we rely on long-term memory.

We can deliberately put something into long-term memory with reasonable accuracy (such as our own phone numbers), or find it there due to repeated encounters (such as the way our dog looks). But when we are simply rumbling along in our lives, we store bits and pieces of things in an extremely parsimonious way. First, we tend to remember the ''gist'' of things but not specific details (Koriat et al., 2000: 491). Does this mean that we have very simplified memories as opposed to detailed pictures? Not at all! Then from where do we get the details of our memories? We make them up.

Or rather, we fill in using patterns that are plausible given previous encounters. For example, when presented with a close-up of a scene, we tend to ''remember'' seeing the surrounding context that we did not actually witness (Intraub et al., 1996). Similarly, many of the ''priming'' effects that show that our memories can be greatly influenced by how we are asked about them come from the fact that we try to fill in details using stereotypes and other cheap information. Why memorize the entire visual surface of a large car, if you basically know what a Lincoln Continental looks like? All you need to do is remember ''black Continental with front damage.'' When it is time to reconstruct the image, what sort of ''front damage'' we add in may have more

[5] There are intriguing suggestions that this has to do with the frequency of certain brain waves; however, there is also individual-level variability that confounds any simple answer.

to do with what *other* sorts of front damage we have seen than with the image we witnessed of this particular case.

Indeed, there is strong evidence that long-term memory involves not so much storing a tape of an event, but a network of concepts and ideas (e.g., Nystrom and McClelland, 1992); thus we might remember seeing an auto accident as ‘‘car’’ + ‘‘crash’’ + ‘‘tree’’ + ‘‘child’’ + ‘‘happened’’ (this last obviously playing a key role); and ‘‘car’’ might be linked to ‘‘black’’ + ‘‘limousine’’ + ‘‘fast’’ and so on. The problem is that many of these same elements have multiple other linkages, and the difficulty may be understood as drawing the proper boundary whereby we stop traversing connections (Schacter et al., 1998). Thus though we might imagine that ‘‘black’’ and ‘‘limousine’’ are connected with ‘‘stretch,’’ it could be that in this case, the limousine was not a stretch limousine. Grabbing hold of this ‘‘happened’’ (e.g., in response to the query, ‘‘what happened at the corner on Tuesday?’’) and getting the associated elements might, however, lead us to pull in ‘‘stretch.’’ This may be especially likely if we have other memories that are similar but include the ‘‘stretch’’ element. Similarly, if a questioner asks us about the ‘‘crash’’ we are more likely to reconstruct our limousine with shattered glass than if asked about an ‘‘accident’’—and if we rehearse these re-produced images, or attach great emotion to them, we are quite likely to insist that they are absolutely true, even if they are completely fabricated (also see Loftus and Davis, 2006; Phelps, 2006). Most tests involve rather simple memories (such as whether we have been presented with a word), but they find that false memories are more abiding than the true, presumably because whatever strength of connection leads them to be produced in the first place also leads to their persistence (Payne et al., 1996).

Now the point of all this is not that we don’t remember well—clearly, it is far more interesting that our little brains can pack in such a huge amount of information in the form of memories into an area the size of a softball. The point is threefold: (1) that what we store seems not so much ‘records’ but sets of connections; (2) that it is not easy to bound these connections; (3) and the bounding happens through rehearsal of various kinds, whether ‘‘remembering a memory’’ or being continually re-acquainted.

We might admit this but imagine that this is irrelevant for the case of culture as a web of meanings, because the issue is not whether they are true or not. But there are two key implications for the study of culture. The first pertains to the ‘‘webbiness’’ of culture. Recall that a great deal of the problem we have with our parsimonious memory system seems to be in stopping a flow of associations. In any conventional understanding of ‘‘meaning,’’ something has no meaning if it is connected to *everything*, as meaning is correlative to a difference or distinction. This does not mean that we cannot have a web of culture in the sense of some things being more strongly associated than are others (say, the key of D minor is more associated in our minds with spiderwebs and E major more with astronauts). But we might be unable to find a consensual set of strict connections allowing for culture to ‘‘be’’ a logical ordering, not because we can’t store all the elements, but because we can’t keep things unconnected. According to this view, culture may not be a complex system, nor even a tool kit (in the sense that a tidy mechanic keeps his wrenches in order separated by British, Metric, and Whitworth), but more like a grab bag (also see Zaller, 1992; I return to this now popular metaphor below).

The second point has to do with the relationship between culture and ritual. Durkheim (1995 [1912]: 422) famously made ritual a key for the revivification of the collective conscience, arguing that its true function was ‘‘to reach, fortify and discipline consciousness.’’ This may well be true, but a simpler reason would simply be that we repeat rituals because otherwise we forget our culture. There is increasing evidence that with memories, we ‘‘use it or lose it.’’ Indeed, sighted persons who become blind seem to eventually forget the visual appearance of even their closest loved ones (Cole, 1998: 27).

Barth (1987: 26, cf. 69f) studied the dispersion of rituals among similarly situated New Guinea groups and realized that it was quite hard for ritual leaders to remember how rituals had been performed ''last time.'' As a result, there was constant innovation whereby specialists linked different themes to express different feelings and points of view. This might be an extreme case—these were secret initiations, only done when a cohort reached the proper age. But more generally, we can admit that ritual need not ''refresh'' the collective conscience so much as reconstitute it, and there is no clear reason to think that ''culture'' exists in some stable form in-between such reconstitutions.

We have seen that memory limitations force a reconsideration of the idea that we have a web of significances in our heads. An alternate possibility would be that we have an understanding of a set of elements, and work through them using some sort of structuralist logic. I go on to argue that this is also extremely implausible.

3.2. Processing

What do we know about the processing abilities of the human mind? Unfortunately, many psychological studies emphasize how we fall short from the economist's bench-mark of rationality, and hence may be of low interest to the sociologist of culture (see Shafir and LeBoeuf, 2002 for a recent review). However, some of the findings that have been produced have implications for our capacities to create complex relationships between ideas.

Despite the well-known problems with the 19th century view that language formed the template for our consciousness, there is increasing evidence that certain sorts of mental manipulations are made with reliance on linguistic forms. But the more complex the linguistic form, the more difficulty we have comprehending and manipulating it. Simply introducing negations poses a challenge for cognition (Wason, 1959), and certainly we find it a bit effortful to reject or ignore ideas. Thus the complex logic that makes for a wonderful sociological or anthropological analysis of culture on paper is unlikely to successfully sit inside a human brain.

Perhaps more important, a fair amount of research finds that people have two complementary ways of handling information, sets of processes that may be used independently or together (Fiske and Neuberg, 1990; Gilbert, 1991, 1999; for a sociological argument, see Vaisey, 2008, 2009). Various formulations of dual processing differ somewhat (see, e.g., Chaiken, 1980; Fazio, 1986; Smith and DeCoster, 2000); here I present a modal version. One mode involves ''bottom-up'' processing, whereby we piece together disparate types of information. Such processes are largely conscious, seem to happen in a serial fashion (though they may rely on parallel processes) often have linguistic structure and may indeed be concentrated in the left side of the brain. The second type of process is ''top-down,'' in that we assimilate data to existing prototypes. Such processing tends to be extremely quick and intuitive, generally below the threshold of consciousness (Brewer, 1988; Lui and Brewer, 1983), and might well often involve the processes of the basal ganglia.[6]

Now, the potentially troublesome part is that our conscious processes—which Margolis (1987) calls our ''reasoning why''—are not very good at understanding the intuitive processes

[6] Although bottom-up reasoning tends to be conscious and top-down automatic, and hence there is a relation between these two distinctions (see Bargh and Chartrand, 1999), not all automatic processes involve the sorts of ''reasoning'' relevant here.

(Margolis's ''seeing that''). Yet it is such ''reasoning why'' that most of our sociological techniques such as interviewing engage. Actors may be unable to use such reasoning why to reach the principles that can be statistically shown to guide their actions (Vaisey, 2009). Alternatively, they may give extremely complex justifications for how we come to have such-and-such an idea, conclusion or action, which have very little to do with the ''top-down'' processes involved.[7] The most breathtaking evidence comes from the studies carried out by Gazzaniga (1970) on patients who have had their corpus callosum—the part of the brain which joins the left and right halves—severed for medical reasons. As a result, the speech processes localized in the left hemisphere no longer have direct knowledge of what is going on in the right hemisphere which controls the left side of the body. Information strategically given to the right brain (which understands language though it does generally not produce it) leads the left side of the body to perform actions that the left brain should not understand. And yet, when asked ''why'' he is doing this or that action (under the control of the right brain), the ''patient'' (that is, the speaking left brain) confidently makes up an answer based only on the elements available to the left brain.

The implication is not that normally there is just this dislocation, but that the ''reasoning why'' processes can work extremely confidently when they are extremely wrong. Yet many of our ideas of how a cultural web of meaning works come from introspection and interview—precisely the sorts of things that would evoke our bottom-up processes. These results of these processes may indeed be tortuously complex (if not elegantly logical). But the behavior may be guided by simpler processes of which our ''reasoning why'' is largely ignorant.[8]

3.3. The dimensionality of experience

One of the most marvelous demonstrations of our actual simplicity in terms of dealing with our environment pertains to the dimensionality of judgment. Because of the great number of distinct stimuli in our cultural world, we tend to think that life is greatly multidimensional. But even moderate multidimensionality can lead to many different instantiations. This is relevant if some of our processing makes use of dimensionality, but our consciousness only takes note of the particularities in a multidimensional space. For example, we might recognize a million different faces, but all faces might be producible through variation in a three-dimensional space, with each dimension having 100 possible values. If our consciousness only responded to the recognition and not the dimensional reduction, we would have no way of knowing the underlying simplicity of the organization of these experiences.

This is of course fanciful, although computer image processors have made great strides forward in reducing faces to dimensions. (Decent reconstructions of faces may involve as few as 50 of these basic ''eigenfaces.'') But it is not implausible that we use something similar for many sorts of perception—the *Gestalt* psychologists found that in many cases, we begin with the simplest form, and take successive approximations away from it, precisely the sort of dimensionalization used in the eigendecomposition of faces. Indeed, such a process would

[7] This distinction may recall to sociologists that made in the philosophy of science by Reichenbach regarding the difference between contexts of discovery and contexts of justification. This bifurcation—one going back to ancient times—may have only a limited utility for a descriptive account of science, but still get at distinguishable modes of cognition.

[8] Of course, most of us have an intact corpus callosum, but it is not clear how interested the ''reasoning why'' module is in accessing information about affect (say) that might be related to past action.

explain why we are able to recognize a wide range of caricatures—exaggerations of how a face deviates from a typical face—as a single ''person'' and in fact recognize caricatures better than the original faces. Other research supports this by demonstrating that our facial recognition responds to a ''norm'' that then, as the *Gestalt* theorists would have predicted, leads us to be sensitive to how other cases deviate from this norm (Rhodes et al., 1987; Tsao and Livingstone, 2008). Thus some of our processing of the complexities of our social life—something as individuated, meaningful and remarkable as a human face—may involve reducing it to a few dimensions to which we attend.[9] More generally, we may miss the simplicity of our cultural orientations because we are unaware of the dimensional reduction actors use in cognition.

The evidence for this comes from the amazing work done in the 1950s by Charles Osgood and colleagues on the ''semantic differential.'' Using one set of data after another, and throwing everything into a factor analysis, they found that the lion's share of practical variance in what things ''meant'' could be explained by three factors, which pertained to activity as opposed to passivity, valuation (good as opposed to bad), and magnitude (see Osgood et al., 1957). What a white rose bud ''means'' may be spun out at some poetic length, but Osgood et al. found that it sits in a three-dimensional space quite near gentleness and sleep.

In sum, we may conclude that human beings probably use much simpler methods for interacting with the world than we believe. The nature of our conscious processes are such as to lead us to imagine that we use more complex reasoning systems, and have more individuated perceptions, than is the case. Given the extreme simplicity of our fundamental processing ability that I have portrayed, it may seem a wonder that we can do anything at all. But these simple processes can be parsimoniously effective if they possess environmental validity.

4. Environmental validity

Minds are, presumably, here for a reason, and most would now imagine that this has something to do with dealing with the environment. Thus we cannot really understand how (or how well) the mind functions without considering the nature of the environment, any more than we could determine whether a whale's tail was a good idea or a bad idea without knowing something about water.

4.1. Minds and environments

What do we know about environments? First, we know that they have what Tolman and Brunswik (1935) called a ''causal texture''—some things lead to, cause, predict, coincide with, others. Second, we know that they are uneven in all sorts of ways. Some sorts of things are big and some are small. Some are on top of others. And so on and so forth. The causal texture can thus be expected to vary. Finally, we know that environments are redundant—a tree has many leaves that are mostly pretty much the same.

Now what do we know about minds? We have seen a set of limitations, but each of these may be understood as the flip side of an advantage. First, we are bad at keeping straight what memory came from what source. Put another way, what we are *good* at is parsimonious storage and the recycling of cognitions for multiple uses. What is more, we are good at *recognizing* something as opposed to knowing precisely what it is and where it comes from.

[9] Further, given the way in which the different proteins are called into play during embryonic development, there is even some plausibility to the idea that this is how faces are *made*.

Second, to say that we are bad at keeping the innumerable individuals straight is another way of saying that we are relatively good at getting the ''gist'' of what is happening. Indeed, there is evidence that our visual system is attentive to statistical properties, in that we can, for example, ''see'' the mean of a collection better than we can see the individual percepts (Ariely, 2001; Chong and Treisman, 2003).

Third, to say that our thoughts and retrievals are greatly influenced by the current environment is to say that memory seems to be good at meshing our patterns of current actions with the properties of the environment (Glenberg, 1997). Finally, we are reasonably good at recognizing patterns even when we cannot consciously determine the rule generating them. As Thomas Schelling (1980: 93) wrote: ''Nature gives hints; she presents her secrets in patterns that make them infinitely easier to guess than if an exhaustive scanning were required to find them.'' Thus our cognitive limitations may be the flip side of parsimonious ways of cognizing that make use of features of the environment.

4.2. Ecologically rational heuristics

In some of the work that was first taken to demonstrate how far short we fall of rationality, Tversky and Kahneman pointed out that actual decision-makers tended to rely on some simple heuristics instead of doing true calculations to reach the most probable answer. They pointed in particular to what they termed the ''availability'' heuristic, the ''representativeness'' heuristic, and the ''anchoring-and-adjustment'' heuristic (see the papers collected in Kahneman et al., 1982). This line of work demonstrated (first) that people are not rational decision-makers in many situations—not a surprise to most sociologists—and (second) that you should be very worried when you go to the doctor, because her diagnostic skills can probably be trumped by a freeware computer program. Here people came out looking quite pathetic.

But other scholars, accepting the findings that we use simple heuristics, removed the stigma. Heuristics may work well because they are ''ecologically rational'' in that they make use of predictable features of the natural or social environment to simplify otherwise daunting processing tasks (see Gigerenzer et al., 1999: 13, 24f).[10] The ''availability'' heuristic—that we tend to use the information that is accessible in favor of what is logically implied (Kahneman, 2003)—is most obviously related to the characteristics of the environment. People are easily distracted by low-quality information if you decide to throw it at them, but if the environment is such that it is the high-quality information that is most accessible, we will do quite well. And fortunately for those trying to determine whether a dog is friendly or unfriendly, it turns out that the dog puts the most important information up front (his face, snarling or not).

For an actual example, consider a set of people attempting to determine what cities in America or Germany are bigger, or what companies in America or Germany we should invest in (here I follow Gigerenzer et al., 1999). We can rack our brains and try to do the forbidding calculations. And here presumably the more information we have the better. But it turns out that those with more information may do worse. Americans know more about American cities than German cities, but they are better at picking the largest German cities. American laypeople pick better German stocks than German economics graduate students, and German laypeople pick better American stocks than American economics graduate students—or mutual fund managers!

[10] Those working in the Kahneman and Tversky tradition now accept that they previously underestimated the advantages stemming from environmental validity (Gilovich and Griffin, 2002: 8).

Those with less information are using what Gigerenzer et al. (1999) call the ‘‘recognition’’ heuristic. The unknown criterion (in these examples, size and quality, respectively) has an environmental correlation with a characteristic that makes some objects more ‘‘present’’—more likely to be talked about, seen, said—and this makes them more likely to be recognized. So merely going on the basis of which things they recognized, those with low information could do a good job at the task. Those who knew too much and recognized everything had to rely on their puny little brains to sort through things, and basically ended up making more random choices.

Now these wonderful experiments show that we *could* use simple heuristics, not that we do. The key to a successful demonstration is to choose tasks where such environmental rationality is a possibility. However, these models of decision-making have face plausibility as close approximations of cognitive processes (Gigerenzer et al., 2008), while classic models of unbounded rationality are implausible. And they illustrate the key point—that our faculties are likely to have developed to make use of the causal texture of the environment, and not to independently deduce it in our heads.

4.3. Leverage

Of course, our environments are now largely those of our own workings, and to the extent that we construct them to ease cognition, we are incredibly effective (also see Kirsh and Maglio, 1994 on the category of ‘‘epistemic action’’). The most obviously important cognitive environment is that of symbolic writing, which allows even a typical sixth grader to add numbers with 10 digits. The vast majority of our cognitive successes are stored not in minds, but in material symbolic form. To some extent, this is through the physical organization of the environment—for example, numbered and lettered streets that allow us to know how to get from any one place to any other. We organize libraries so that we can find encyclopedias, and the encyclopedias so that we can find particular articles. A world in which we could not look things up would (as Ong, 1988 has said) be a world of idiots.

Even more, we increase the leverage of the simple decisions made by our brains through technologies, which build into material objects almost all of the cognitive labor that results when these objects are used. It is the application of mental force, and not its strength, that matters in such a built environment. The controls of large airplanes are such as to translate intuitive motions to complex combinations of rudder and aileron movements; even stepping on a car’s gas pedal or brake now activates a computer that simultaneously controls at least two changes. And these computers were programmed using programs that were developed using other programs. No one has to, and no one could, begin any of these tasks from scratch.

The same degree of cumulative informational enriching takes place in culture. First, as Ong (1988) and Goody (1977) (also see Latour, 1986) in particular have emphasized, a literate culture can achieve a degree of consistency surpassing those of others not because of the nature of the thinkers, but because so much less is required to identify inconsistency.

Second, we are able to make seeming innovations by connecting already existing and highly leveraged components. In some cases, these are rigid enough that serious progress can be made through completely mechanical changes to such components (such as expanding or substituting when carrying out mathematical derivations). It in no way detracts from Einstein’s genius to point out that his breakthrough of special relativity was more or less to take existing equations and propose a straightforward interpretation. Certain other classic breakthroughs in physics can retrospectively be understood as the joining of one highly leveraged symbolic representation with another.

Interestingly, we find strong evidence that such leveraging exists in *informal* arenas as well—building on the arguments about environmental rationality, we find that people are able to make use of unplanned features of the (largely planned) environment to increase the power of their calculation. Indeed, it seems that the mere fact of environmental presence increases our computational power for specific tasks (see Lave, 1988).

5. Interactional competence and simplicity

5.1. Situations

The picture I painted above of our cognitive limitations may seem somewhat hard to accept, for we are also clearly very good at some extremely difficult tasks, those pertaining to interaction. Here humans are able to simultaneously process many different types of data—words spoken in a grammatical structure incompletely known until the end, intonation and emphasis as well as base frequency and ‘‘tightness’’ of the voice, how facial muscles are held as well as facial movements, and other bodily signals, often from two or more persons at the same time. (Also see Collins [2004: 75] on nonverbal communication competences.) We recognize people and their moods at the same time as we develop intuitions about, say, their feelings about some *other* person present. Such processing dwarfs the abilities of the simple computers that out-perform us in other tasks.

But there is very good reason to think that many of these social processing tasks are done by specialized neural circuitry and do not reflect on our capacity to deal with abstractions (Lieberman, 2007). Most importantly, the complex processing that allows us to read the intentions of others may be affected by forms of neurological damage that leave other processes intact. Damage to the orbitofrontal cortex/right medial prefrontal cortex interferes with forms of social cognition (as well as with the recognition of such decreased competence) without necessarily affecting certain other capacities associated with mental flexibility (Mah et al., 2004; Mazza et al., 2007; Fournier et al., 2008).[11]

Similarly, facial recognition seems to be handled by distinct processes unconnected to the processing of other shapes (Tsao and Livingstone, 2008: 420). These firmly-wired circuits, then, work quite well for a pre-arranged set of tasks, but cannot be easily adapted to the sorts of operations consonant with internalizing a ‘‘web of meanings.’’

The key thing is, however, not simply that we have dedicated circuits for social competence.[12] It is that our apparent behavioral complexity probably is related to our stunning capacity to take in these features of the interactional environment. The seeming complexity of our interaction probably involves a responsiveness to the cues given by interaction partners that we use to adjust our performance in midstream.[13]

[11] And regarding less specific interactional competences, evidence from those with different sorts of brain damage strongly suggests that much of our pattern recognition competence, including that used in social communication, is carried out in the basal ganglia and is not normally accessible to consciousness (Lieberman, 2000). What we call ‘‘intuition’’ may be the operation of such pattern recognition capacities that we cannot justify but can use to successfully navigate social situations, including conversation.

[12] This does not mean that we lack the neurological flexibility with which to find different strategies; persons with autism spectrum disorders who have deficits in functioning of these areas may use different (serial) processes for social cognition (Pinkham et al., 2008).

[13] We generally say ‘‘subtle cues’’ but I hope we are now past this gratuitous assumption. To a dog or a chimpanzee our non-verbal communications are probably painfully gross and over-stated.

The significance of this latter is seen in the behavior of humans who are not, as it were, playing with a full deck, either because this deck is in the process of being assembled (children in the second year of life) or disassembled (aged persons suffering from strokes or other neurological impairment). These are important cases because of the contrast they allow to the same individuals in full-deck behavior. (This is in contrast to cases of impairment that are permanent or near so.)

In such cases (as opposed to cases of 'full-deck' behavior) we are far more likely to see the exact repetition of large communicative chunks, whether phrases, punchlines, or even stories, with intonation and body language that seems a perfect copy. The toddler seems to be struggling to master and internalize this combination and is still working on the basic motif from which later improvisations will be made; the effects of the senility seems twofold: first, to interfere with remembering that one has already carried out the same action in the same company, and second, a decreased attentiveness to cues given off by others. Just as a system that is chaotic with three dynamic equations can become periodic when one of these is removed, so a human being who is "complex" in behavior when interactionally attentive may become incredibly simple when this attentiveness is damped due to impairment.

5.2. *Emotion and judgment*

It also appears that part of our interactional competence is likely to involve emotional action—for acting emotionally is in no way antithetical to acting rationally or appropriately (Schwarz, 2002; also Slovic et al., 2002). Our emotions may be a way that we are able to monitor the results of a calculus happening below our threshold of awareness; sometimes it is less important to know exactly what is happening than it is what to do. We seem to gather information through our senses, and use it to guide our interactions, when we are unaware of many of the principles that link such information to our judgments.[14] For one, we give off signals through the base frequency of our vocal utterances, even though this frequency is subsonic (e.g., Gregory and Webster, 1996). Visually, we are attentive to various aspects of "body language" including relative position of limbs, whether arms are turned inwards or outwards, pupil and nasal dilation, whether the eye muscles are involved in a smile (the "Duchenne smile") (e.g., Spiegel and Machotka, 1974). Finally, we even use smell and process the presence of sweat, menstruation, or, quite possibly, other pheromones (e.g, Engen, 1991).[15]

Thus much of our interactional competence is related to our ability to process physical data below the threshold of consciousness; those lacking certain senses have both initial characteristic interactional impairments and develop workarounds using other senses.

In sum, we have great interactional competence, and the resulting behavior is quite complex. But this is compatible with an understanding of our basic mental structures as being quite simple. Because we process certain signals below the threshold of consciousness using dedicated neurological modules, and respond to such signals largely by distilling an emotional state from the aggregate information, we need little in the way of flexible intelligence for such encounters. Further, the complexity of our resulting behavior comes more from the nature of our reciprocal responsiveness to one another than from our individual complexity.

[14] Like a number of other sociologists of culture, I was introduced to much of the work on sense and cognition through Karen Cerulo's syllabus for her Sociology 602.

[15] The relation between emotion and sensation is actually bidirectional. Thus emotion guides perception in that images with greater arousal potential actually are more likely to be seen (Sheth and Pham, 2008).

6. Implications for the study of culture

You may or may not have an elephant as a pet, but if you do, I am confident that he does not sleep in your bathtub. Culture may be complex, but that means it is not in our heads. If not, where is it? We know that culture is stored in material objects (e.g., Mukerji, 1983), and in other people's heads—which we saw in Barth's discussion of ritual. At any time, culture exists in various pieces that can be re-assembled, but may be put somewhat differently together. Culture then is a set of potentials for experience.

This has three strong implications. The first is that if we want to learn about culture, the last thing we should do is to conduct in-depth interviews with a selection of informants, any more than we would expect to strike gold by asking them for whatever change is in their pockets. The second implication is that culture is, by and large, not shared. We have different experiences. These differences may be organized—and culture may be distributed in the sense of Hutchins (1995)—or it may mostly be in the form of haphazard chunks. Culture may at some times function as a tool kit (Swidler, 1986), but more generally I suspect it is more like a junkyard, full of sharp bits of rusty metal, in which children happily play.

The third implication is that, like items in a junkyard, the vast majority of culture is unused. It is not just unused at any instant, it is unused, period. Most books sit in libraries unread, most vistas go unseen, most of our rituals are forgotten, most of our memories are not shared. And of the books that *are* read, we generally preserve poor simplifications (of the nature "Socrates was the guy who was critical of everything")—more generally, the complexity of culture is unlikely to be related to its *depth*. Rather, to the extent that culture is complex, it is related to its *mass*—it is a very very large junkyard indeed.

We do have ways of working our way from one part of culture to another—there are connections between elements, though it may strain somewhat to try to argue that these constitute a "logic." But these connections themselves must be actual connections made by actual persons (and not tables produced by an analyst), and are likely to be selective, to some extent idiosyncratic, and to owe a great deal to the chance matters of "what is available." This sort of culture may be a bit harder to study, but at least it is the sort of culture that simple creatures like us can work with.

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