HUMAN EVOLUTION: COMPATIBILIST APPROACHES

Paulo C. Abrantes

Abstract: This paper discusses attempts to keep track of the evolution of the human mind which are commited to a commonsense image of ourselves as both agents and interpreters, following a compatibilist line. These attempts take also a bold stance concerning the role philosophy should play in looking for an integration of that commonsense image with an image of ourselves pressuposed by the natural sciences, especially by the biological sciences. Different scenarios for the philogeny of a distinctively human kind of mind, in the space of other animal minds, are compared. A new reading of Richerson and Boyd's dual inheritance theory is proposed by adopting that compatibilist framework.

Keywords: human evolution; kinds of mind; interpretive abilities; folk psychology; compatibilism; dual inheritance theory.

Commonsense and the human predicament

Philosophy usually takes human beings as *agents*, that is, as systems whose behavior is caused by mental states. Furthermore, we are often recognized as *interpreters*, that is, as systems engaged in explaining and predicting the behavior of other people, by attributing mental states to them. We mindread our fellows all the time in (real or imagined) social interactions. Being both agents and interpreters is considered constitutive of our very nature as *persons*: this is how we *make sense of* ourselves and our fellows. This stance is also in agreement with a commonsense image of ourselves.

My aim in this paper is to look at some attempts to deal with the *evolution* of the human mind which mingle:

(1) a substantive commitment to a commonsense image of ourselves as both agents and interpreters;

(2) a bold stance concerning the role philosophy should play in looking for an integration between a commonsense and a scientific image of ourselves.

Even among philosophers who favor a commonsense image there are, however, conflicting positions concerning its *relationship* to scientific descriptions of ourselves. There are those which argue for an almost complete *autonomy* of folk descriptions *vis-à-vis* scientific ones, and those which attempt an *integration* between both descriptions.

L. Baker (1995, 2001) falls in the first camp, arguing for an anti-eliminativist, as well as anti-reductionist, slant towards commonsense. She argues for a practical realism: a metaphysics based on our everyday cognitive practices (especially our interpretive practices).

In the next sections, I will scrutinize approaches which fall in the second camp since they embed a commonsense image of ourselves (as agents and interpreters) in a naturalistic-evolutionary framework.

Two kinds of facts

A central topic related to (1) is the adequacy of *folk psychological* notions for depicting the architecture of the human mind and their application in the prediction of human behavior in everyday situations. The status of folk psychology has been a hot topic in the philosophy of psychology: is it a theory or a craft (Dennett, 1998)? Is it true? Intentional realism is far from being a consensus - instrumentalism and plain eliminativism are options that have prestigious supporters. The various approaches to the mind-body problem (reductionism, functionalism, etc.) make also different commitments towards a folk-psychological conceptual scheme.

A lot of ink has also been spilt by philosophers trying to clarify the notions of representation and interpretation (concerning behavior). These notions relate to the issue of defining different orders of intentionality as a way to deal with metarepresentational abilities. Much debated is also the way these abilities are accomplished.

Godfrey-Smith's strategy (2002a) is to bypass those acute philosophical problems concerning the status of folk psychology as well as those related to agency, representation and the mechanisms underlying mindreading. He argues that, in any case, we have to take for granted two kinds of *facts* - as (empirical) data to be dealt with by any theory addressing the evolution of the human mind:

(1) facts about our "wiring" and how it "connects" with the world, on the one side, and;

(2) facts about our "habits of interpretation", on the other side.

These facts should be taken at face value:

> "…Whether the interpretations made by people are descriptions of the wiring-and-connection facts or not, the world does contain these two sets of facts. Both are empirical phenomena, and in principle there could be complete empirical theories of each" (Godfrey-Smith, 2004).

The *natural* sciences tipically focus on the first kind of facts, largely ignoring those related to interpretation. The *social* sciences – more influenced by philosophical and commonsensic concerns - address the latter kind, usually disregarding the facts about wiring-and-connections.

Furthermore, philosophers (and many scientists alike, for that matter) usually don't frame those facts in evolutionary terms. Developmental questions concerning human cognitive capacities and interpretation habits aren't usually raised either (Dennett, 2000: 22). These are precisely Godfrey-Smith's theoretical concerns: "What kind of description of cognitive mechanisms picks them out in a way that is appropriate for evolutionary explanation?"

In particular, we should also ask for the credentials of folk psychology in framing the typical puzzles that arise in an evolutionary setting: "Does folk psychology supply us with concepts that we can use to formulate good evolutionary questions about the mind? Is folk psychology even *trying* to describe real features of cognitive mechanisms?" (Godfrey-Smith, 2005).

An important task is, therefore, that of integrating natural-scientific (including biological) and social-scientific perspectives on those two kinds of *facts*, as a way to coordinate them.

Coordination as a philosophical task

Godfrey-Smith claims that a theoretical coordination between those two kinds of facts should be a *philosophical* endeavour:

> "So imagine a future state of scientific knowledge in which we have highly detailed empirical theories of people. One thing this body of empirical knowledge will contain is a description of these two sets of facts. But as well as these two bodies of *empirical knowledge*, we will want a *theory* of how the two sets of facts are inter-connected. Here we find one of the roles for philosophy – to describe the coordination between the facts about interpretations and the facts about wiring-and-connections (…) Philosophy would aim to describe the connections between facts about the use of difficult and controversial concepts, and facts about the parts of the world that the concepts are in some sense aimed at dealing with…" (Godfrey-Smith, 2004; emphasis mine).

He highlights, actually, *two* roles for philosophy:

1. To investigate the relations between different sciences: might these *fragments* of knowledge fit together?

2. To coordinate commonsense and scientific views of the world and ourselves.

It is helpful to refer to the latter role using a more general and traditional label - *compatibilism*. Originally, this is a position in metaphysics concerning the compatibility between free-will – as part of a commonsense image of human agency - and causal determinism, as part of a scientific-mechanistic image of the physical world, including ourselves. More akin to my concerns in this paper, *compatibilism* refers also to those trends in the philosophy of psychology that look for relations between commonsense (or folk) psychology, on the one side, and different kinds of scientific psychology, psychoanalysis and neurophisiology, on the other side.[1]

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[1] Hurley (2003b: 274) pleads also for a certain kind of compatibilism in the philosophy of mind. One finds an example of a compatibilist stance in the philosophy of science, regarding the topic of scientific realism, in Godfrey-Smith (2003b: 174-6).

Sterelny (1990) also pleads for a sort of compatibilism between folk psychology (with its intentional idiom, usually adopted by the social sciences) and a conception of humans as *part of the natural order* (usually presupposed by the physical sciences):

> "Philosophy is an integrative discipline ... There are two very different pictures of what we are… Our actions have intentional or belief-desire explanations. We are intentional agents. Our actions reflect our thoughts. This is the picture of folk psychology. There is an alternative physicalist picture which emphasizes our continuity with nature… We cannot reject the scientific image of ourselves, so we must try to reconcile it with what we know of ourselves from our common experience" (Sterelny, 1990: 1-2; 22).

The views that are especially relevant to this paper are those pertaining to the coordination of the facts about wiring-and-connections and the facts about our (social) skills of interpreting our fellows (by attributing mental states to them). They illustrate the *second*, compatibilist, role for philosophy pointed out by Godfrey-Smith. This role seems to be relevant to tackle with what looks like a distinctive evolutionary process: human's.

A central issue is also the compatibility between folk psychological depictions of agency and interpretation, on the one side, and reconstructions of our evolutionary past, on the other side.

The internal integrative project

At least two integrative projects embracing evolutionary biology might be conceived, given the distinction made by Godfrey-Smith between facts about wiring-and-connections and facts about habits of interpretation: an integrative project *internal to the sciences* and another, *external* project.

The *internal integrative project* of evolutionary naturalism is precisely that of giving a purely scientific explanation of how our wiring-and-connections evolved, pretty much in the same terms as one would tell a story about how other organic systems (the immune system, for instance) evolved.In his early work, Godfrey-Smith put forth a set of questions about the function of mind in nature, different from those traditionally asked by the philosophers of mind. In this context, he formulated the *environmental complexity thesis*: "The function of cognition is to enable the agent to deal with environmental complexity" (Godfrey-Smith, 1998: 3). The application of this thesis to evolutionary

problems illustrates a trend in the internal integrative project[2]: cognitive systems of different kinds are explained as adaptations to the complexity of different types of environments.

The *social intelligence hypothesis*, proposed initially by Humphrey in 1976, can be framed in terms of the environmental complexity thesis: the complexity of the *social* environment (and not just that of the physical environment) was responsible for the chief selection pressures that drove the evolution in the hominid lineage.

The social environment is actually very demanding, cognitively speaking: one might just mention the cognitive load of food and information sharing, of activities like cooperative hunting and collective defense against predators, of grasping social relations and hierarchy, of detecting free riders as a way of stabilizing group behavior (Donald, 1991) etc. These pressures drove the evolution of a particular kind of cognitive arquitecture: intentional systems. Systems of this kind, with capacities for decoupled representation, have a more flexible (or less automatic) behavior, enhancing their fitness in dealing with the physical and the social environments alike (Sterelny, 2003b: 30; Kornblith, 2002: 41-2).[3]

Godfrey-Smith argues, in his most recent work, that it wouldn't be enough, however, to tell a purely *scientific* story about the evolution of human wiring-and-connections along the lines pointed out by the environmental complexity thesis. One has to elaborate more complex evolutionary scenarios that take also into account our interpretive capacities.

The external integrative project

The *external* project attempts, otherwise, to depict evolutionary scenarios in which we are conceived not just as *ecological* agents - (an image commonly associated with human behavioral ecology in which the physical environment plays the central role) -, but

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[2] In his 1998 book, Godfrey-Smith doesn't make explicit, as much as in his more recent work, the relationship between the environmental complexity thesis and an integrative project (cf. Godfrey-Smith, 2002b). See Abrantes, 2006.

[3] It is controversial whether the social intelligence hypothesis might also be sufficient to account for the evolution of the special mindreading skills of the human mind (eventually supported by a version of folk psychology). I will not tackle this issue here (see Abrantes, 2006).

also as *social* agents (an image of ourselves which has been central to philosophy and also to the social sciences). The external integrative project of evolutionary naturalism strives to figure out, therefore, how to "weld together evolutionary-scientific and social-scientific conceptions of human agency" (Sterelny 2003b : 5).

In the internal project, the interpretive abilities (that is, mindreading based on a folk psychological conceptual scheme) are not acknowledged as playing any causal role in shaping the evolution of the wiring-and-connections. To get a grip on this project, we have first to distinguish between simple and complex coordination of the two kinds of facts mentioned above.

One way to coordinate these two kinds of facts about ourselves is to assume that folk psychology is a theory that picks out fairly well the wiring-and-connection facts, the inner causes of behavior. This would explain, in a straightforward way, why our interpretive practices are predictively successful.

Sterelny calls this the "simple coordination thesis" (Ibid. : 5). Fodor can be read as a philosopher committed to a coordination of this kind, what amounts to see "… folk psychology as science, [as] a largely true theory of the overall architecture of the human mind" (Sterelny, 2003a : 258). This *simple* (in a sense to be clarified below) coordination presuposes, therefore, the theory-theory and intentional realism.[4] This way of looking at folk psychology is qualified as *scientific* because it has a descriptive focus.

Godfrey-Smith's and Sterelny's *philosophical* integrative project is that of figuring out, in evolutionary scenarios, how to coordinate in more complex ways the wiring-and-connection facts, on the one side, and the interpretive abilities, on the other side. These facts are taken separately as different *traits* - each of them being part of the selective environment of the other trait.

In contrast with a simple coordination like Fodor's, the two kinds of facts here causally shape each other in human evolution. As a consequence, an *arms race* is expected

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[4] The expression *theory-theory* comprises the thesis that folk psychology is a theory (with a structure similar to a scientific theory and used to attain the same descriptive and explanation aims). An alternative view is that folk psychology is a craft (Dennett), that is, it has a practical (and not a theoretical) motivation. Sterelny (1998) argues that conflicts might also arise between different crafts and practices, given their metaphysical presuppositions. Interpretation might be grounded on some version of folk psychology (as the theory-theorists presuppose) or, otherwise, on simulation or other mechanisms (Goldman, 2006).

to take place between these traits, bringing forth selective pressures in *both* directions. Godfrey-Smith argues as follows for a complex coordination:

> "If folk-psychological interpretation is biologically old, then it has been part of the environment in which human cognitive traits were exposed to natural selection. Folk psychology is not just the tool that we use when first thinking about the mind, it is also a social fact that human agents have had to contend with, for some unknown period of time. It is part of the social context in which thought and action take place. So while it is obvious that folk psychological practices of interpretation will have been affected by the facts about cognitive mechanisms, it is also true that the evolution of cognitive mechanisms might have been affected by the social environment generated by folk psychological interpretive habits" (Godfrey-Smith, 2005).

Henceforth, a complex coordination embodied in an evolutionary framework address anew our role as interpreters - a central element of a philosophical image of *personhood* (Dennett, 1986).

This integrative project is *external* to the sciences because it takes seriously the way we conceive ourselves not only as intentional systems but also as interpreters: we have been using, probably for a long period of time, a folk psychological scheme to make sense of the behavior of other people in social environments.

Nativist and non-nativist scenarios

An evolutionary and developmental concern with the human quandary provides a promising field for (thought-) experimentation - by setting up different scenarios in which philosophical and scientific perspectives are taken into account and effectively integrated.

Godfrey-Smith explores some of these possible scenarios, trying to answer questions such as the following: did a folk psychological framework for interpretation *evolve*? Or, else, does this framework just *develop* given certain environmental conditions?[5]

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[5] An approach that takes into acccount both folk psychology's philogeny and ontogeny should not be disposed of *a priori*. One should expect that different descriptions of human cognitive capacities, as well as of the mechanisms that realize them, lead to different accounts not only of the evolution but also of the development of these capacities. And the other way around: evolutionary and/or developmental approaches might lead us to revise the way we ordinarily describe these capacities and underlying mechanisms.

One of the scenarios point to the evolution of a module for our folk psychological interpretation abilities, by means of an orthodox process of natural selection comprising just genetic inheritance.[6]

In another scenario, there is *individual* learning of the interpretation abilities. Interpretation has a non-canalized ontogeny: the individual acquires these abilities in a fact-driven way, by observing other people in the social environment and using general-purpose learning mechanisms.[7]

A third scenario gives a prominent role to *social* learning. The social environment selects for groups that facilitate the learning of the interpretive abilities (a kind of "epistemic engineering"; Sterelny, 2003b: 236). Furthermore, learning takes place in niches constructed by several generations.[8]

Sterelny favors the last scenario and explicitly mentions that it is motivated by an external-integrative bias: "A theory of human cognitive evolution needs to integrate the biological and social-scientific perspectives on human nature. Niche construction and its partial transformation into bone fide inheritance is the key to this integration" (Sterelny, 2003b: 171).

He qualifies this "biocultural integrated theory of human agency" as the unique genuinely philosophical project (Sterelny, 2003b: 5; cf.: 171). If this external integrative project of an evolutionary naturalism comes to be accepted as a result of its epistemic virtues compared with internal integrative projects, an important dimension of commonsense will have provided fruitful insights for setting up adequate scenarios of how the human species distinctively evolved.

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[6] Usually, the following properties are associated with cognitive modules: they are innate, encapsulated and domain-specific. Evolutionary psychologists argue that our interpretive abilities are adaptations to a social life. They exemplify a nativist stance towards mindreading as a social task: one of the modules of our cognitive architecture would be specialized in solving the problem of predicting behavior, by attributing mental states to other people throught the application of a theory of mind - the content of that module (Cosmides and Tooby, 2000). In this view, mindreading tasks are solved at a *sub-personal* level (Dennett, 1991).

[7] A genetic takeover process such as the Baldwin effect is not excluded, though, in this scenario.

[8] I discuss in detail the controversy *evolution versus development* concering the interpretive capacities in another paper: Abrantes (2010); cf. Abrantes, 2006. The third scenario presupposes that group selection has enough intensity to be taken seriously, given certain conditions prevalent in human-social environments.

Godfrey-Smith and Sterelny acknowledge, however, that progress in the internal, scientific, project might force a revision of some aspects of the external project or, even, its complete rejection (Sterelny, 2003b: 5).

Is folk psychology an adequate framework for describing (nonhuman) minds?

There is an old and lasting controversy in the litterature of cognitive ethology, as well as in philosophical reviews of if, about the adequacy of an intentional vocabulary (taken, basically, from commonsense psychology) to describe and, possibly, to explain the behavior of nonhuman animals.[9]

The prospects of that debate are enlarged by considering the evolution of animal minds. As a precondition, we have to distinguish different kinds of "systems for the adaptive control of behavior" (Ibid., 2003a: 257). The project of "charting control space" is an attempt "to identify the crucial dimensions of control space (…) occupied and occupiable locations in [it] and the potential trajectories between those locations…" (Sterelny, ibid.: 264). How adequate is a folk psychological conceptual scheme for accomplishing this project? In other words, might folk psychology (and, therefore, a commonsense image of wiring-and-connections) contribute to chart this space and to depict trajectories *from* ancestral nonhuman minds *to* a fully human mind?

Hurley (2003a) is confortable with a wider range of application of our intentional vocabulary. She argues that nonhuman animals may be considered intentional agents in context-bounded situations such as, for instance, competitive contexts over finding food, contrasting with cooperative contexts (Ibid.: 21). There would be "islands of practical rationality" out there, even if we shouldn't expect to find *theoretical* rationality, that is, a "conceptually promiscuous" kind of mind (Hurley, ibid.: 1). Philosophers might have been "over-intellectualizing" social life, after all (Ratclife, 2005 : 213).[10] Hurley claims they should emphasize, rather, the space of action: social contexts require often this shift of focus from theoretical to practical rationality, from a *know that* to a *know how*.

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[9] Dennett, 1987 and Kornblith, 2002 are good examples of philosophical accounts of this topic.
[10] Ratclife claims that folk psychology has "no psychological reality as an autonomous ability"; it is a philosophical abstraction "from a complex of perceptual, affective, expressive, gestural and linguistic interactions, which are scaffolded by a shared cultural context" (2005 : 231).

Hurley is, however, fully aware of the relevant discontinuities between humans and other animals, as far as mindreading is concerned (Hurley, 2005). We *make sense of* animals by *interpreting* them, but this is just unilateral mindreading. In this context, she distinguishes instrumentally rational agents (which have non-conceptualized reasons in the practical sphere) and mindreaders:

> "Even if other animals have minds for us to interpret, most current evidence suggests that they are not mindreaders themselves. Asking what is rational for a creature to do when it plays against nature is very different from asking what is rational for a creature to do when it plays against another rational agent when it is trying to interpret and who is also trying to interpret it. If nonhuman animals are not mindreaders, then game-theoretic problems of mutual interpretation and prediction do not arise in the same way for our relations with them, and strategic rationality does not really get a grip on animals" (2003a: 278).

Sterelny and Godfrey-Smith blaim Hurley, nonetheless, for having *exapted* PS notions for describing the architecture of nonhuman minds. They work out the implications of taking folk psychology as, rather, a craft. It's primary role is interpretation:

> "If we think of folk psychology as a socially-evolved interpretive tool that functions to help us deal with a specific set of social tasks, then when it is used to describe nonhuman animals it is far from its domain of normal use. The framework will be under some stress, and it will be unclear what conclusions can be drawn from how it behaves" (Godfrey-Smith, 2003a: 267).

This way of addressing the actual role of folk psychology suggests a further question: shouldn't we be also skeptical concerning the descriptive credentials of folk psychology in the human case? This is what eliminativists, like Stich (2004) and others, have been arguing for. If it is defensible that the primary function of folk psychology is that of (unilateral or mutual, for that matter) *interpretation*, when its conceptual resources are used not only as a craft but *to describe* the wiring-and-connection facts (in a scientific setting, for instance), it might also be "under stress" *even in the case of humans* !

Godfrey-Smith and Sterelny don't go far down this path - they hold a bold skeptical position concerning the *scientific-theoretic* credentials of folk psychology just in the case of nonhuman minds.

It is important, at this point, to make explicit *two* different roles folk psychology might play in integrative projects. First of all, folk psychology may be used as a conceptual framework (e.g. a theory) for describing the human mind (as having, roughly, a belief-

desire architecture). This is, traditionally, a scientific task (even if, in this case, a folk psychological conceptual scheme is being applied).

Folk psychology may also be taken as a craft, conveying our everyday interpretive practices. Folk psychology is conceived, in this second role, as a basis for *mindreading*.

Concerning the first role, Sterelny and Godfrey-Smith take a mild realist path: they argue that folk psychology picks out the fundamental wiring-and-connection facts. Taking for granted this conceptual framework, they come up with conjectures about the evolutionary story of intentional systems: why and how have systems with this basic architecture been selected for? Are beliefs (decoupled representations) and preferences "fuels for success" (Sterelny, 2003b: 30)?

Even if we are compelled, at the end of the day, to accept a full eliminativism concerning a commonsensic conceptual-psychological framework for describing the wiring-and-connection facts of at least some animals (including us), our interpretation habits might still be acknowledged as facts which presumably have played an important role in the evolution of a *human* kind of mind.

I highlighted that in complex coordination scenarios, like those depicted by Godfrey-Smith, the interpretive habits put pressure on the wiring-and-connection facts, shaping their evolution. Hence, one might say that the *use* of folk psychology as an interpretive craft, was an *ultimate cause* of the evolution of a particular kind of mind, with a special wiring and special connections to the world.

Dual inheritance theory

P. Richerson and R. Boyd's dual inheritance theory is one of the main contemporary approaches to human evolution. I want to suggest in the following that their theory embrace elements of a commonsense image of human beings and therefore might be seen as another compatibilist approach to human evolution.

They assume, effectively, that human evolution is anomalous because we are social *and* cultural agents.[11] Culture functions, in the human case, as another kind of inheritance system, besides the genetic one, making available a faster way to meet adaptive problems in a wide range of environmental conditions.

Furthermore, they take seriously the human sciences (and its underlying folk image of human agents) to come to grips with an acceptable evolutionary theory. Richerson and Boyd claim that it is not enough to explain the observable variation in human behavior on the basis of just genes and environment (like other approaches to human evolution, as evolutionary psychology and behavioral ecology): "The evidence accords better with the traditional views of cultural anthropologists and kindred thinkers in other disciplines: heritable cultural differences are crucial for understanding human behavior" (2005b : 19).

The traditional nature/nurture dicotomy is forcefully discarded on the basis that culture is not just a *proximate* cause of human behavioral variability but also an *ultimate* cause of our (innate) social psychology. This is one of the levels in which coevolutionary processes involving culture shape human evolution (Ibid. : 8).

There is also a compatibilist element in the way Richerson and Boyd model cultural evolution, by assuming *forces* which are *not* analogous to those acting in classical evolution through genetic inheritance. Among these we have several biases in the way we assimilate and transmit culture, as well as a special case of natural selection, acting on cultural variation. Cultural inheritance is not, therefore, strictly analogous to genetic inheritance. This is not an obstacle, of course, for conceiving a coevolution between those two processes.

A definition of *culture* is, of course, crucial to their project: "Culture is information capable of affecting individuals' behavior that they acquire from other members of their species through teaching, imitation, and other forms of social transmission" (R&B, 2005b : 5).

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[11] To recognize the exceptionality of human evolution doesn't exclude, of course, the need to find out the relevant homologies between human behavior and psychological capacities, on the one side, and those of other animals, on the other side (Richerson and Boyd, 2005b : 104).

Despite the use of the *prima facie* scientific concept of information, in their discussion of that definition they deploy folk psychological concepts (with a disclaimer, though[12]):

> "By information we mean any kind of mental state, conscious or not, that is acquired or modified by social learning and affects behavior. We will use everyday words like idea, knowledge, belief, value, skill, and attitude to describe this information, but we do not mean that such socially acquired information is always consciously available, or that it necessarily corresponds to folk-psychological categories" (R&B, 2005b : 5).

This is an ideational concept of culture which constrats with many other concepts that do other jobs in different theories.[13] Many animals surely have culture, if we adopt Richerson and Boyd's definition. However, the evidence presently available is that the *accumulation* of culture is a very rare phenomenon.

We've got an *adaptationist puzzle*: if the advantages of a cumulative culture are so impressive (greater and faster adaptability), why did it not evolve, as far as we know, in other lineages besides our own?

Culture can function as an inheritance system only if there is some mechanism supporting what Tomasello calls the *ratchet effect* (1999). A capacity for social learning through imitation (or observational learning) plays this role in dual inheritance theory.

Learning by imitation incur, however, heavier costs than we might expect at first sight. It requires, effectively, a special psychological capacity: mindreading (theory of mind). The *adaptationist puzzle* led Richerson and Boyd to bring forth our interpretive abilities in their account of human evolution. It is a remarkable result from a compatibilist point of view, since what Sterelny and others call *social agency*, now incorporate also *cultural agency*, that is, the role agents play in cultural transmission with their effects, at a population level, in cultural evolution.

I don't have space here to analyse the mathematical models Richerson, Boyd and others set up which show that there are barriers, however, to the evolution of true imitation. A way to counter these results is to suppose that the psychological precondition for culture accumulation evolved, originally, to meet the complexities of the social environment (an

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[12] They are sometimes rather dismissive about folk psychology (e.g. Richerson and Boyd, 2005b : 35).
[13] 'Culture' should be viewed as a theoretical term.

application of the social inteligence hypothesis). Richerson and Boyd suggest, along these lines, that a "roundabout path" might have been traveled by our ancestors: they first evolved an ability to (better) predict the behavior of their fellows - by reading their minds (and not just their behavior). Then, as a byproduct, this psychological capacity could be used for imitation purposes (R&B, 2005b : 138-9). This argument pressuposes that what has been called a *machiavelian intelligence* has the same psychological requirement as true imitation: a mindreading (or theory of mind) capacity.[14]

It still has to be shown, however, why other species - for instance, the great apes - could not have traveled the same path. After all, they were facing physical and social adaptive problems analogous to those of our hominid ancestors. The *adaptationist puzzle* is still there to be solved!

Richerson and Boyd's attempt to meet this enduring puzzle is not very convincing, though. All they have to say is that we got there before other species: "… we have preempted most of the niches requiring culture, inhibiting the evolution of any competitors" (Boyd and Richerson, 2005a : 16).

Their commitment to adaptationism and nativism concerning the mind seems to be the problem here. They bite the bullet of the evolutionary psychologists accepting, for instance, that we've got a theory of mind module.[15] This corresponds to the *first* scenario depicted by Godfrey-Smith, in which a mindreading capacity *evolves* on the basis of just genetic inheritance.

The external integrative project proposed by Sterelny might help fleshing out Richerson and Boyd's roundabout path. The *third* scenario points to niche construction and epistemic engineering as processes underlying the *development* of interpretive abilities. Those processes allow, of course, a much faster pace in spreading these abilities in the population than (classic) evolution through genetic inheritance. Very slight differences in mindreading abilities - due to differences in those constructive processes - might have had big cultural-evolutionary effects in a relatively short period of time, precipitating more differences in niche construction and epistemic engineering, bringing about a virtuous

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[14] See Blackmore, 2000.

[15] Richerson and Boyd don't accept massive modularity, though (see note 6). They reject also a thesis evolutionary psychologists are sympathetic with: that culture is evoked by the environment (2005b : 44).

circle. Furthermore, if we admit the full causal power of our interpretive capacities and their bearing in shaping those processes, we can predict that our minds could have changed even after the Pleistocene, what Richerson and Boyd seem ready to accept in their latest publications (Richerson and Boyd and Henrich, 2010; cf. Richerson and Boyd, 2005b : 230).

Why isn't there more room for niche construction and epistemic engineering in their theory, despite the importance they attach to cultural evolution? My guess is that Richerson and Boyd don't accept the full implications of their compatibilist stance.

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