

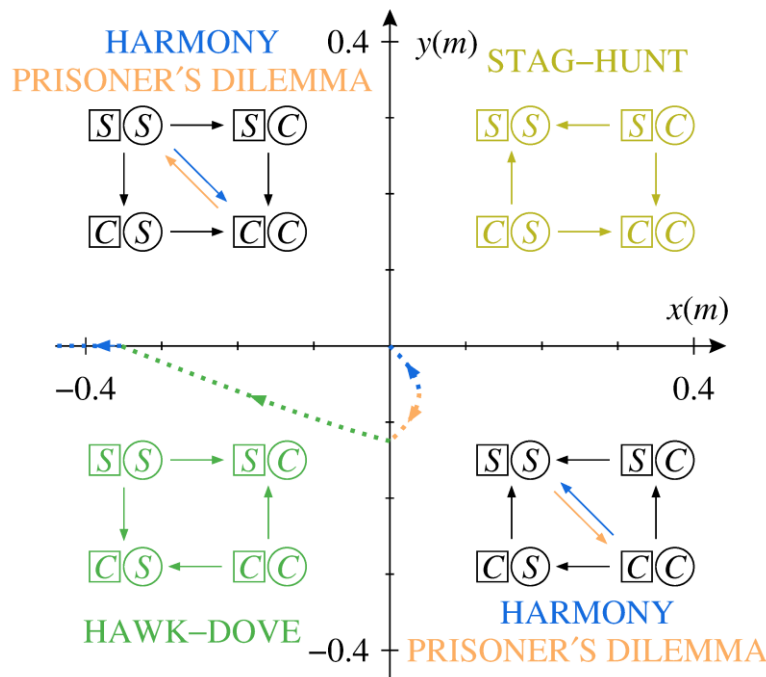
Evolutionary path from a prisoner's dilemma to a harmony game via hawk–dove games

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The article studies a game theory model where the rewards depend on both behaviour and an evolving physical trait. The researchers presented a simplified hunting example where the predators hunt in pairs. Their main conclusion is that evolution can change not only strategies but also the type of game being played in the population. In their example, evolution transformed a social dilemma into a “harmony game”. The model follows classic evolutionary game theory assumptions such as having an asexually reproducing monomorphic population perturbed by rare mutations and fast selection.

The authors examined an illustrative example modelling how hunting success is affected by predator size. Larger predators could hunt bigger prey, which allowed them to gain more benefit from cooperation. Small predators preferred safer stalking, while larger predators found risky chasing more rewarding. As prey became large enough to feed multiple predators, cooperation became beneficial for everyone.

The researchers state that their model framework could also work for more complex behaviours and traits in future studies. They finally add that populations of real animals, like lions, are more complicated because of factors such as sexual reproduction and kinship, which also affect cooperation.



The figure shows the evolutionary trajectory of the resident population (dotted line with arrowheads showing the direction of evolution) in the illustrative example presented in the article. The four quadrants of the plane spanned by the payoff difference incentives to match an opposing player's strategy correspond to the four possible symmetric two-strategy game classes. The colour of the trajectory indicates which type of game is being played in the population.