



## EVOLUTIONARY FOUNDATIONS OF HUMAN SOCIAL BEHAVIOR ABSTRACT

### *FUNDAMENTOS EVOLUTIVOS DO COMPORTAMENTO SOCIAL HUMANO*

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#### ABSTRACT

**Objective:** The article examines the causes and mechanisms of the origin of human social behavior.

**Methods:** The theories of multilevel selection and inclusive fitness are analyzed and the former theory is concluded to have significant explanatory power. It describes the mechanism of mutual altruism and reflects the process of rapid (on the evolutionary scale) emergence of social behavior in communities that have crossed clan limits.

**Results:** Multilevel selection theory demonstrates that egoistic activity gives individual advantage within the group, but destroys the social organism as a whole. Group selection works in the opposite direction. As a result of competition between groups, the one with the higher level of mutual assistance and altruism has evolutionary success. This exact effect made its appearance in the course of divergence between Neanderthals and ancient humans. The divergence exacerbated the clash between the two levels of natural selection. The individual level was reinforcing egoism and contributing to the success of an individual. Yet the confrontation with the Neanderthals intensified the mechanism of group selection, laying down a permanent internal conflict between the differently oriented aspirations for the personal and public good in human nature.

**Conclusion:** For the group to survive, its members need to become altruistic and even sacrifice themselves. Through this sacrifice, the primordial stimuli were overridden and communication within the community was strengthened. The divergence resulted in the emergence and consolidation of fundamental imperatives of social behavior, primarily the principle of mutual altruism, in the life of society.

**Keywords:** social behavior; inclusive fitness; multilevel selection; divergence; altruism.



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**RESUMO**

**Objetivo:** O artigo examina as causas e os mecanismos da origem do comportamento social humano.

**Métodos:** As teorias de seleção multinível e aptidão inclusiva são analisadas e conclui-se que a teoria anterior tem poder explicativo significativo. Descreve o mecanismo do altruísmo mútuo e reflete o processo de emergência rápida (na escala evolutiva) do comportamento social em comunidades que cruzaram os limites do clã.

**Resultados:** A teoria da seleção multinível demonstra que a atividade egoísta dá vantagem individual dentro do grupo, mas destrói o organismo social como um todo. A seleção de grupo funciona na direção oposta. Como resultado da competição entre os grupos, aquele com maior nível de assistência mútua e altruísmo tem sucesso evolutivo. Esse efeito exato apareceu no decorrer da divergência entre os neandertais e os humanos antigos. A divergência exacerbou o choque entre os dois níveis de seleção natural. O nível individual reforçava o egoísmo e contribuía para o sucesso de um indivíduo. No entanto, o confronto com os neandertais intensificou o mecanismo de seleção de grupo, estabelecendo um conflito interno permanente entre as aspirações de orientação diferente para o bem pessoal e público na natureza humana.

**Conclusão:** Para que o grupo sobreviva, seus membros precisam se tornar altruístas e até mesmo se sacrificar. Através desse sacrifício, os estímulos primordiais foram superados e a comunicação dentro da comunidade foi fortalecida. A divergência resultou no surgimento e consolidação de imperativos fundamentais do comportamento social, principalmente o princípio do altruísmo mútuo, na vida da sociedade.

**Palavras-chave:** comportamento social; aptidão inclusiva; seleção multinível; divergência; altruísmo.

**1 INTRODUCTION**

There are various approaches to explaining the nature of human social behavior. Many of them began to take shape back in the late 19th century and have become classic. In particular, instinctivism interprets social behavior in terms of instincts, while behaviorism views it as reactions to external stimuli. G. Tarde (2011); L. Ward (1883), E.A. Ross (1918), R.E. Park (1967), N. Mikhaylovsky (1998) offer an introspectionist explanation of social behavior in terms of beliefs, desires, and interests. Several scientists (E. De Roberti, F. Giddings, C. Cooley, E. Durkheim) explain social life by bringing collective, social



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consciousness to the fore. Much attention is paid to the study of the nature of social interactions (Tönnies 1971, Simmel 1971; Vierkandt 1975, Bouglé 1926, Ross 1918). Social Darwinism (Gumplowicz, Walter Bagehot, Gustav Ratzenhofer, A.W. Small, W.G. Sumner) names the “struggle for existence” as the source of social behavior. We note that classic approaches typically pay little attention to describing the reasons and mechanisms behind the transition of humankind to social behavior and focus instead on researching the processes and forms of social interaction.

In modern paleanthropology, discussions of the emergence of social behavior are more often than not based on the theories of multilevel selection and inclusive fitness. The first theory finds increasingly more support, while the second one is subjected to justified criticism. In this study, we will adhere to the interpretation of social behavior offered by Harvard University Professor D.K. Homans. By social behavior, he understands the behavior of two or more individuals in direct contact in any social situation, which involves the exchange of material and non-material activities (Homans, 1961). We, however, do not share Homans’ excessive emphasis on the amount and kinds of rewards that people receive from social contacts. This emphasis leaves little to no room for altruistic behavior.

The relevance of the topic under examination is due to the significance of the search for the driving force of social evolution. The discovery of this force will explain the greatest transition to a new level of organization – from organism to super-organism, from primates to human community.

The purpose of this paper is to analyze the leading theories of the origin of human social behavior and to consider multilevel selection as a determinant of human social evolution.

## 2 METHODS

The methodology of the study is based on the multilevel selection theory, in particular, the analytical procedures of population genetics and evolutionary game theory



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are used. The toolkit of multilevel selection theory is supplemented by retrospective analysis, which allows studying the gene-culture coevolution of populations structured by spatial, group, physiological, and other characteristics. In addition to the above methodological and theoretical tools, the work uses the basic principles of historicism, scientific objectivity, systematicity, dialectical contradiction, and the unity of theory and practice.

### 3 RESULTS AND DISCUSSION

Biology and anthropology continue to debate the mechanisms of transition from the biological to advanced social organization. The theories of multilevel selection and inclusive fitness discuss the emergence of a high level of cooperation and altruism in the human community.

Natural selection takes place at two levels – of the individual and the group. At the first level, the gene coding for longevity and reproductive success becomes the object of selection. At the second level, the genes responsible for cooperation are selected. The corresponding genes may or may not be included in the individual selection, but due to the competition between groups, they become objects of group selection.

As a result, either the individual and group levels of natural selection are balanced, or one of the attributes disappears. The authors of the modern version of this theory (E.O. Wilson, M.A. Nowak, and C.E. Tarnita) believe that multilevel selection, on the one hand, explains the emergence of the eusociality of animal evolution and, on the other hand, shows the limitations and explanatory weakness of considering kin selection as the reason behind human social behavior. The multilevel selection theory suggests that it was group selection occurring in the intergroup competition that promoted the development of altruism and mutual aid among group members. The outcomes of intergroup competition are primitive morality, a sense of conscience, and honor.



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The multilevel selection theory competes with the theory of inclusive fitness based on the principle of kin selection. In accordance with this principle, individuals prefer to live in collateral groups, that is, with relatives but not descendants. As a result, there develops complex social behavior (given that the loss of genes because of altruism is lower than the number of genes passed on to the next generation by each member of the group). Thus, the theory of inclusive fitness considers not a gene but an individual as the unit of selection. In this case, the emergence of social behavior is determined by indirect natural selection.

The theory of inclusive fitness has recently been subjected to increasing criticism. Among the main drawback of the theory are:

1. The theory of inclusive fitness is substantiated through linear regression, but does not explain the reasons behind phenomena and does not provide for prognosis. The regression method is expressed by formula  $BR - C$ , where B refers to benefits, advantages, R – the quantitative rate of relatedness, and C – to costs and losses. This method does not involve modeling preliminary assumptions on how the process is going to unfold and, therefore, has no predictive power. For instance, in the study of antibiotic resistance in *Escherichia coli*, even when B, C, and R values in the system under study are calculated, it is impossible to predict changes in the population structure or the biochemistry of individuals.

The regression method reveals correlations and not cause-and-effect relationships. There are several scenarios in which the regression method distorts the reasons behind the variation of frequencies. For example, a bird may live near the nest of a well-adapted pair, expecting to later occupy that nest. Another example is the social wasps that stay in the parent nest of a well-adapted swarm to inherit the nest. These scenarios involve sponging behavior and applying the regression method yields a B greater than 0. This means that spongers bring benefits and provide higher fitness, although the causal relationship is the opposite: spongers are attracted by high fitness.

In a similar vein, the regression method gives incorrect indications of allele frequency changes when assessing “jealousy” and “nursing” scenarios. In the first case,



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B and C are greater than 0, but not because jealous individuals participate in a cooperation that is disadvantageous to them. The real reason is that the jealous individual seeks out and attacks the well-adapted partners, thus reducing their adaptability. In the second case, B is less than 0 and C is greater than zero, but not as a result of “costly sabotage” by the nurse, but as their attempt to increase the adaptability of weaker individuals.

2. The results of inclusive fitness are nonadditive (cannot be summed), which can be observed in the example of cooperative behavior in microbes.

3. The theory of inclusive fitness, unlike the genetic theory of natural selection, is not universal, although it provides correct explanations in some cases. However, without criteria (and the regression method offers none), it is impossible to identify such cases. Thus, “the attempt to eschew the requirement of additivity using regression methods has led to logical obfuscation and false claims of universality” (Allen, Nowak, Wilson, 2013, p. 20138).

We believe that, as far as human sociality is concerned, these disadvantages are alleviated when considering communities that have not crossed clan limits. “Discussions of our social past in the epoch of gathering and emerging farming constantly mention the “magic” range of 50 to 100 units as the typical size of the communities in which our recent cultural and biosocial evolution unfolded. As the maximum size of a social group, a limit we crossed only very recently, a few thousand years ago” (Napoleon, 1997, p. 77). This idea is supported by Y.N. Harari who notes that “the social instincts of ancient man, like those of chimpanzees, extended only to a small group. If a group grew too big, social ties in it would be broken and it would disintegrate. Even if some fertile valley could support 500 ancient sapiens, there is no way that many strangers would be able to get along” (Harari, 2019, p. 35). The scholar believes that it was only as a result of the cognitive revolution that the sapiens began to unite into larger groups, and before this revolution, the binding force of the collectives was gossip. “Sociological studies have shown that the limit of the ‘natural’ size of a group that is united by gossip is about 150 individuals” (Harari, 2019, p. 35-36).





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In small communities of closely related individuals, the individual has a vested interest in ensuring the survival of offspring, blood sisters, brothers, and parents, because they share 50% of their genes with them. As a result, to ensure high inclusive fitness, individuals need to compromise their interests for the sake of the clan, i.e., to practice social behavior. However, as the population grows, the influence of kinship weakens considerably. This process is shown, for instance, in Napoleon Chagnon's work on the Yanomamo. The researcher concludes that "there is an upper limit to the size of the group successfully organized according to the principles of kinship, inheritance, and marriage, the integration mechanisms usually available to primitive peoples" (Napoleon, 1997, p. 76).

The theory of inclusive fitness has convincing explanatory power with respect to communities that have not yet outgrown the tribe, clan limits. When this limit is crossed, a new unifying factor comes into play, creating the basis for social behavior. Inclusive fitness theory, in light of the above shortcomings, cannot be considered an evolutionary design principle with respect to large non-clan societies. In the latter case, the theory of multilevel selection, involving the mechanism of reciprocal altruism, allows for a more complete understanding of natural history. "The operation of this mechanism can be summarized as follows: egoists win within groups, but altruistic groups prevail over egoistic groups" (Wilson, 2018, p. 63). The reciprocity strategy extends the boundaries of assistance beyond the kinship community. In parallel, a mechanism had to evolve to expose and punish cheaters. Otherwise, the demise of situational altruists would have been inevitable.

The central question in the discussion of the emergence of human social behavior is the search for the reasons that led to the need for sapiens to use the reciprocity strategy. In the light of the above, we may conclude that these reasons arose at the time when the population of Homo sapiens began to grow dramatically, acting as a stimulus for this growth.

P. Mellars and J. French from Cambridge University analyzed a 75,000-km<sup>2</sup> complex of sites in the Dordogne area. These sites belong to the period when Neanderthals and Neanthropes coexisted in the area. The results of the study are



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striking: “during this period of time, the population of modern humans increased approximately 1.8 times faster than the population of Neanderthals” (Shipman, 2016, p. 128). The emergence of the reciprocity strategy and the surpassing of clan boundaries by sapiens occurs after the African exodus and the beginning of contacts between ancient humans and Neanderthals. There is a causal relationship between the above events. The divergence of Neanderthals and ancient humans triggered the mechanism of group selection, promoted the strengthening of cooperation, and stimulated the social evolution of sapiens. The divergent model of interspecies interaction was developed by the Soviet anthropologist B.F. Porshnev (2006). Further advancement of his ideas (taking into account the achievements of modern paleoanthropology) is found in the works of O.T. Vite (2005), A.N. Zadvornov (2018), E.V. Kosilova (2012), V.G. Morogin (Morogin, Mazilov, 2018), and other researchers.

The hypothesis of divergence (interspecific competition) of Neanderthals and ancient humans appears very realistic since otherwise, the northern exit of sapiens from the African continent would have been impossible. The hypothesis of divergence of Neanderthals and ancient humans is evidenced by the fact that it took the latter about 10,000 years to cover the distance from the Middle East to Europe. This circumstance is extremely striking, since, taking into account the route across the Bosphorus, ancient people only needed to cover a fairly small distance. Some kind of constraining force (the Neanderthal blockade) must have prevented the movement of migrants through these territories.

The alien and aggressive Neanderthal community evoked fear in ancient people. “Fear stimulated the development of speech, which becomes a kind of sublimation of fear and its limiter in sapiens. In addition, speech was a tool for neoanthropes to escape their dependence on Neanderthals. Through speech, sapiens established contacts, which created conditions for the growth of their sociality. Together, it was easier to survive, to overcome fear, and to resist the troglodytes” (Zadvornov, et al., 2018, p. 665). Language provided a link between people, created a foundation for empathy, and helped to overcome the barrier between “I” and “you”, that is, served social behavior.





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Thus, human reciprocity strategy and social behavior evolved between 40,000 and 35,000 years ago, which served as a basis for the dramatic increase in the population of *Homo sapiens*. It was social behavior that unlocked the cognitive capacity of modern humans, and this conditioned their progressive development and evolutionary success.

Modern paleoanthropology explains human social evolution from the standpoint of the theories of inclusive fitness and multilevel selection. The first theory provides a weak explanation for the results of field studies because it relies on the regressive method and avoids the additivity requirement. The second theory allows revealing the mechanisms of social evolution, particularly when considering the interspecies competition between ancient humans and Neanderthals.

The first migrants from Africa, upon reaching the Levant, encountered Neanderthals. The conflict between the species caused the need for cooperation, and the need to alienate part of their prey in favor of the Neanderthals came into conflict with the primordial stimuli. Altruism developed in ancient communities and became the basis of social behavior. The divergence was not only the cause of social evolution but also the condition for the formation of the second signaling system. Language has mediated social behavior and unlocked the cognitive capacity of ancient people. Ancient man, upon coming to Europe, developed social behavior over several thousand years, created numerous sites, new stone implements (made more carefully and by new design), composite tools made of bone, horn, and tusk. Neoanthropes made jewelry, played flutes made of bone, improved throwing tools, and buried their dead with observance of rites.

## 4 CONCLUSIONS

The theory of multilevel selection makes it possible to explain the origin of the strategy of reciprocity and altruism in the interspecies competition between ancient humans and Neanderthals and, hence, to determine the causes of the evolutionary breakthrough. Future studies will hopefully provide additional evidence for the defining



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role played by the divergence of Neanderthals and ancient humans in social evolution and the formation of the foundations of modern civilization.

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