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Selfishness and Cooperation: Challenge for Social Life

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Abstract:
Cooperation is a great challenge for natural selection. Some scholars assume that cooperation could not evolve within the framework of natural selection. It is undeniable that natural selection, at least at the individual level, favors selfishness and defectors. Nonetheless, this selfish tendency does not necessarily imply that cooperation could not evolve by means of natural selection. In this paper, we specifically acknowledge certain basic challenges for the evolution of the human ability to cooperate at the level of large groups. In this paper, we discuss topics like the human ability for "supercooperation," the importance of repetition and reputation, and Multilevel Selection Theory as the basic mechanisms of evolution of cooperation.
Keywords: Cooperation, kin selection, natural selection, direct reciprocity, indirect reciprocity, Multilevel Selection Theory.

1. Introduction

Martin Nowak calls humans "supercooperators" [15]. David Sloan Wilson points out that a distinctive feature of humans is that they are not only "groups of organisms," but builders of

"groups as organisms." It is especially apparent today when global communication technology such as the Internet enables fast and spontaneous connection between unrelated humans. Humans can unite for the purpose of various social actions, from revolts and protests against authority or some morally wrong phenomena (like a protest against war, crime, environment pollution, etc.) to crowdfunding campaigns and charitable actions. Unlike non-human primates that usually fight for mates and resources, humans are able to moderate and/or suppress eliminative and selfish in-group selection forces, and they are affected by in-group selection forces against inter-group selection. Despite the fact that humans are able to act altruistically, altruism is costly and an unnatural phenomenon. It is so costly and unnatural that altruism in the form of thoughts and intentions does not exist even within various religious frameworks – precisely where one would most expect to find it. Of course, religious altruism does exist, but only as acts, not as thought or intention. That is to say, one must engage in self-sacrifice and contravene one's natural inclination in order to conduct a religiously motivated act of altruism. This level of analysis is the most important one from the evolutionary point of view because altruism at the level of action may be affected by various motives and causes [23, pp. 49, 84, 142]. One of the proximate causes of altruistic action may be a pure intention, like in the case of psychological altruism. Another cause of altruism may be selfish motivation, like concern for reputation or future welfare (like belief in an afterlife). Some religious practitioners are motivated to altruistic acts by what they perceive to be the will of God. The above, then, represents a rough cross-section of the taxonomy of human altruism.

As alluded to above, there is a good reason to question whether altruistic thought exists within religious frameworks. Certain mechanisms such as the concept of an afterlife and the concept of a supernatural agent could reasonably affect one's moral life. The concept of an afterlife can affect eusociality. One useful evolutionary mechanism which could motivate altruistic acts is empathy [20]. However, the mechanism of empathy is context-dependent and occurs in degrees, and is therefore "environmentally variable." [18] Paul Bloom went one step further and points out that empathy is a mechanism that is harmful to social life and should be replaced by compassion [3]. The case of empathy suggests that we cannot rest on any fixed biological mechanism that could automatically provide altruistic and cooperative behaviors. Human life can be understood as a constant tension between short-term selfish approaches and long-term cooperative efforts [15, p. 280]. In this paper, we discuss some challenges for the human ability to cooperate at the level of large groups with unrelated individuals.

2. Kin Selection and the Challenge for Cooperation

Many authors underline the puzzling nature of human cooperation as something strange and in some sense abnormal from an evolutionary point of view [7, p. 422]. Cooperation can be defined as a work toward a common goal in which one agent sacrifices and another benefits [6, p. 4]. A slightly different definition of cooperation is proposed by Samuel Bowles and Herbert Gintis. They define cooperation as "mutually beneficial activity." [4] They point out that cooperation often functions as a kind of mutually beneficial interaction. Nevertheless, cooperation includes also altruistic behaviors, and this kind of cooperation is more familiar with the type of behavior mentioned above which implies cost for one side of an interaction [4, p. 2]. The reason that cooperation is a puzzling phenomenon is because Natural Selection is generally thought to favor immediate benefits. An agent who provides benefits for others will be outcompeted by the selfish

recipient. Consequently, Natural Selection should not affect the evolution of cooperation and altruism [7, p. 422]. In a one-shot game, both agents have a strong motivation to cheat and/or to defect; consequently, defection works as a default behavioral mode. However, when the probability of repeated encounters between the same agents is sufficiently high, the number of cooperative behaviors increases meaningfully [2, pp. 139–141]. Altruism understood biologically means that one agent minimizes his own fitness in favor of the fitness of another unrelated agent.

It is possible to view altruism and cooperation as cognate behaviors. A specific phenomenon is a eusociality that works as an extreme kind of altruism [10, p. 341]. It is worth noting that the crucial distinction revolves around proximate and ultimate mechanisms and causes. At the proximate level, we are looking for altruism and cooperation that occur in thoughts and feelings. Such an approach refers to conscious states and right intentions. The ultimate approach talks instead about action and effect. In this approach, we can find selfish motivation for altruistic acts, and this motivation is not important from the standpoint of ultimacy [23, pp. 60–65]. From a biological point of view, we talk about altruism in the context of effects of a given act, not in the context of its motivation [4, p. 201]. For this reason, religious components can work effectively as motivational tools to altruistic behaviors even if believers execute them out of fear of God or by hope for eternal reward. In both cases, he is affected by own selfish interests but it does not exclude to talk about altruism in terms of effects.

In the natural world, altruism does not exist [10]. It seems that we cannot find any example in which Natural Selection designed one species for providing benefits for other species. We can find many examples of mutualism, but mutual relations are a kind of reciprocity, and some of them are deeply rooted in parasitism. The case of yucca that are pollinated by yucca moths, is one example of mutualism which has some parasitic origins [10, p. 440]. In the context of a "selfish" natural world, some theorists assume that evolution of cooperation in humans could not evolve naturally within the framework of Natural Selection. The alleged selfish nature of the natural world requires some special instruments that are assumed to be unique to humans in order to explain acts of altruism and cooperation. One of such instrument is the concept of supernatural punishment that is enhanced by religious beliefs, especially by the concept of God/gods who can observe, detect, and punish morally wrong human behaviors [12, pp. 174–177].

Cooperation is a crucial factor for humanity [23]. Human evolution may be explained as the transition from small groups of hunter-gatherers to the current large societies. This process required increasing cooperation within the group. Its importance is so high that some scholars assume that the incestual taboo is not genetically engendered but is rather effected by social rules to provide benefits caused by inter-familiar cooperation. Nevertheless, cooperation is not a crucial ability only for human species. In a living world, we can find many examples within species and between species of cooperation. Like Douglas J. Futuyma points out, almost all species have adaptations that make possible cooperation between species [10, pp. 425, 430].

If cooperation is a crucial factor, it is puzzling that it would be so hard to establish and to maintain via natural processes. The evolution of cooperation is hindered by at least two factors. One of them is Natural Selection's rule that favors selfishness over cooperation. At the group level, it causes the challenge of free-riders. The second challenge is associated with another evolutionary rule that states that the most common kind of relations is genetic [11]. Individuals are more prone to collaborate and to conduct altruistic acts towards their kin not only in small traditional societies, but also in modern, large-scale societies. One strategy for going beyond kinship limits is by practice of

fictive kinships. This process can be maintained by kin-like linguistic forms. This strategy is used especially within the framework of religious language. Nevertheless, artificial social networks never replace the priority and strength of kinships. Like multiple authors have pointed out, members of large families take into account first their family members before looking for unrelated cooperators [8, pp. 20, 25].

It is possible to explain the evolution of cooperation and altruism by individual selection or group selection. The dominant approach states that cooperative behaviors including altruistic ones are affected by mechanisms of individual selection. The basic mechanisms include manipulation, individual advantage, reciprocation, or kin selection [10, p. 339]. The central idea assumed here is that a cooperative and/or altruistic individual cannot intentionally reduce his fitness by selflessly enhancing the fitness of other individuals. If he does so, he will wait for reciprocity from an agent in a pair of interactions, he is manipulated and/or cheated by another individual, or he helps other agents who are genetically related. In the last case, an individual cares for his own genes that are located in his offspring (kin selection) or other related individuals like siblings or cousins (inclusive fitness theory) that are not his own offspring. In this evolutionary landscape, it is difficult to expect that natural selection will affect cooperation and altruism that requires genetic self-sacrifice. Some scholars try to explain this phenomenon that is incompatible with the idea of natural selection by reference to the concept of group selection. However, the leading approach assumes that group selection is too weak evolutionary force [21].

3. Multilevel Selection Theory and Evolution of Altruism

On a biological level, it is possible to discuss the conflict between individual and group benefits. Individual behaviors designed to maximize individual fitness are different from behaviors that are designed to provide group fitness. Wilson points out that group dynamics favor selfishness. Consequently, altruism cannot evolve within a group because Natural Selection favors individual benefits, not group benefits. Altruism can evolve only on the level of inter-group selection when individuals are able to provide benefits for other individuals or the whole group, and such behavior is advantageous for an individual. According to Wilson, we can talk about altruism when a group-level functional organization is at work. Wilson points out that all kinds of explanations of altruism – except for inter-group selection – reduce altruism into selfishness. It refers to Kin Selection and Inclusive Fitness Theory, Selfish Gene Theory, and Evolutionary Game Theory, including direct and indirect reciprocity. Evolution of altruism is affected only by group selection because internal group dynamics, including those mentioned individual selection's mechanisms, favors selfishness [23, pp. 20, 22–23, 29, 32–33, 38–39]. Consequently, it can be assumed that altruism is inexplicable from the point of view of Selfish Gene Theory and from such levels of selection like genetic and organismic levels [22].

Evolution of altruism that is definitely against intra group selection account can work as an argument for group selection theory. Differential group reproduction affects the evolution of altruism by group selection level [9, p. 1523]. Wynne Edwards suggests that animal populations can evolve adaptively at the group level to avoid the risk of exploitation of resources [25]. In this case, we could talk about group selection that leads to group adaptations. However, the idea of group selection is still discussed, and its main explanatory competitor is the concept of Kin Selection and Inclusive Fitness Theory [13].

One possible explanation of human altruism is the idea of inter-group conflict and wars that enhance intra-group altruism by increasing hostility toward outsiders. The focal point of this approach is an assumption that parochial altruism is a behavioral and social phenomenon that started altruism by using default hostility and distrust towards members of other groups. Intra-group selection favors evolution of tolerant nonaltruists. Only inter-group selection and inter-group competition affects evolution of parochial altruists who are hostile towards members of other groups and who are prone to self-sacrifice for the benefits of their group. Evolution of altruism can be connected with the warlike genetic predisposition of humans [5, pp. 636–637, 640].

4. Eusociality

It is worth mentioning the mechanism of eusociality, which is a domain of some social insects. Wilson points out that eusocial insects are the most dominant species on Earth. They have one of the longest life spans among other species, and they dominate ecologically because they produce the greatest amount of biomass. Biomass of insects comprises the majority of the total biomass. Among biomass of insects, biomass produced by eusocial insects like ants and termites greatly surpasses that of other species of insects. Eusocial species do not go extinct and they affect the evolution of other species. Eusocial life, like Wilson points out, is more beneficial in terms of fitness and provides such benefits like better inheritance of resources or more efficient homeostasis [24, pp. 4, 26–27, 36, 40]. In the case of eusociality, the unit of selection is a colony, not individual organisms. However, there is a discussion between two approaches, Kin Selection and Inclusive Fitness Theory on the one side, and Multilevel Selection Theory, on the other side [17], [1]. This kind of group selection makes a colony a functional superorganism that possesses some extra properties that are unavailable at the individual level. One of them is an ability for mass communication. Mass communication is used to make decisions at the level of the whole group. Another property is adaptive demography that means regulation of the rate of birth and death in the colony that works to achieve an optimal level of division of labor. Wilson points out that eusocial organizations provide success and dominance for eusocial insects [24, pp. 72, 97].

As mentioned above, the evolution of eusociality can be explained in terms of Kin Selection. On the one hand, the eusocial population seems to be caused by genetic relatedness among members. A eusocial queen with small numbers of offspring-workers has much higher rates of reproduction than solitary insects [17]. On the other hand, genetic relatedness in eusocial populations can be a consequence, not a cause, of eusociality. In this case, eusociality could evolve among unrelated individuals who united themselves for the purpose of common defense of their nest and resources. Eusociality among unrelated individuals is explained by Multilevel Selection Theory, including Group Selection, not by Kin Selection or Inclusive Fitness Theory.

5. Human Cooperation is Affected by Repetition, Reputation, and Social Networks

It is no doubt that cultural evolution, especially cultural group selection was a crucial factor for the evolution of cooperation. It is important to distinguish here cultural and genetic evolution. Some cultural factors like religion may use biological and/or psychological components that make them by-products from a genetic point of view. However, the same factor can work as adaptations at the

level of cultural evolution because they provide benefits for a given group that can be measured in terms of survival and reproduction [23, p. 79].

Human cooperation can be treated as a unique and special phenomenon in a living world. One of the reasons is specific human biological and cognitive equipment, including such cognitive devices like language or theory of mind. According to Dominic D. P. Johnson, these devices impede human defection and selfishness because such selfish and socially detrimental acts become easy to detect and punish [12, p. 169]. The crucial difference between humans and non-human primates – which is due to a lack of aforementioned cognitive capabilities among non-human ancestors – is the impossibility of punishment by absent individuals. Morally wrong human behaviors can be punished because linguistic skills and mind-reading ability enable detection of prohibited acts and their perpetrators even if punishing agents were absent from the event. In this context, Johnson suggests that evolution of the theory of mind and complex language among humans made selfishness a very costly act that can be easily detected and heavily punished by the entire group [12, p. 172].

There is no doubt that language played a crucial role in human evolution. However, a causal correlation that worked in the field of evolution of language and of cooperation is not clear. Nowak points out that natural selection favored people who could communicate by an extended set of linguistic signs [15, p. 177].

Bowles and Gintis put language and cultural transmission of social norms among the tools that have enabled the evolution of cooperation. They underline a crucial role that was played by uniquely human cognitive and linguistic abilities. Human evolutionary group dynamics could work according to them by following social structures: intergroup competition including warfare, within-group cooperative practices, and institutions that were used to promote and to enhance preferred values and rules [4, pp. 196–197]. According to some theorists, the phenomenon called the Tragedy of the Commons requires institutional (third party) support for providing collaboration for the purpose of the common good. In a default natural environment, people tend to cheat and defect not only for selfish motives but also out of concern over being cheated by others [15, p. 208]. In other words, they would rather "beat others to the punch."

Nowak points out that the care for reputation works as an important motivational factor [15, pp. 215–216]. Reputation is a crucial concept for indirect reciprocity [16]. One of the mechanisms that is used to strengthen and to control cooperation is the practice of punishment. Nowak rejects the concept of altruistic punishment because he finds selfish motivations beyond the practice of punishing others. He talks about costly punishment instead of altruistic punishment. According to Nowak, punishing others is not a basic mechanism but it is associated with direct and indirect reciprocity. The leading role played by direct and indirect reciprocity is the consequence of the human evolutionary history of living in small groups. Living in small communities was affected by the high probability of encounter of the same agent and by concern for reputation. According to Nowak, it is impossible to remove the criteria of repetition and reputation from everyday human life. However, Nowak points out that punishment is not a useful mechanism for the evolution of cooperation because people who gain the best results in economic games do not punish. Consequently, people who prefer to punish do not win. The practice of rewards is much more effective than the practice of punishment for establishing cooperation and the common good. It is worth bearing in mind that behavioral dynamics in terms of reward, punishment, and cooperation is context-dependent. In one survey, participants from Greece and Russia were much more prone to

retaliate instead of accepting punishment for their deceptions than participants from other countries, especially from the West [15, pp. 225–227, 229–233].

Humans are organized into cooperative units. Like in the case of intersexual mating, we find the phenomenon of assortative mating (when someone is looking for a mate with whom he shares some similarities like origin, ethnicity, religion, hobbies, etc.) in the rest of everyday life activities humans organize into assortative sets. Such sets join humans according to their interests, preferences, etc. Set membership creates networks that can provide effective cooperation among unrelated individuals. Network reciprocity works in the most efficient way if there is an optimum point between low and high rates of mobility. Such an intermediate level provides chances for building stable relations with opportunities to avoid exploitation by defectors.

Nowak enumerates five mechanisms for the evolution of cooperation. The basic one is a repetition that is associated with encounters with the same agents and with the so-called tit for tat rule. It is a domain of direct reciprocity. Another crucial mechanism is indirect reciprocity that is based on the concept of reputation. Nowak mentions also spatial selection (network reciprocity). Multilevel Selection (group selection) means a selection between groups. Nowak points out that Multilevel Selection works more effectively at the level of many small groups than at the level of a few large groups. Finally, Nowak talks about the kin selection that affects cooperation by genetic relatedness.

Nowak is a proponent of the concept of cooperation as a principle of Natural Selection. He points out that such features like hope for reciprocity, forgiveness, and generosity in everyday human interactions often are default behavioral modes that are used to strengthen and to maintain cooperation. Nowak points out that mankind is linked together by global technology that provides an opportunity of global communication for the first time in human history. It is important for possible cooperation for the purpose of neutralizing negative effects of climate change [15, pp. 258, 262–263, 270–272, 278].

Cooperation can be genuinely treated as a natural mechanism as Nowak asserts. Some moral emotions can work as tools that affect prosocial behaviors. One recent study by Nowak in the field of Evolution of Cooperation suggests that reward and forgiveness are much more effective than retaliation and punishment in pro-cooperative policy. The discussed study shows that guilt is more useful for establishing cooperation than retaliation and anger [19].

6. Conclusion

Evolution of Cooperation is a highly discussed topic today. This discussion attracts attention from biologists and psychologists as well as from philosophers and theologians. Some of them try to find similarities between human and non-human animals and show that the human ability to cooperate is not a unique mechanism. Others point out that humans are unique biologically and socially [14]. They show that biological and cognitive human uniqueness affects cultural evolution, which in turn shapes human social relations.

It is no doubt that only humans build global social networks. Only humans can interact spontaneously with other unrelated humans. This unique capacity is the combined product of cognitive devices like language and mind with highly selective pressure for collaborative patterns. Ancestors with higher pro-cooperative tendencies probably had greater chances of survival and reproduction than less cooperative individuals. Human cooperation is not affected only by the need

for help and care since other non-human animal species also require care and help. Human cognitive devices could enable the evolution of special prosocial tools and strategies. It seems that they are based on criteria of repetition and reputation, and on all good and bad effects that are affected by them. Of course, some individuals can try to calculate means of avoiding negative effects of cheating or defection. Personal reputation is also a strong deterrent from cheating or defecting. Defectors and cheaters should understand that the others in their community will no longer collaborate once outed. Like in the case of repetition, also in the case of reputation someone can assume that he does not have to care for his own reputation. However, mentioned special cognitive human abilities like mind and language make reputation a really important factor in human communities.

In this context, we could say that human cooperation is the product of biological and cognitive abilities that make social relations exceptionally important, much more than in the case of any other animal species. Cultural tools like religion/religious components, legal systems, or some traditionally inherited cultural patterns, are secondary agents. It can be assumed that they can regulate or enhance the power of mechanisms of repetition and reputation, but their role is not as important as some proponents of cultural evolution assume.

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