

Axelrod, R. and W.D. Hamilton (1981). "The Evolution of Cooperation",  
Science, 211: 1390-96.

The authors of this article are mainly concerned with the advent of cooperation in nature. They are confounded by the apparent contradiction between the theory of evolution, which stresses the survival of the fittest, and the reality of specie cooperation. The authors explain away this mystery with the help of some game-theoretic reasoning.

On the assumption that interactions between pairs occur on a probabalistic basis, Axelrod and Hamilton develop a model which sheds light on how cooperation can get started in an evolutionary setting where the dominant temptation is always to defect. They do so in the context of the Prisoner's Dilemma, and the strategy of Tit for Tat. Based on the deductions from their model, and the results of a computer simulation where the Tit for Tat strategy proved effective in inducing cooperation, Axelrod and Hamilton argue that cooperation in an asocial world is possible where there is reciprocity. As they themselves write of their approach:

Darwins emphasis on individual advantage has been formalized in terms of game theory. This establishes

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conditions under which cooperation based on reciprocity can evolve (p. 1396).

In the latter part of this article, Axelrod and Hamilton briefly consider the potential applications of their work. They find it relevant to the phenomenon of interspecies mutualism, animal philopatry, and territoriality. Their findings are also thought to have some bearing on the etiology of cancer and chromosomal nondisjunction during ovum formation with increase in maternal age.

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