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Robert Axelrod, *The Evolution of Cooperation*

This book presents an extended discussion of the results of Axelrod's famous iterated PD computer tournament. As is now common knowledge, the most successful strategy in both rounds of the tournament was Tit-for-Tat (cooperate in the first round, then cooperate in period t if opponent cooperated in t-1, defect if opponent defected in t-1). There are two major criteria which determine the success of a strategy set according to Axelrod. The first criterion is obviously the time horizon. While in a single period PDG, a player's dominant strategy is always to defect, in a multiple period framework there will be a multiplicity of equilibria, certain of which will entail cooperative strategies (iff the last period does not exist or is unknown to the players). TFT does so well in Axelrod's simulations precisely because it accumulates a large amount of points in long, cooperative interactions with other "nice" strategies while giving up relatively little to the more predatory ones. From this follows the second criterion of a successful strategy: it must be well suited to the strategy sets of the other players in the game. In a world of pure predators (i.e. all D players), a single, wide-eyed TFT will perform the worst. In a more mixed social milieu, however, TFT may perform well even if "nice" strategies are in the minority. So long as TFT has a sufficient number of interactions with other non-predatory strategies, it may very well outscore the predators as these players spiral into long mutual recriminations with one another. In this sense, TFT is considered by Axelrod to be particularly adept at "invading" other populations of strategies. By this he means entering a population of strategies, interacting with the "natives" as well as other TFT players, and, via a score-based process of selection, increasing the proportion of the population that are TFT players. As a successful invader, TFT is robust, i.e. it performs well in a variety of environments. This exceptional performance is largely due to the facility with which TFT is recognized as a decision rule as well as its non-exploitability. In the fourth chapter of EoC, Axelrod extends these ideas to the evolution of cooperative norms among opposing infantrymen engaged in trench warfare during WWI. He argues that such norms were widespread and persisted despite many of the efforts of military administrators to stamp them out. On this account, the implementation of (non-voluntary) trench raids and their attending recriminations played an important role in unraveling a carefully constructed mutual understanding of 'staged' warfare.