
Fitness measures and the evolution of social behavior

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Abstract

Session: Exploring the evolution of culture and social behavior (Steve Downes, Patrick Forber, Matt Haber, Fiona Jordan, Elisabeth Lloyd, Rory Smead)
Evolutionary models of social behavior, both biological and cultural, depend on measuring the fitness costs and benefits of behavioral interactions. The classification of such social behavior as altruistic, selfish, or spiteful also depends on such a fitness measurement. For instance, acts count as altruistic if they involve paying a fitness cost to confer a fitness benefit on another. Yet many common measures of fitness that are quantified over the entire life history of an organism, such as number of offspring, make classification difficult. Immediate costs or benefits of a single behavioral interaction can be offset by downstream indirect costs or benefits of the interaction. An act of punishment might appear to be altruistic (paying a cost to punish non-cooperative behavior creates a public good for the rest of the population) but actually may be selfish by increasing long-term average payoff from future interactions. This project is motivated by evolutionary game theoretic models of spite, and will explore possible fitness measures proposed in the literature using these models as examples. The challenge is to find a fitness measure that is both theoretically coherent and empirically measurable, allowing clear quantification of costs and benefits from behavioral interactions.

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