Understanding Human Cooperation

Wu, J.

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English Summary

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Social dilemmas emerge when people experience a conflict between their immediate personal interest and the long-term collective interest of the group they belong to (Dawes, 1980; Kollock, 1998; Van Lange, Joireman, Parks, & Van Dijk, 2013). Such dilemmas underlie a variety of societal problems, including resource depletion and environmental pollution. One typical example is overfishing that occurs when a group of fishermen have access to a common resource: fish in the high seas. Each fisherman can be tempted to maximize their catch. However, excessive fishing increases the likelihood of irreversibly depleting the collective resource. As such, resolving social dilemmas to promote cooperation is important for the success of groups, organizations, and societies at large. Past research suggests that reputation and punishment are two key mechanisms that promote cooperation (e.g., Fehr & Gächter, 2002a; Panchanathan & Boyd, 2004). Yet relatively little is known about the specific conditions in which reputation can promote cooperation. Nor can we ascertain its relative efficiency compared to punishment.

The present dissertation focuses mainly on the social functions of gossip and reputation to promote and maintain cooperation, as well as the psychological mechanisms underlying these effects. Furthermore, drawing on life history theory (Del Giudice, Gangestad, & Kaplan, 2015), we examine whether people adopting faster (vs. slower) life history (LH) strategies are more willing to cooperate with others. In one review chapter (Chapter 2) and four empirical chapters (Chapters 3 to 6), we review extant theories and research on reputation-based cooperation, report the findings from several research programs designed to understand why and when people cooperate, and discuss the broader implications of these findings.

Chapter 2 addresses the fundamental question of why people cooperate by analyzing the role of reputation in social interactions. First, theories of indirect reciprocity, competitive altruism, and costly signaling all suggest that one's current (un)cooperative behavior functions to build a reputation that leads to future fitness benefits or costs (e.g., resources, attraction to coalition partners or mates). This may explain why reputation can promote cooperation. Moreover, people may have evolved specialized adaptations to adjust their cooperativeness when their reputation is at stake, especially when this reputation may affect their future interactions. Second, cooperation increases when the situation contains reputational cues (e.g., the presence of a third-party observer, cues of "watching" eyes, or gossip). Third, the effectiveness of reputation in promoting cooperation is contingent on the type of situation. For example, reputation is more effective when people anticipate future interactions with others who know their reputation. It may also be more effective in larger groups if people can freely gossip about each other, and there is competition over a

good reputation, and less chance to be chosen as potential partners. Fourth, not everyone values a good reputation to the same extent. Variations in social value orientations and life history strategies may explain this difference. For example, compared to prosocials, proself individuals, who seek to maximize their personal interest, tend to show a larger increase in cooperation in response to reputational cues (e.g., Simpson & Willer, 2008). Also, people who follow slower (vs. faster) life history strategies (and in general value long-term benefits) may be more concerned about a good reputation that leads to delayed indirect benefits (Barclay, 2012; Del Giudice et al., 2015).

Finally, to optimize the utility of reputation systems in promoting cooperation, we propose three avenues for future research. First, the level of group stability that results from intergroup competition may influence whether people cooperate and whether they also monitor others' behavior to guarantee mutual cooperation. Second, unintended errors (i.e., noise) might occur in social interactions or communication processes and lead to biased reputation (e.g., cooperators are perceived as free riders) that may harm social interactions. Thus, future research needs to explore effective solutions to cope with noise and biased reputation. Third, a positive, compared to negative, reputation system (i.e., a system that allows people to mainly transmit positive reputation about each other) may be more effective in promoting trust and cooperation.

As the first empirical chapter, Chapter 3 presents the results of three studies that examine whether people are invariably more cooperative when their reputation is at stake, or alternatively, increase their cooperation on the condition that reputational information is demonstrably transmitted to their future interaction partners. This chapter also tests whether proself individuals are strategically more cooperative in response to reputation transmission (i.e., gossip). In the first two studies, participants allocated an amount of resource (i.e., 100 lottery tickets) to a recipient. The recipient, in turn, could either gossip by sending an evaluation about their behavior to their future partner (i.e., investor) in a subsequent trust game, or could gossip to another person they would never meet, or could not gossip at all. The third study increased the number of gossip recipients, such that the recipient could gossip to five persons (instead of one) with whom participants would interact, or could gossip to five persons participating in an unrelated study, or could not gossip at all. We also examined whether proself, compared to prosocial, individuals would be more sensitive to cues regarding the possibility of gossip to their future partner(s). Moreover, we assessed the psychological mechanisms underlying this effect. As expected, participants were more generous (as measured by the number of lottery tickets they gave to the recipient) when they anticipated future interactions with the gossip recipient(s), compared to the other two conditions described above. Participants did not vary their generosity between the condition in which gossip was sent to an irrelevant person and the no-gossip condition. In line with our prediction, proselfs, compared to prosocials, showed a larger increase in generosity when gossip was sent to their future partner(s) than when

gossip was sent to irrelevant persons or when gossip was not possible.

Chapter 4 builds on the idea that reputation may only promote cooperation when there is a perceived "shadow of the future", and as such presents an extension of Chapter 3. From an evolutionary psychology perspective, natural selection may have shaped psychological mechanisms that identify opportunities to enhance one's reputation (Cosmides & Tooby, 2013). While people may not ascertain with whom they will interact in the future, situational cues may inform them when to behave in ways to manage their reputation effectively. We propose that two properties of social networks might serve this function. First, social networks are densely connected, so information from one person may potentially spread over an entire network. Second, people differ in their number of network connections, which may co-vary with their gossip potential. Thus, we predict that people may be more cooperative when their interaction partner or a third-party observer is connected and can gossip to at least one (vs. no one) or many (vs. fewer) others within their social network.

This prediction was tested using the same paradigm as in Chapter 3. For the experimental manipulation, participants learned that their recipient or a third-party observer was connected and could gossip to 0, 1, 4, or 8 of their eight potential future partners in the subsequent trust game. In line with the prediction, participants were more generous toward a recipient when this recipient or a third-party observer was more socially connected and thus could gossip to more people. In particular, even a single connection (versus no connection at all) is sufficient to significantly promote generosity.

Importantly, the findings from Chapters 3 and 4 suggest that the gossip-based generosity effect was mainly driven by one's reputational concern, rather than expected benefits one could gain from future partners. This implies that people may not rationally calculate potential future benefits from a specific interaction or base their decision on these benefits, although situational information facilitates them to do so (see also Levine & Kurzban, 2006).

Chapter 5 examines the relative effectiveness and efficiency of gossip and punishment in promoting and maintaining cooperation. In an online real-time experiment, participants interacted with others in an initial four-round public goods game (PGG), and then a subsequent two-round trust game (TG), with different partners in each round. In each round of the PGG, four group members decided simultaneously to contribute to a group account. After knowing each other's contributions and earnings, they were given or not given the option to (a) send a message about other group members to these members' future partners (i.e., gossip), or (b) assign deduction points to reduce others' earnings with a cost-to-fine ratio of 1:3 (i.e., punish).

The TG involved an investor and a responder in each round, with no option to gossip or punish. Participants acted as either an investor or a responder in each round, and their partner acted in the complementary role. Behavioral measures were participants' contri-

bution and earnings in each round of the PGG, and their levels of trust and trustworthiness in the TG. The findings revealed that gossip significantly increased both cooperation and individual earnings in the PGG. However, punishment had no overall positive effect on cooperation, and significantly decreased individual earnings. Moreover, the initial gossip option made people more trusting and trustworthy in the subsequent TG. These initial findings indicate that gossip may be relatively more effective, and especially more efficient, than punishment to promote and maintain cooperation. Gossip is especially more efficient because it involves no monetary costs, whereas punishment does.

Finally, Chapter 6 aims to answer the question of whether individual differences in life history (LH) strategies relate to one's willingness to cooperate with others. Life history theory predicts that people who tend to follow slower (compared to faster) LH strategies are more likely to engage in long-term cooperation and reciprocity with others (Del Giudice et al., 2015). However, no empirical research has directly tested this prediction. To address this research gap, we employed both correlational and experimental methods across five studies. Studies 6.1 and 6.2 correlated different LH strategy measures with cooperation in various economic games. Studies 6.3 to 6.5 measured participants' childhood environments (i.e., childhood socioeconomic status and childhood unpredictability), manipulated current resource scarcity, and tested whether these two interacted to predict cooperation. Across the five studies, we also tested whether the relation between LH strategy and cooperation could be explained by temporal discounting, concern for reputation, social value orientation, and trust in others. Overall, we found no support for the prediction that a slower LH strategy relates to more cooperation or that childhood environments interact with current resource scarcity to predict cooperation. However, some of the findings do suggest that people following slower LH strategies tend to be more concerned about their reputation, more prosocially oriented, and more likely to trust others.

To conclude, the present dissertation advances our understanding of why and when people cooperate by providing converging empirical evidence on the effects of gossip, reputation, and life history parameters. The current findings suggest that gossip and reputation monitoring may increase cooperation and thus provide a cost-effective solution to promoting cooperation. Indeed, such reputation systems already exist in many contexts, such as online anonymous exchange forums (e.g., Jøsang, Ismail, & Boyd, 2007). Thus, to establish interpersonal trust and cooperative relationships, it may be useful to think creatively about the more informal reputation systems, rather than costly sanctioning systems. We did not find a direct relation between life history strategy and cooperation in economic games. However, the current findings suggest that the development of slower, compared to faster, strategies comes together with enhanced levels of prosocial orientation, reputational concern, and trust in others. We point to fruitful avenues for future research with regards to the two potential routes (i.e., reputational concern vs. beliefs about others' cooperative intent) through which gossip exchange may affect cooperation, and

factors that influence to what extent people condition their cooperation on second-order information about their partner's past behavior (e.g., whether their partner had cooperated or punished non-cooperators). Looking back and ahead, we stress the importance of reputation monitoring and spreading in groups and social networks to promote trust and cooperation in society at large.