

The Evolution of Cooperation

Reviewed by Roger Arnold

Robert Axelrod's *The Evolution of Cooperation* is destined to find its way into hundreds of scholarly footnotes over the next decade. It is, quite simply, a book that will be widely read and discussed within the academic circles of many fields.

There is a reason for this. It is a book that in simple and straightforward language addresses a major and long-standing question that, it so happens, is peripherally related to a long list of interesting topics. The question, as Axelrod notes, is "Under what conditions will cooperation emerge in a world of egoists without central authority?" A few of the peripherally related topics include: trench warfare in World War I, biological systems, the golden rule, nuclear warfare, government's *raison d'être*, family feuds, stereotyping, economic protectionism, congressional politics, morality, taxes, and international cooperation.

The sum around which the book revolves is the game strategic prisoner's dilemma. Prisoner's dilemma, as Axelrod tells us, "is simply an abstract formulation of some very common and interesting situations in which what is best for each person individually leads to mutual defection, whereas everyone would have been better off with mutual cooperation." The recognition of which has predictably led many persons to ask, "So, what is the solution?" Axelrod, armed with the computer tournament results of prisoner's dilemma experts, answers that in iterated prisoner's dilemma games it is Tit for Tat: the behavioral response that seeks to do to others (good or bad) what others have done to you.

A little background is necessary. Axelrod asked persons who had written on prisoner's dilemma (persons in the fields of biology, computer science, economics, mathematics, physics, political science, psychology, and sociology) to submit a computer program they thought would obtain the most points when pitted against other computer programs within the prisoner's dilemma setting. The winner was Tit for Tat, submitted by Anatol Rapoport.

This is interesting in and of itself. But there is more. First, and most importantly, there is the fact that the winner of prisoner's dilemma is also the solution to it—Tit for Tat generates mutual cooperation, the slippery and supposedly unobtainable goal of prisoner's dilemma. Second, Tit for Tat, while designed as a strategy for winning, appears to have admirable characteristics: it is nice (it is not the first to make trouble), it is retaliatory (thus providing an incentive to the person who starts trouble to desist), it is forgiving (which means it shows good faith, a key ingredient for mutual cooperation), and it is clear (thus making a communication foul-up between persons unlikely).

All this is interesting and simple enough, and Axelrod does an exceptionally good job at reporting the results of the computer tournament, describing some of the high-scoring strategies other than Tit for Tat, and bringing out the subtle points behind Tit for Tat. It is when he tries to interpret what Tit for Tat means for some important policy questions, though, that Axelrod does less than an exemplary job. In fact, here he might be faulted for muddled thinking.

One important case in point in his discussion of government. As no doubt many persons have heard by now, and Axelrod makes clear by citing Hobbes and quoting Rousseau, it has long been acknowledged that government is the solution to prisoner's dilemma. The story line is familiar: (1) in some cases, individuals would be better off cooperating than not cooperating; (2) uncertainty and general human nature sometimes make cooperation a difficult outcome to achieve; and (3) government enters the picture, and through it individuals get what they want but could not obtain on their own.

In game theory language, government solves the prisoner's dilemma by "changing the payoffs." Axelrod notes that

Large changes in the payoff structure can transform the interaction so that it is no longer even a prisoner's dilemma. If the punishment for defection is so great that cooperation is the best choice in the short run, no matter what the other player does, then there is no longer a dilemma.

Government's "changing the payoffs" obviously does not disturb Axelrod, for in chapter 7, he advises the reader on how to promote cooperation—government is not one of the ways ruled out. On the contrary, it is one of the ways ruled in. Speaking of government-imposed taxes, Axelrod says: "But everyone may be better off if each person has to pay so that each can share the benefits of schools, roads, and other collective goods."

This is a rather odd statement from one who, up until this point, appears to have been quite excited over the discovery that Tit for Tat offers a noncoercive way out of prisoner's dilemma settings. Axelrod might be saying that there are two ways to remove oneself from the grasp of the prisoner's dilemma: the coercive way and the noncoercive (or free) way. Or he might be saying that the noncoercive way only works in some prisoner's dilemma situations and

not in others—it might work when the goal is the removal of international trade barriers, but not when the goal is the provision of a public good. In either case, Axelrod leaves people hanging; he leaves them without information that directly relates to answering the question he starts his book with: “Under what conditions will cooperation emerge in a world of egoists without central authority?”

In Axelrod’s defense it needs to be said that he does say that in a prisoner’s dilemma setting, the more people believe that they will come into contact with each other in the future, the more likely cooperation is to naturally emerge. While this answer to his introductory question is better than no answer, it is not a full answer, and in that it is not, one is left with no more objective knowledge to aid in deciding where the line between government and the market should be drawn than one had before reading the book. To go one step further back, no answer is provided for Axelrod’s question, which is a proxy for what Robert Nozick calls the “fundamental question of political philosophy”—namely, should there be any state at all?

The Evolution of Cooperation ends up being a mixed bag. It is topical and well written; additionally, Axelrod is superb as reporter and analyzer of prisoner’s dilemma strategies and computer tournament results. It is only when Axelrod sets out (one senses somewhat timidly) to look at what prisoner’s dilemma and the winning strategy, Tit for Tat, mean within the larger context, that things come up short. This book would have been much improved if Axelrod had taken greater pains here, if he had only focused on answering the question that begins his book. Robert Axelrod needs to seriously think about writing *The Evolution of Cooperation: Part II*.