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Journal
Proceedings of the Annual Meeting of the Cognitive Science Society, 45(45)

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Publication Date
2023

Peer reviewed

The evolution of reciprocity based on welfare tradeoff ratios in games with asymmetric information

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Abstract

People care about others' welfare to varying degrees, captured by the welfare tradeoff ratio (WTR), or the weight placed on another person's welfare compared to one's own. People can infer another person's WTR toward themselves and reciprocate by adjusting their own WTR toward that person. However, the evolutionary origin of such a capacity is unclear. In games with perfect information, a heuristic strategy with tit-for-tat-like reciprocity is unbeatable, and the additional computation of inferring the opponent's WTR confers no benefit. Here we show that in games with asymmetric information, where the actor has more accurate information about the payoff structure than the observer, the heuristic strategy is prone to errors from misperception, while reciprocity based on the inference of WTRs is robust. These findings suggest that asymmetric information about social decisions, a realistic modification to the game environment, may have contributed to the evolution of people's understanding of others' WTRs.

In M. Goldwater, F. K. Anggoro, B. K. Hayes, & D. C. Ong (Eds.), *Proceedings of the 45th Annual Conference of the Cognitive Science Society.*