

# **None-Equilibrium Steady Flow in Human Rock-Paper-Scissors Game: Experiment and Theory**

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How humans make decisions in non-cooperative strategic interactions is a big question. For the fundamental Rock-Paper-Scissors game system, classic Nash equilibrium theory predicts that players randomize completely their action choices to avoid being exploited, while evolutionary game theory of bounded rationality in general predicts persistent cyclic motions, especially in finite populations. We performed a laboratory experiment on the RPS game involving six human subjects. We observed population-level persistent cyclic motions for five different payoff parameters. This collective behavior was quantitatively explained, without any adjustable parameter, by a microscopic model of win-lose-tie conditional response. Our work demonstrates the feasibility of understanding human competition behaviors from the angle of non-equilibrium statistical physics.