

Cultural transmission and social control of human behavior

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Abstract Humans have developed the capacity to approve or disapprove of the behavior of their children and of unrelated individuals. The ability to approve or disapprove transformed social learning into a system of cumulative cultural inheritance, because it increased the reliability of cultural transmission. Moreover, people can transmit their behavioral experiences (regarding what can and cannot be done) to their offspring, thereby avoiding the costs of a laborious, and sometimes dangerous, evaluation of different cultural alternatives. Our thesis is that, during ontogeny, the evaluative communication (approval/disapproval) between parents and offspring is substituted by other evaluative communications among peers, like individuals of the same generation. Each person belongs to a reference social group with individuals that interact more intensively. Humans have developed psychological mechanisms that enable cultural transmission by being receptive to parental advice as well as their reference social group. The selective pressure that promoted these new evaluative interactions arose to facilitate the establishment of efficient cooperative relationships. In short, the social control of behavior is essential to understand human cultural transmission.

Keywords Cultural evolution · Assessor · *Homo suadens* · Social learning

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Introduction

Nature, when she formed man for society, endowed him with an original desire to please, and an original aversion to offend his brethren. She taught him to feel pleasure in their favourable, and pain in their unfavourable regard. She rendered their approbation most flattering and most agreeable to him for its own sake; and their disapprobation most mortifying and most offensive. Adam Smith (*The Theory of Moral Sentiments*)

Even when we are quite alone, how often do we think with pleasure or pain of what others think of us,- of their imagined approbation or disapprobation; and this all follows from sympathy, a fundamental element of the social instincts. A man who possessed no trace of such instincts would be an unnatural monster. Charles Darwin (*The Descent of Man*)

Cultural transmission in our species works as a cumulative inheritance system of great adaptive value that has facilitated colonization around the planet, despite that humans lack specific adaptations for some environments (Richerson and Boyd 2005). However, human populations living in similar environments can exhibit different cultural patterns of behavior and hold different beliefs and values that can be adaptive, sometimes neutral, or even maladaptive (Boyd and Richerson 1985). This has been explained by most social scientists by taking culture as a “super-organic” phenomenon (Durkheim 1962; Kroeber 1917; Geertz 1973). For example, Durkheim (1962), the founder of sociology, indicates that “the general characteristics of human nature participate in the work of elaboration from which social life results. But they are not the cause of it, nor do they give it its special form; they only make it possible”. This sociological point of view, also called the Standard Social Science Model (SSSM), argues that evolved, biological, or innate aspects of human behavior are insignificant, having been superseded by the capacity for culture. Therefore, according to the SSSM, individuals are more or less passive recipients of their culture and products of that culture.

The theory of dual inheritance suggested by Boyd and Richerson (1985) criticizes super-organicism and proposes an eclectic position between the Standard Model and evolutionary psychology. Boyd and Richerson take for granted that culture is a part of human biology, but they also assume that culture acts as a second system of inheritance that uses transmission rules that are different from genetic inheritance. They suggest that much variation in human behavior cannot be understood without accounting for beliefs, values, and other socially acquired determinants of behavior. In the basic standard model of Boyd and Richerson (1985), each individual of the new generation chooses a cultural model from the previous generation, either from their parents or an individual taken at random, and adopts his behavior. The result is that the initial frequencies of the alternative cultural behaviors are maintained. Therefore, culture replicates the phenotypic structure of the parental generation and behaves as a true system of inheritance. In other words, cultural transmission functions in a similar way as SSSM. However, Boyd and Richerson’s theory differs from SSSM because, starting from an unbiased basic model, they built biased transmission models that favor the preferential transmission of some variants above

others. These biases depend on Darwinist psychobiological mechanisms as those proposed by evolutionary psychology. Such psychobiological learning mechanisms can produce two types of biases that can be categorized into *content* biases and *context* biases (Henrich and McElreath 2003). Content biases affect the likelihood that a particular cultural alternative will be transmitted because of its special content. Content effects may reflect the direct action of natural selection on our evolved psychobiological abilities or may also arise as by-products of cognitive evolution. Conversely, *context* biases exploit cues from those individuals who are cultural models, rather than features of the cultural alternatives themselves, to guide cultural transmission. Examples of context psychobiological mechanisms are conformist transmission that allows individuals to aggregate information over the behavior of many individuals or the prestige bias that favors the adoption of behaviors performed by the most successful individuals. Richerson and Boyd (2005) emphasize that innate content biases work against the spread of arbitrary differences, whereas context biases can sometimes generate traditions without adaptive value or even maladaptive traditions.

In this paper we assume, as do Boyd and Richerson, that culture is a part of human biology which works as an inheritance system but, following Castro and Toro (2002, 2004), we consider that culture is not a true system of replication. Castro and Toro (2004) propose that the human cultural transmission depends on a singular system of social learning that our species possesses: the assessor cultural transmission. They suggest that our hominid ancestors, which they call *assessors*, developed the capacity to conceptually categorize one's own and others' learned behavior in terms of values—positive or negative, good or bad—and that such a capacity allowed them to approve or disapprove of their offspring's learned behavior. In this way, assessor individuals can transmit all their behavioral experience about what can and cannot be done to their offspring and hence, the costs of a slow, laborious, and sometimes dangerous, evaluation of different cultural alternatives are avoided. For Castro and Toro (2004) it was this capacity to approve or disapprove of offspring's behavior that transformed the hominid culture into a system of cumulative cultural inheritance similar to that of humans.

Here we propose that the capacity to conceptually categorize one's own and others' learned behavior allows human beings to approve or disapprove of the behavior of other individuals as well (not only of their children's behavior). Our thesis is that, during ontogeny, the evaluative communication (approval/disapproval) between parents and offspring is expanded to other evaluative communications among peers like individuals of the same generation. Thus, we extend the model of assessor cultural transmission between parents and offspring to a more general model where the approval or disapproval of behavior is also provided by other unrelated individuals. We propose that each person belongs to a reference social group composed of individuals that interact more intensively: relatives, partner, friends and colleagues. We suggest that humans are *Homo suadens* (derived from Latin *suadeo*: advice, evaluate, counsel, approve). Humans have developed psychological mechanisms to enable assessor cultural transmission by being receptive to parental advice as well as advice from their reference social group. We propose that the selective pressure that promotes these new evaluative interactions arises to facilitate the

establishment of efficient cooperative relationships. In short, social control of behavior is essential to understanding the human cultural inheritance.

Assessor cultural transmission from parents to offspring

In species with some individual learning capacity, the development of a system of social learning can turn out to be adaptive, since it takes advantage of the range of behavior developed by the previous generation (Lumsden and Wilson 1981), and allows a reduction in the time and cost involved in such learning (Boyd and Richerson 1985). However, Rogers (1988) has shown that the fact that social learning allows an individual organism to avoid the costs of learning does not increase the ability of that species of organism to adapt and is insufficient to explain the adaptive success of human culture. Although Roger's result is robust, Boyd and Richerson (1995) have shown that social learning (i.e., basically imitation) can be adaptive if it makes individual learning more accurate or less costly. Imitation makes individual learning more accurate if imitation allows for accumulation of behaviors. Imitation makes individual learning less costly if individuals use individual learning when it is cheap and reliable, and switch to imitation when individual learning is expensive.

Social learning is common in nature, but only in humans did it produce a cumulative cultural evolution with great adaptive value. For Boyd and Richerson (1996), cumulative cultural evolution is not present in chimpanzee culture because chimpanzees unfold their imitative learning abilities in a less reliable manner than humans. All primate cultural traditions may be maintained through indirect social learning, while evidence suggests that the cumulative cultural change is only feasible with true imitation, and not with indirect social learning, since with the latter the behavior is not truly imitated, but rather has to be re-invented (Boyd and Richerson 1995). That is, although a given individual may learn somebody else's innovation by imitation, there will be no other individual that could later imitate it in a precise manner. Thus, this innovation cannot be propagated, and becomes lost until someone else re-invents it. Boyd and Richerson (1996) suggest that, although cultural accumulation is adaptive, it is likely that the cognitive abilities that allow the initial evolution of an efficient capacity of imitation must evolve as a side effect of some other adaptive change—e.g., a capacity for theory of mind that may have initially evolved to allow individuals to better predict the behavior of other members of their social group.

Following Castro and Toro (2004), we suggest that imitation in primates is basically a tool that allows an individual to learn the behaviors that other individuals of the population exhibit but to refrain from adopting the behaviors until after further evaluation. We consider that the adoption of a learned behavior in non human primates can be defined as a three-step process. First, the behavior is discovered and learned. Second, the learned behavior is tested and evaluated, and third the behavior is rejected or incorporated into the behavioral repertoire (Castro and Toro 2002, 2004). We think that imitation is a mechanism to discover and learn a given behavior, without compromising its final adoption. Therefore, primates can learn the behaviors

they observe but evaluate them before deciding which ones are going to be incorporated into their behavioral repertoire. When an individual tests a learned behavior, it obtains satisfaction or rejection. Depending on the results, he may or may not incorporate the behavior into his behavioral repertory. Therefore, primates maintain intact the evaluation systems required for the trial-and-error learning, that are phylogenetically older, in mammals, than the capacity of imitation.

From this definition of imitation as a process of observational learning but not of replication of behaviors without evaluation, we contend that an increase in the efficiency of imitation is necessary but not enough to explain the transformation of primate social learning into a cumulative cultural system of inheritance in strict sense such as it happens during hominization. A key factor enabling such transformation was the fact that some hominids, which we call *assessors*, developed the capacity to categorize and to approve or disapprove their offspring learned behavior. This capacity to categorize learned behavior can be defined as the ability of an individual to categorize a given behavior by means of an essentially dichotomous conceptual evaluative code: positive or negative, good or bad (Castro and Toro 1995, 1998). This implies that an automatic mechanism for categorizing behavior used for individual learning is transformed into a conceptual categorization mechanism. It also implies that human beings may approve or disapprove of the behavior learned by their offspring and transmit to them the emotional value of behaviors they have already learned and categorized.

The simultaneous presence of both capacities in our hominid ancestors, imitation and approval/disapproval of offspring's learned behavior, represented a radical change in the rudimentary cultural transmission of first hominids. Individuals with both abilities generated a cultural inheritance system in a strict sense, since they could transmit information about the behavior their children were learning by conditioning its final acceptance or rejection (Castro and Toro 2004; Castro et al. 2004). Thus, children can take advantage of parental expertise, and transform social learning into a cumulative inheritance system, since young individuals reproduce the phenotypic structure in their parent's generation, thereby avoiding learning costs. Besides, as occurs in other primates, assessor individuals can rectify previously adopted decisions if the reward obtained from the behavior changes and can modify individually or socially learned behavior in a process that Boyd and Richerson (1985) have called guided variation. Thus, assessor social learning turns imitation into a parent-child inheritance system, without eliminating children's capacity to innovate. The possibility to learn from other individuals does not constrain their evaluation system either. Moreover, this cultural inheritance system is flexible despite of its reliability because it does not impede dissemination of behavioral innovations, which lack previous evaluation.

We take the view that human beings are assessor hominids (*Homo suadens*) with the ability to approve or disapprove of offspring's learned behavior. It seems that we humans have developed psychological mechanisms enabling assessor cultural transmission by making ourselves more receptive to parental directions. Baum (1994) indicates that humans are unusually sensitive to expressions of approval and disapproval by parents and others, whereas chimpanzees young brought up as human children remain quite wild and troublesome. Simon (1990) suggested that

human beings have a tendency to accept social influence that it allows the individual to use adaptive advantages stored in the cultural tradition. The capacity of approving or disapproving of children's learned behavior is an elementary form of teaching. Really it is not only a question of showing to the children how a thing can be done and if it has been performed well or badly, but also if it must or must not be done. This capacity has been adaptive because: (a) the approval and disapproval of learned behavior improves reliability of social learning, since it helps to modify badly imitated behaviors, and allows cumulative cultural transmission; and (b) it allows quick categorization of behaviors as positive or negative, favoring their acceptance or rejection. Therefore, it was this capacity to approve or disapprove offspring's behavior that made learning both more accurate and less costly, increasing reliability in the replication of imitated behavior and favoring the implementation of behaviors which have no immediate positive evaluation for the individual experiencing them.

Assessor parents make available to the offspring all the experience they had learned related either to the things they can do or to the things they cannot do. The former could be imitated but the latter is only transmissible by disapproval of behaviors that offspring are self discovering. Consequently, offspring can reject bad or dangerous behaviors without having to experience all their negative consequences. Moreover, human societies show many adaptive cultural traits actually take many years to learn—e.g. bow hunting (Walker et al. 2002; Gurven et al. 2006). When culture is complex, the parental approval/disapproval can serve as reinforcement to consolidate the different stages in which we can divide the complex learning and can also condition from the initial stages what conduct to learn. Thus, choosing which behavior to learn is an important decision that the parental orientation can facilitate.

Approval or disapproval of offspring's learned behavior has a cost for the assessor teacher just as many other traits of parental care have. The cost comes from the time and energy devoted to influence the offspring's behavior. However, the cost will be attenuated because a given amount of parental investment can be used to control simultaneously several behaviors learned by the offspring. The evolution of this capacity will depend on whether the benefit of parental orientation outweighs the cost. From the perspective of the offspring, acceptance of parental orientation could hardly be negative if we consider that the docility of offspring does not cancel out the possibility that children keep their innovative tendencies, imitate new behavior ignored by the parents or change their behavior when they are adults.

Assessor cultural transmission among peers

Humans can approve or disapprove of one another's behavior as well. Here we propose that, during ontogeny, the assessor communication between parents and offspring is extended by other evaluative interactions where the approval or disapproval of behavior is provided by other unrelated individuals. Throughout their lifespan, a person establishes a social reference group with individuals that interact closely during in a particular stage of life (parents, partner, friends, and colleagues).

Our thesis maintains that the individuals in the social reference group are neither neutral nor passive towards the behavior of a person in the group. Rather, they evaluate and demonstrate approval or disapproval, even if the behavior in question does not affect them directly. Chimpanzees may classify other individuals' behavior as favorable or unfavorable with respect to themselves, and may act accordingly, but the ability to approve or disapprove of other individuals' learned behavior seems completely absent in primates (Inoue-Nakamura and Matsuzawa 1997; Tomasello and Call 1997; Premack 2004).

In the previous section we have argued that approval and disapproval of offspring's learned behavior has been adaptive because it transformed non human primate social learning into a system of cumulative cultural inheritance. Now we propose that assessor cultural transmission also could be adaptive among unrelated individuals. However, if that is the case, we should be able to explain how a mechanism evolved where unrelated individuals have influence on one another, how they transmit their beliefs about appropriate behavior and how they became sensitive to other opinions. We think that the answer can be found in the Pleistocene when assessor individuals interacted in small groups for mutual benefit. The fascination with the paradoxical nature of altruism has made researchers overlook forms of cooperation which benefit both parties, although those behaviors have fundamental for the success of human societies. Individuals cooperate in pairs or in groups to form social groups of reference with frequent interactions. Cooperation for mutual benefit implies that the interaction between two or more individuals provides greater benefits for each partner than if they had acted independently. Frequently, an important requirement for mutually beneficial cooperation is the coordination of individual behaviors. Cooperation will be more efficient if individuals have similar knowledge, habits and norms about how they should behave (McElreath et al. 2003; Castro and Toro 2007).

Following the ideas of Hume, Adam Smith, Darwin and others, we suggest that human beings have developed psychobiological mechanisms that produce pleasure when we feel accepted by our social reference group. Assessor individuals have the ability to categorize one's own and others' learned behavior in terms of values, i.e., positive or negative, or good or bad. Our theory proposes that a tendency for cooperators to influence one another (and be sensitive to one another's opinions) could evolve in *assessor* individuals because the most frequent behaviors of their group would be accepted, favoring coordination and increasing benefits when cooperation for mutual benefit takes place. Thus, the evolution of the psychobiological predisposition to accept social influence can be explained by the greater payoffs obtained by cooperative groups that can harmonize their norms. The hypothesis assumes that this evaluative perception of the behavior allows disapprove of those individuals manifesting a behavior categorized as negative. The reprobation is a signal to the individual whose behavior has been reprovved. Furthermore, the negative consequences of social censorship to individuals (basically rejection as candidates for co-operation for mutual benefit (ostracism)) would explain the evolution in the human nature of this psychobiological predisposition to share the values with the reference social group.

Social approval/disapproval of behavior can affect significantly the evaluation of a behavior. The individuals have two sources of emotions when they exhibit a behavior, the first produced directly by the behavior and the second produced by social approval/disapproval. The assessor individuals combine both emotions and, as a result, can categorize the behavior as positive or negative, good or bad. If both emotions agree, there is no conflict in the evaluation. If the emotions are different, one of them will prevail. A change in the emotion produced by a previously categorized behavior implies a re-evaluation. For example, the feeling of pleasure generated by behavior i can decrease in intensity or even become negative over time. Also, a new behavior k that can be learned which produces more intense pleasure than i , and will displace it. But change can also occur due to a modification of socially transmitted value. For example, a behavior that it is forbidden at some age can be allowed later. Or the social group of reference can change in such a way that the categorization of some behaviors changes. Notice that a change in the social group of reference does not imply that the individual moves to a different population. We suggest that a substantial part of the positive/negative reinforcement comes from social interaction and we think that cultural transmission in our species will not be possible without this social control (approval/disapproval) of learned behavior.

It is worth emphasizing that the ability to approve or reprove the other's behavior could have interesting implications on the evolution of the capacity to establish and enforce social norms in the human species. We have proposed that conceptual classification of behavior in terms of positive/negative (good/bad) involves, according to its natural origin, a feeling of duty toward those positive behaviors, and this behavioral categorization and the feeling of "must" are the developmental roots of the ethical capacity (Castro and Toro 1998). We have also suggested (Castro et al. 2004) that the adaptive advantage provided by the system of assessor cultural transmission generated a selection pressure in favor of the development of a more efficient communication system (i.e., in favor of a linguistic capacity), allowing children to better understand this new kind of information received from parents about the value of a given learned behavior. We think that ethical capacity and language have been key factors in the evolution of social norms and cooperation in human societies.

Social norms are standards of behavior that are based on widely shared beliefs about how individual group members ought to behave in a given situation. The capacity to impose social norms is perhaps the decisive reason for the uniqueness of human cooperation in the animal world (Fehr and Fischbacher 2003). The evidence indicates that other animals largely lack the cognitive and emotional capacities that are necessary for social norms (Stevens and Hauser 2004). For example, experimental evidence indicates the existence of a norm of conditional cooperation (Fehr and Fischbacher 2004). If other group members cooperate, the norm also requires us to cooperate; if others defect we are also allowed to defect. We have suggested that assessor individuals, if the partner behaves in a selfish way, can reprove and penalize this behavior (Castro et al. 1998). The reprobation permits assessor individuals, through simple observation, to inhibit their altruistic behavior towards individuals whose selfish behavior have been already reproved, without

having experiences with them. Thus, assessor individuals would develop a cooperative behavior with evolutionary properties similar to that of reciprocal altruism and the ‘Tit-for-tat’ strategy. Nevertheless, in our opinion, the evolutionary origin and the success of the ability to approve or reprove the others behavior has not been to promote the development of the cooperation but it represents an adaptive answer to a more general problem: the cultural transmission of information about the value of learned behavior between individuals with a high capacity of learning.

A simple model

The following example is provided to clarify the ideas expressed above. Let i and j be two behavioral alternatives present in a population of N individuals. During ontogeny, individuals discover and learn by imitating the behavior of their parents (vertical transmission) and other individuals of the population (oblique and horizontal transmission). We assume that the imitation capacity is well developed and that population size (N) is small enough so that the individuals can observe the two behavioral variants present in the population. Then, individuals have to test and accept or reject the imitated behaviors. In this process they are exposed to parental influence and then to the social group of reference. Let β_{ij} be the probability that an individual (exposed to the two behaviors i and j) prefers i in the absence of parental or social approval or disapproval, and $\beta_{ji} = 1 - \beta_{ij}$ the probability that he prefers j . Under those conditions, the incorporation of behavior i , assuming that there is only one other alternative behavior j , will depend on β_{ij} . We assume that if $\beta_{ij} > 0.5$, the payoff of behavior i is greater than behavior j , and vice versa. If $\beta_{ij} = 0.5$ there are no differences in reward between i and j , or at least the individuals’ evaluation system cannot detect them. After parental influence, the probability p_i that an individual includes i into its behavioral repertory will depend on both β_{ij} and his parents’ behavior. Let us suppose, for simplicity, that only the mother approves or disapproves of a child’s behavior. Thus, if the mother is i , p_i will be

$$p_i = \beta_{ij} + (1 - \beta_{ij})\delta_m \quad (1)$$

and, if the mother is j , p_i will be

$$p_i = \beta_{ij} - \beta_{ij}\delta_m \quad (2)$$

where δ_m ($0 \leq \delta_m \leq 1$) measures the efficacy of maternal approval or disapproval whereas $(1 - \beta_{ij})\delta_m$ and $\beta_{ij}\delta_m$ measure the net effect of such approval or disapproval. In a similar way we can calculate the probability $p_j = 1 - p_i$ that an individual includes j into its behavioral repertory simply by changing β_{ij} by $\beta_{ji} = 1 - \beta_{ij}$ and substituting Eq. 1 by Eq. 2 and vice versa.

The second ontogenic step refers to social approval/disapproval. Let assume that N individuals cooperate for mutual benefit in random groups of n individuals. In each group there are n_i individuals that show behavior i and n_j that show behavior j , with $n = n_i + n_j$. The probability P_i of an individual finally adopting behavior i when it interacts in a group where this behavior is the most frequent ($n_i > n_j$) will be

$$P_i = p_i + (1 - p_i)\delta_s(n_i - n_j)/n \quad (3)$$

Whereas if the prevalent behavior in the group is j the probability P_i will be

$$P_i = p_i - p_i\delta_s(n_j - n_i)/n \quad (4)$$

where δ_s ($0 \leq \delta \leq 1$) measures the efficacy of social approval/disapproval and $(1 - p_i)\delta_s(n_i - n_j)/n$ and $p_i\delta_s(n_j - n_i)/n$ measure the net effect of such approval or disapproval. Obviously, if $n_i = n_j$ the social effect is neutralized and $P_i = p_i$. Similarly, the probability P_j that an individual adopts behavior j is constructed by simply changing the p_i by parameter $p_j = 1 - p_i$ and substituting Eq. 3 by Eq. 4 and vice versa.

Let us assume that the frequencies of the two alternative cultural behaviors i and j are p and $q = 1 - p$, respectively. If $\delta_m = \delta_s = 0$ (i.e., individuals are not assessors), the frequencies of i and j in the following generation will be $p = \beta_{ij}$ and $q = \beta_{ji}$, respectively. If $0 < \delta_m < 1$ and $\delta_s = 0$ (i.e., individuals are assessors but approval or disapproval is only from parents to offspring) it can be shown that, in the absence of selection, the equilibrium phenotypic frequencies of behaviors i and j converge, as before, to β_{ij} and $1 - \beta_{ij}$ respectively, although slowly. Besides, if $\delta_m \approx 1$ and $\delta_s = 0$, the system maintains the initial frequencies p and q irrespective of the value of β_{ij} and $1 - \beta_{ij}$, replicating the phenotypic structure of parental generation. Let us now assume that selection is introduced in such a way that the ratio of the fitness of behaviors i and j is $1:1-s$, and that genetically the capacity to approve or disapprove of offspring's learned behavior is controlled by haploid genetic system with two alleles, A for the assessor and a for the non-assessor. Then, it is possible to show that the assessor genotype A ($\delta_m > 0$) can invade a population of non-assessor genotypes a ($\delta_m = 0$) and that it will also be stable against invasion by the non-assessor genotype (see Castro and Toro 2004). This means that if there are fitness differences between behaviors i and j , selection favors individuals with a greater δ_m . Finally, if $\delta_m \approx 1$ and $0 < \delta_s \leq 1$ (i.e., individuals are assessors but approval or disapproval is also social), then individuals of each group of interaction will adopt the most frequent behaviors within the group. Let us assume that the coordination of behaviors within the group increases individual fitness when cooperation takes place—i.e., cooperative interactions can be modeled as a coordination game (McElreath et al. 2003). This means that selection also favors assessor individuals with greater δ_s .

Social approval/disapproval of learned behavior increases the frequency of the most frequent cultural alternatives within the population and, therefore, has a similar effect as conformist cultural transmission. Conformity is often observed in human social learning. Social learners preferentially adopt the most common behavior in many situations, though it is not clear why such a psychological tendency has evolved (Boyd and Richerson 1985; Henrich and Boyd 1998; but see also, Nakahashi 2007; Wakano and Aoki 2007). Cumulative cultural transmission has originated complex cultural traits in the human societies. In order to be able to choose between these complex characters the individuals they must carry out a slow and expensive evaluation by means of individual learning. In this situation it can be adaptive to imitate (to adopt) at random a conduct without evaluating the different

alternatives and, still better, imitating the most frequent (Boyd and Richerson 1985; Henrich and Boyd 1998). Nevertheless, according to our thesis, the cumulative cultural transmission has arisen between individuals assessor that interchange information on the value of the conduct. Thus, imitation in the hominid lineage did not evolve as an alternative to rigorous assessment of individually learned behavior, i.e., a mechanism to adopt conducts without evaluating them. Approval or disapproval of individuals' behavior works as a quick evaluative criterion that permits agents to orientate their behavior, which is particularly useful when evaluation is difficult or learning is complex. Only if a given individual does not have a social orientation and does not know how to behave in a new situation, then the most sensible thing to do is to do what the majority does ("When in Rome, do as the Romans"). In our model, conformism works when an individual does not have information coming from the individuals that form their social group of reference. Therefore, the conformism is a complementary mechanism to the social approval or disapproval of the conduct instead of an alternative mechanism.

Discussion

Evolutionary psychologists maintain that the blank-slate view of the mind is wrong (Cosmides and Tooby 1992). They defend that, as a result of selection on information-behavior relationships, the human brain is densely packed with programs that cause intricate relationships between information and behavior (Tooby and Cosmides 2005). Therefore, they suggest that the architecture of these evolved programs must be an essential constituent of social theories on human behavior and society. However, they do not contemplate, in an explicit way, the psychobiological tendency that Hume, Adam Smith, and Darwin detected clearly in the human nature, that makes us desire social acknowledgment and feel pleasure from approval and displeasure from disapproval. Castro and Toro (2004) have proposed that the approval/disapproval of behavior from parent to offspring is adaptive because it increases the reliability in the replication of imitated behavior and decreases the costs of testing the learned behavior. Now we propose that the social approval/disapproval of behavior is also adaptive because it tends to homogenize behaviors, beliefs and values of the groups that interact cooperatively for mutual benefit.

Thus we assume that an essential aspect of man is his condition as *Homo suadens*. This condition obliges individuals to acquire those behaviors that are marked as positive by their social group of reference irrespective of the specific behavior performed. Modern environments differ importantly from ancestral ones, particularly when it comes to social behavior. Our ancestors lived for a long time in bands of 50–100 people, in small, face-to-face societies which maintained very simple cooperative social networks (Tooby and Cosmides 2005). Therefore, our cognitive programs were designed for that ancestral environment and our evolved capacity for approval and disapproval was adaptive in that social world. In modern societies, individuals can interact with other individuals from very diverse cultures to carry very diverse activities. However, underlying this apparent diversity, people

pursue the approval of their social reference group and tend to prefer what the group prefers.

Richerson and Boyd (2001) quote a study of Nisbett and Cohen (1996) to illustrate the importance of culture. For their research, Nisbett and Cohen recruited subjects with Northern and Southern backgrounds from the University of Michigan student body. During the experiment, a confederate bumped into some subjects and muttered asshole at them. Cortisol and testosterone were measured before and after the insult. The insulted Southerners showed big jumps in both cortisol and testosterone compared to the non-insulted Southerners and insulted Northerners. The South was settled by Protestant Scotch-Irish pastoralist, whereas Northern settlers were English, German and Dutch peasant farmers. At the present time, few Southerners are pastoralists, and few Northerners are peasant farmers, nonetheless, for Nisbett and Cohen and for Boyd and Richerson these striking differences in psychological, physiological, and behavioral responses to insults persist because culture is an inheritance system. Our model assumes, as does the dual inheritance theory of Boyd and Richerson, that culture is fundamental to understanding human behavior, but we think that human cultural transmission is not a true system of replication of behavior. In each generation individuals have to choose the behaviors that they think are appropriate for the current situation. They utilize evolved psychobiological mechanisms to guide their choice. But, in addition, humans are sensitive to advice from their reference social group. Parental and social approval/disapproval of a learned behavior explains why individuals adopt behaviors, beliefs and values of the social group of reference. This means that social learning depends, at least partially, on causal factors associated with cultural traditions linked to local contexts. In this way, the approval/disapproval makes culture function as an inheritance system.

The adoption of behaviors through assessor social learning lies in the emotional satisfaction that individuals obtain from performing them, irrespective of the specific behavior performed. Assessor individuals feel pleasure when they adjust their behavior to what is considered good in their social group of reference and, on the contrary, they have feelings of guilt and discomfort when this is not the case. In some way, human sciences have always sensed that human desire is a learned desire, the desire of the Other, the desire to possess and exhibit that which arouses the desire and the recognition of Others (Hume 2000; Smith 1976). The rule of inference underlying the assessor social learning, that we have called *modus suadens*, can be summarized as follows: if a behavior is approved then it is a good behavior (Castro et al. 2008; Castro-Nogueira 2009). Assessor learning is based on parental and social approval of a behavior. In a sense it is similar to trial and error learning: approval produces pleasure and this emotion is transferred and interpreted as an objective property of the behavior. That is, an individual does not accept the beliefs of other individuals (about how it must behave) as an act of faith or authority acceptance; it acquires the belief in the value of a behavior assuming that the social emotions of pleasure/displeasure that it generates reflects the true value of its own behavior. The social learning of values creates an emotional barrier against other ways of life. Nevertheless, close contact with people from other cultures can modify the social group of reference and generate changes in behavior and values, which can be very drastic.

All human groups have belief systems and values which they can use to categorize (with an appearance of objectivity) the correctness of behavior. According to our hypothesis, humans tend to accept things which are shown to be true through social approval. However, to assert that social approval generates beliefs that individuals perceive as true, does not imply that everything we have learned is definitively true. Throughout history humans have been able to establish axiomatic principles and rules of inference, as in logic and mathematics, or use falsification as a criterion of demarcation, as in science, from which they can rationally discriminate among different assertions. Unfortunately, it is not easy to find principles to generalize the application of rationality in non-instrumental fields of knowledge, as for example, in the moral, philosophical, and political contexts. The search for a solution surely requires first being aware of the problem we are facing.

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