our brains may have both initiated and adapted to cultural change. The different theories that are presented are not necessarily mutually incompatible, however.

3. The philosopher C.S. Peirce distinguished three classes of representation which he termed "signs" (Peirce 1960). His "symbol" and "icon" correspond roughly to my use of "description" and "depiction" here. His third class is worth a note. The "index" represents by providing physical evidence of what it represents "as smoke is to fire." The most obvious example in our culture is the photograph, which is an index to the degree that it represents by sampling the light reflected by real objects. Now that machine-generated images can simulate the retinal light pattern so closely that they can hardly be distinguished from photographs, should they be termed "false indices," fiction masquerading as evidence? In a fascinating study Al Cheyne has discussed Peirce's theory of signs in relation to palaeolithic art. He too sees a psychological connection between the Ice-Age use of accidental marks on cave walls and the much more recent tradition of using deliberate indeterminacy to stimulate invention (Cheyne 1999).
4. It is often unclear in the literature exactly what is meant by "mental representation." Frequently, I suspect, the term is used to mean representation in the brain in the same sense that bit patterns in a computer can be said to "represent," say, letters and numbers. These represent not because the computer interprets them in any way, but because they are interpreted as ASCII codes by the human machine user. It is with this meaning in mind that Edelman and Tononi (2000) claim (with some reason) that memories are not representations at all but "re-entrant neural circuits" that have the capacity to repeat a given perceptual or cognitive process. According to these authors, there is no "memory code" that an external observer (i.e., a neuroscientist) can interpret as a representation. I offer a different meaning to "mental representation." I claim that thought is inexplicable unless we assume that there is a hierarchy of processes within the brain wherein higher level processes are capable of analyzing, comparing, and monitoring information "represented" by lower level processes. Thus the interpretive process is within the brain itself. The brain is mapping one part of itself on to another. Such a neural monitoring process is not a homunculus but of necessity, it must have some of the recursive properties of a "brain within the brain." How else can we count the windows in a remembered house and know what we are doing as we do it?

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