INTRODUCTION: COMPLEX PHYLOGENY

Besides proposing a solution to the “paradox of altruism,” which refers to the apparent fitness disadvantage of moral behavior, Darwin was interested in understanding the continuity between lower animals and humans. He pointed to analogs and precursors of morality in other creatures. In this context he formulated claims that concern the phylogeny of moral psychology. He said famously:

"Any animal whatever, endowed with well-marked social instincts, the parental and filial affections being here included, would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well, or nearly as well developed, as in man."

This certainly sounds like a simplistic hypothesis. It declares that moral conscience is equivalent to a simple sum of intelligence + social instinct. Consequently, the phylogenetic trajectory is also maximally simple. Morality appears after adding one trait to social instinct, which Darwin conceives as being already present in any social species. In fact, I think the formula represents a shorthand version for a far less simplistic view. Spelling out intelligence and social instinct already reveals considerable complexity.

The social instinct is constituted by several elements. First, many animals feel pleasure at each other’s company. This explains why they aggregate in groups and tolerate each other’s proximity. Then, there is sympathy, which implies the ability to feel pleasure/pain when confronted with the pleasures/pains of others. This explains why animals
are motivated to do services for other animals, mainly to conspecifics, and also how they learn behaviors that benefit others. Finally, Darwin thinks animals also have some innate impulses to perform services to others, such as grooming, warning of danger, mutual defense and cooperative hunting.

Adding intelligence to these components will transform them in several ways. Darwin does not explain in detail what he understands by “intelligence.” But from his scattered reflections in chapter 4 of the second edition of the Descent of Man we gather that he refers to the reflective awareness of agency through time and memory. Two important transformations of the social instinct follow. One of them involves a transformation of sympathy into the feeling of remorse, which is essential to how we experience duty. Animal sympathy seems restricted to present consciousness and perception to the pleasures or pains of others that lie in the present, but not to those that lie in the past. When a non-human animal fails to perform a service because a conflicting drive presents a more urgent matter, it does not feel remorse later (a migratory bird will not feel remorse at having abandoned its offspring in the face of the urge to migrate) whereas humans characteristically do. Darwin explains that humans retain a vivid memory of past failure with a present consciousness of the content of the social instinct. Whereas the content of the social instinct is a picture of doing a service to others, a memory of past failure is a picture of oneself as harming others. Sympathy will make the subject feel the other’s pain and direct anger at oneself as the cause of that pain in the form of remorse, but only after intelligence makes available both the past (as present in memory) and the self. Therefore, intelligence is active in the production of the elements that are necessary to build the feeling of remorse: memory of a past action and the connection of the pain of others to the self as cause.

The transforming action of intelligence does not end here. Consciousness of the content of the social instinct is realized differently in animals and in humans. In animals the contents are embedded in innately specified instincts. Animals have no command over those contents and seem unable to modify them fundamentally. Humans, in contrast, make those contents propositionally available in the form of rules. Darwin says that humans possess innately or instinctively only a general idea of common good and no special instincts “to tell him how to aid his fellow men.” Particular social instincts that are typi-
cal for animals have been replaced in humans by learned behaviors backed by cultural norms. Specification is achieved through reason and experience. The specific rules that make up duty are thus marked by the peculiar plasticity of cultural creation. Through language, members of a tribe formulate their individual aspirations and negotiate agreements with others about the normative commitments of the group. Language thus favors both the negotiation of norms and a shared consciousness of the outcome. Darwin points out, moreover, that some norms can be the outcome of wrong reasoning: he usually mentions food taboos.

The memory of past violations that produces remorse has a propositional content that overlaps with the content of the violated norm, which is in some measure a cultural product. With the consciousness of past violation, Darwin brings a radical transformation of social instinct into something more like the consciousness of norms and of imperative rules of conduct that are publicly supported by members of one’s group. A complex trait of inter-subjective consciousness and shared intentionality is introduced under the idea of a simple sum of intelligence + social instinct. This “sum” is more complex than it seems, and consequently the phylogenetic trajectory must be more complicated than just adding one trait to social instinct.

SOCIAL ANIMALS AND SOCIAL ANCESTORS: COOPERATION VS. COMPETITION

Darwin’s phylogenetic hypothesis contains more complexity than is apparent at first sight, but there is one further peculiar point in his view. Darwin understood social instinct in the specific sense of a pro-social instinct. He was referring to those behaviors that make animals cooperative, as opposed to competitive. Certainly, Darwin believed that an intelligent bee would end with a rather alien morality but even that would count for him as morality, i.e., as mainly directed at the common good:

If, for instance [...] men were reared under precisely the same conditions as hive-bees, there can hardly be a doubt that our unmarried females would [...] think it a sacred duty to kill their brothers, and mothers would strive to
kill their fertile daughters; and no one would think of interfering [...] the instincts of the bee have been acquired for the good of the community.

Darwin conceived animal sociality as constituted mainly by cooperative behaviors oriented to a common good. This is no longer obvious. Today social intelligence is understood as neutral between cooperation and competition. Sociality can mean, for any given species, more competition than cooperation. Moll and Tomasello have recently advanced, under the name of the Vygotskian intelligence hypothesis, a view of this sort. Their hypothesis claims that chimpanzees differ from humans as being a mainly competitive social species. Since I will address this claim in detail below, I shall formulate it here:

Competitive chimpanzee hypothesis (CCH): Chimpanzee social intelligence is adapted for social competition rather than for cooperation. Chimpanzees attribute in competitive contexts mental states that they cannot attribute in cooperative ones.

According to this hypothesis, chimpanzees’ social cognitive skills reflect a competitive bias. The CCH is particularly relevant for a phylogeny of morals if we assume that chimpanzees are a good approximation to the mind and psychology of a common ancestor. Moll and Tomasello say explicitly that chimpanzees are lacking something besides intelligence if they are to be capable of a predominantly cooperative way of life. Their social intelligence is certainly less developed, but they lack foremost an emotional quality that would incline them to cooperation. They have too much aggression and not enough tolerance or good will toward each other (see also Hare, 2001). This was presumably characteristic of our common ancestor as well, who lacked, first of all, a pro-social emotional attitude, which in general would be necessary before a social species can gradually perceive new possibilities for cooperation and collective action. Intelligence of the sort required can only evolve after this emotional precondition for cooperation is met.

We can now identify the disagreement between Darwin and the CCH as concerning, not the phylogenetic sequence per se, but rather the point in the sequence occupied by chimpanzees and presumably by our common ancestor. Darwin’s characterization of the social instinct and his dictum about adding intelligence suggests that our common ancestor with chimpanzees had the instinctive orientation to a common good that is required for the development of a moral
sense. But according to Moll and Tomasello (also Hare, 2001), our common ancestor had yet to develop this instinctive pre-condition before being able to adopt a cooperative way of life.

Now, this disagreement cannot be resolved otherwise than empirically, i.e., by observation and correct interpretation of chimpanzee social character. Darwin based his views on general observations. He did not have the opportunity to observe primates in any detail, let alone chimpanzees, and even less to experiment with them. Moll and Tomasello, in contrast, are committed primatologists and experimentalists. What they have to say about chimpanzees should be invested with a little more authority than Darwin’s own speculations.

SOCIAL CHARACTER OF CHIMPANZEES: WHOSE EVIDENCE?

Contemporary primatologists are not, however, of one opinion regarding chimpanzee social character. Some of them would line up with Darwin and locate them high up in the cooperative scale. Christoph Boesch (2005) has argued, based on field observations, that cooperative hunting in the Thai chimps is an example of intentional coordination of different roles to achieve a collective good, very much as in humans. This directly contradicts the views of Tomasello and collaborators. Unfortunately, consensus about how to resolve the disagreement is lacking. Empirical evidence drawn from field observations is ambiguous and subject to many interpretations. But lab-based research is suspicious on other grounds: it lacks ecological validity, for animals do not experience a proper cognitive development in artificial environments. However, one cannot be wholly skeptical of either of these two sources of evidence. Claims that try to combine the advantages of each should deserve special attention. It seems to me that the advocates of the CCH make precisely a claim of this sort. They claim to have found differences in chimpanzee performance in social intelligence tasks, depending on whether the frame of the lab-tests is competitive as opposed to cooperative. Chimpanzees show social understanding in competitive contexts that they lack in cooperative ones. This is exactly what one would expect if competition were the natural ecological environment for the expression of their social cognitive abilities. They conclude that chimpanzees are pre-
dominantly competitive, that is, the CCH. This claim combines the use of controlled experiments for disambiguation of field observations with the idea that competition is the right ecological context to test social cognition.

The CCH was proposed as a way of explaining away contradictory experimental findings about social cognition in chimps. Primatologists were initially optimistic about mind reading abilities in chimpanzees (Povinelli, 1990), but the criticisms of Heyes (1993) introduced a skeptical turn. Research into psychological understanding in chimpanzees reached a dead end when Povinelli obtained negative conclusions in a series of experiments about visual attention (Povinelli and Eddy, 1996; Reaux et al., 1999). Then, two papers by Hare et al. (2000, 2001) brought a turning point. They seemed to prove, against Povinelli’s results, that chimpanzees understand the difference between seeing and not seeing. Hare proposed the CCH as a way of resolving the apparent contradiction (Hare, 2001). He observed that the experiments differed precisely in the cooperative or competitive task with which subjects were confronted. Chimpanzee social cognition is expressed in the competitive tests, but not in the cooperative ones. Tomasello’s lab abandoned the global skeptical view of chimpanzee understanding of mental states (Tomasello et al., 2003), while Povinelli’s lab remained skeptical.

THE CCH AND THE ALLEGED CONTRADICTION IN EXPERIMENTAL DATA

The case for the CCH depends therefore on the claim that chimpanzees understand in competitive contexts psychological states that they do not understand in cooperative ones. In this and the next section I will examine the experiments that presumably prove this. I do not think they do, so my assessment of the CCH is that it currently lacks experimental support.

Let us first look at Povinelli’s experiments that suggested that chimpanzees do not understand “seeing that” (Povinelli and Eddy, 1996; Reaux et al., 1999). In these experiments, subjects have to decide from which of two cooperators (experimenters) they will beg food. They face two experimenters, one of whom sees that they are begging food, while the other does not. In the pictures in figure 1, chimpanzee sub-
jects choose randomly. They choose the wrong one on figure 3 (the experimenter with closed eyes). The only case in which they choose correctly without training is depicted in figure 2. Their performance across these conditions suggests that chimpanzees do not understand “seeing that,” at least not in the way humans do. They mainly consider body orientation to choose from whom to beg and to a lesser extent face orientation; eyes are apparently irrelevant.

![Figures 1, 2, and 3]

Figure 1. Subjects choose randomly.
(All figures from Reux et al., 1999.)

Figures 2 (left) and 3 (right). Subjects choose (fig. 2); subjects choose the wrong (fig. 3).

In the competition design of Hare et al., two subjects, a subordinate and a dominant, will compete for a piece of food placed in an middle room which each can see from adjacent rooms on opposite sides. The subordinate will always see the piece of food either presently or at the moment of hiding and will always be able to monitor the dominant;
the dominant will sometimes see it or have seen it placed, sometimes not (see fig. 4). The point of the experiment is to establish whether subordinates can discriminate pieces of food that the dominants are aware of at the moment of competition, from those of which they are not aware, and reveal this discrimination in the choices they make in the competition. Several conditions are used for marking the distinction awareness/non-awareness in the dominants: pieces in the open as opposed to a piece behind a barrier; pieces behind a transparent barrier as opposed to ones behind an opaque barrier; pieces that are not actually seen but were seen as they were being hidden, as opposed to pieces that are neither seen nor were seen being hidden; pieces that were seen both during hiding and as they were changed of location, as opposed to those that were seen during hiding but not during change of location; pieces that the dominants saw when being hidden, but then, at the moment of competition, the dominant is exchanged for another one that is ignorant, as opposed to a situation where the dominant that witnessed is the same one that competes. Table 1 gives a summary of all the conditions for competition.

Table 1. Risky conditions (A) against safe conditions (B)

<table>
<thead>
<tr>
<th>A. Risky piece</th>
<th>B. Safe piece</th>
</tr>
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<tbody>
<tr>
<td>seen now or seen during hiding process</td>
<td>(not seen now, nor seen during hiding process</td>
</tr>
<tr>
<td>in the open</td>
<td>behind an opaque barrier</td>
</tr>
<tr>
<td>behind a transparent barrier</td>
<td>behind a transparent barrier</td>
</tr>
<tr>
<td>seen placed behind a barrier</td>
<td>seen placed behind a barrier</td>
</tr>
<tr>
<td>seen placed and moved</td>
<td>not seen placed</td>
</tr>
<tr>
<td>seen placed by the same dominant witness</td>
<td>seen placed, but witness was changed</td>
</tr>
</tbody>
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| Table 1 | Risky conditions (A) against safe conditions (B) |
In all these experiments the results were univocal: subordinates preferentially retrieved the piece of food of which the dominant was unaware and succeeded more often in these cases. Presumably, chimpanzees keep track of what others see/have seen or do not see/have not seen and use this knowledge in food competition.

It seems therefore, that there is a contradiction between Hare’s and Povinelli’s experiments. However, the crucial point is whether the contradiction is in the data or not. Only a contradiction in the data calls for the sort of reconciliation that Hare is proposing. Povinelli’s results suggest that chimpanzees attribute visual perception, if at all, on the basis of body orientation. His data suggest that they do not understand the role of eyes. But Hare’s experiments produce no data concerning eye role. Hare’s subordinate subjects could have tracked what dominants see from their body orientation. Strictly speaking, the data do not contradict each other.

DIFFERENT INTERPRETATIONS, COMPATIBLE DATA

The appearance of a contradiction comes from the different interpretations: Povinelli and Vonk (2003) argued that chimps read behavior (body orientation) but do not read minds. Hare et al. argued that they do. The disagreement is at the level of interpretations, not at the level of the data. Since subjects did not seem to understand the role of eyes, Povinelli claimed that they do not attribute the mental state of seeing. But this assumes that a subject can understand another one as seeing an object only if it understands the roles of eyes. However, it seems possible to attribute awareness of an object in the visual field even being ignorant of the role played by the eyes; much in the same way as ancient philosophers attributed propositional awareness to others, without knowing about the role played by the brain in thinking. Chimpanzees and other animals could attribute visual perception even without understanding eye role. Tomasello’s group endorses this interpretation: “there is no reason why other [non-human] organisms could not develop [an understanding of] perceptual mental states based on the face as opposed to the eyes” (Kaminsky and Tomasello, 2004).

Both experiments produce data that suggest that chimpanzees un-
derstand the behavioral implications of being bodily oriented towards an object. Since Hare et al. produce no data about conflicts between eye and body orientation, they cannot contradict Povinelli’s data on this subject. So in the end, whether you want to say with Povinelli that chimpanzees only read body orientation and hence behavior but not minds, or you want to say with Tomasello that they do understand mental states, this is a question of how you interpret the data and of how you understand the relationship between mental states and behavior. What we have is different interpretations of fundamentally compatible data.

But, if there is no contradiction in the data, can we say that chimps understand seeing in competitive contexts but do not understand it in cooperative ones? The answer, I think, is obvious and definitive: we cannot. The comparison between both sets of experiments cannot establish that chimps attribute perceptual states in competitive contexts that they do not attribute in cooperation contexts. The CCH needs contradictory data across contexts. Only in this case can it claim that a context dependent performance solves the contradiction, but we do not have the required contradiction. Given the data, you can advance for both experiments either the interpretation that chimps understand seeing, but not eye-role in seeing; or that they understand the behavioral implications of being bodily oriented towards an object but do not attribute mental states. What you cannot say is that they understand something in competitive contexts that they do not understand in cooperative ones.

To have an idea of what is missing, imagine doing a variant of the Hare et al. (2000; 2001) experiments, with two conditions:

1] Dominants have blindfolds over their eyes.
2] Dominants have blindfolds over their mouths.

Imagine moreover that subordinates respond differently in these two conditions, i.e., they retrieve the piece of food preferentially when the blindfold is over the eyes of dominants but not when it is over their mouth. This would show that, in the competitive context, chimpanzees understand something about visual perception (eye-role) that Povinelli had already shown that they do not understand in a cooperative context (where they beg food randomly from cooperative experimenters with blindfolds over eyes or mouth). Both things
together deliver the contradiction that CCH requires but currently no evidence exists for this view.

Hare and Tomasello did further experiments to confirm differences in cognitive abilities across competition and cooperation contexts and published a report with the title "Chimpanzees are more skilful in competitive than in cooperative cognitive tasks" (Hare and Tomasello, 2004). The idea was to confirm the CCH in one experimental setting instead of the two separate experiments that suggested the hypothesis in the first place. In this new setting, the chimpanzees are tested in their ability to understand and attribute goals to others. A piece of food is hidden under cups. An uninformed chimpanzee that has seen that some food was hidden but could not see exactly beneath which cup has to infer its location via its understanding of the goals expressed by \textit{a]} the reaching hand of a competitor which has seen the hiding and wants the food, or by \textit{b]} the pointing hand of a cooperator which has seen the hiding and wants to communicate where the food is. Without training, chimps understand the goals that drive the reaching hand of the competitor, but not those behind the pointing hand of the cooperator.

However, one should note that though the behavior expressing the goals is very similar in both conditions (an arm extended in the direction of the food), the goals themselves are very different. In the competitive condition, the competitor wants to get the food. But in the cooperation condition, the cooperator does not want to get the food but to communicate where the food is. These goals are not only different but of different complexity as well. The goal of wanting food is a first order intentional state. The goal of communicating is a higher order intentional state. Most probably, in order to understand a communicative intention, a subject has to attribute to the communicator an intentional state that mentally mirrors the mind of the receptor as mentally mirroring in turn the mind of the communicator; that is, at least three orders of intentional understanding are involved, if not potentially more.

For this reason, I conclude that the cooperative and the competitive conditions in Hare and Tomasello (2004) test for different mental state attributions. Now, if the experiment tests for different mental states, it cannot show that chimps have an understanding of a mental state in competitive contexts that they lack in cooperative ones. A simpler explanation is that chimpanzees are able to understand
wanting food: they interpret the reaching hand of the competitor as revealing that intention; but are not able, at least not spontaneously and naturally, of understanding a communicative intention, which is a mental state of greater complexity.

To see the difference, imagine a variant of the experiment where the cooperative condition is designed with a counterpart that shows interest in the food by eating some and sharing some with the chimp. This cooperative counterpart would then try to reach for the food expressing the same intention of getting the food as the competitor. This experiment would test the understanding of the same mental state across two different contexts. Two things could happen in this new experiment. If chimpanzees in the test phase understand this behavior as revealing the location of the food, then it will be confirmed that their lack of understanding in Hare and Tomasello (2004) was due to the difference between the goal of wanting food and the goal of communicating where the food is. If they do not understand the reaching hand of the cooperator, then it would be evidence that they understand mental states better in competitive than in cooperative contexts. We have yet no evidence as to what it will be.

CONCLUSION

The \textit{CCH} is an interesting hypothesis that establishes chimpanzees as a being either one step behind social species as Darwin understood them or as having gone curiously astray in social evolution but contrary to what its advocates say, no hard empirical evidence has yet advanced in favor of the \textit{CCH}. The evidence so far offered is not the type of evidence that the hypothesis requires.

REFERENCES


