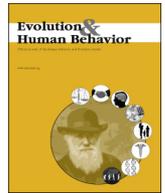




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Commentary

An independent replication that the evolution of direct reciprocity under uncertainty explains one-shot cooperation: commentary on Zefferman (in press)

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As you hail a cab at the airport, a man in khakis asks to share. Cabs are scarce, but you decline. You're tired and have a job interview tomorrow. Flash forward to your meeting with the department chair. It's the man in khakis. Oops.

Adaptive cooperative behavior requires knowing how long a relationship will last. Is this relationship destined to be short, like two strangers passing in an airport? If so, cooperating or reciprocating is pointless; it brings you nothing. Will the relationship last indefinitely, like departmental colleagues? If so, there can be enormous benefits, like a multi-decade collaboration. Lacking omniscience, however, humans must act under uncertainty. Being at an airport you assumed you would never see the man again. That was reasonable, but wrong. And it cost you a job. The small cost of cab-sharing would have led to large rewards. Even if the man was not the chair, being generous costs you little. If it was a mistake, at least it was cheap. All else equal, you should make the cheap error – share with a stranger – and avoid the costlier error – which preempts a lifetime of benefits.

Thinking about uncertainty and the costs of mistakes can solve an ongoing debate: Why do people cooperate when a long relationship is impossible? The most extreme experiments involve anonymous, one-shot interactions: One-time interactions with someone you never meet and whose identity is forever unknown. Surprising many researchers, people cooperate here – they are generous despite no possible personal gain. In response, theorists have developed complex theories based on cultural group selection, gene–culture co-evolution, and the learning of arbitrary norms. Zefferman (in press) is a recent example; he develops four related simulations (calling them Treatments 1 through 4) that he believes show the necessity of cultural selection.

We do not think such complexity is required to explain cooperation in one-shot (or otherwise brief) relationships. The airport example shows why. Perhaps you will never see the man again, but why risk it? Yes, you lose a little if the interaction is one-

shot, but you lose so much more if you are wrong. Others have made this argument, but norm theorists were unconvinced because the arguments were verbal. We therefore created a simple model of uncertainty and costly mistakes (Delton, Krasnow, Cosmides, & Tooby, 2011b). (For elaboration, see Delton, Krasnow, Cosmides, & Tooby, 2010; Krasnow, Delton, Tooby, & Cosmides, 2013; for a critique and our response, see Delton, Krasnow, Cosmides, & Tooby, 2011a; McNally & Tanner, 2011) Zefferman's paper is a response to our model. He believes that our model is incomplete and that cultural selection is required. But, as we show below, our model in fact predicts all of Zefferman's results.

Our model shows that one-shot cooperation evolves as a by-product of a psychology designed to establish long, beneficial relationships. The quantitative results vindicate a verbal argument that, prior to our model, was not widely believed: Don't risk it, just cooperate. This model parsimoniously solves a long-standing debate with minimal assumptions – and no group selection or norms. The only addition to standard models was uncertainty about interaction length, a feature always present in the real world. When missing out on a long relationship is sufficiently costly, evolution creates agents who, as a by-product, cooperate in one-shot interactions. As he acknowledges, Zefferman's Treatments 1 and 2 replicate this finding.

The disagreement comes with Zefferman's Treatments 3 and 4. Here, with a complex and carefully chosen mix of strategies, one-shot cooperation does not evolve. He argues that this is inconsistent with our model, but this assertion is false. In these treatments, the best response in the first interaction of a long relationship is to defect – even if you are absolutely certain it is a long interaction. If this is true, there is nothing to lose by mistakenly treating a long relationship as if it were a one-shot. Our model shows that one-shot cooperation evolves because – under uncertainty – you cannot afford to defect in long interactions. But if defection is best in long interactions, it is of course best in one-shots. This point is straightforward but we nonetheless modeled it and, indeed, when cooperation does not evolve in long interactions, neither does it in one-shot interactions (Delton et al., 2011b, Fig. 3D, bottom row and farthest right).

Given the complete harmony between our model and Zefferman's results, what is the disagreement about? One issue is that Zefferman

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misconstrues us as arguing that one-shot cooperation will always evolve – no matter what – in long relationships. Ironically, this mistake stems from an over-interpretation of our verbal description (which often mentions long relationships), while simultaneously ignoring our explicit model (which examines and parametrically manipulates the asymmetric costs of decision errors). The irony is that cultural evolution theorists constantly emphasize that by focusing on explicit models, researchers do not have to rely on verbal arguments.

The deeper issue is that our two papers are talking past each other. Instead of trying to explain one-shot cooperation specifically, Zefferman wants an explanation for cooperation and reciprocity generally. He believes that without cultural selection processes it is impossible to explain the evolution of human-like cooperation in indefinitely repeated games (the technical term for what we have called long relationships). But addressing the initial evolution of cooperation was not our goal. We simply assumed it and modeled the additional effects of uncertainty and costly mistakes. We felt safe in assuming reciprocity existed because it is also assumed by the major proponents of cultural selection accounts (see Fehr & Henrich, 2003, p. 61; Gintis, Bowles, Boyd, & Fehr, 2003, p. 155). Zefferman is welcome, of course, to challenge this consensus. An ossified consensus is not necessarily correct; perhaps there are no psychological adaptations for cooperation and reciprocity (though the evidence is overwhelming, see Cosmides & Tooby, 2005). Such a challenge, however, requires a detailed look at past ethnographic and psychological evidence. Building up or tearing down the hypothesis that the

mind has adaptations for reciprocity cannot be accomplished alone by his – or our – simple models.

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