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Cooperation in teams: The role of identity, punishment, and endowment distribution

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ABSTRACT

Common identity and peer punishment have been identified as crucial means to reduce free riding and promote cooperation in teams. This paper examines the relative importance of these two mechanisms under two income distributions in team cooperation. In a repeated public good experiment, we use different combinations of homogeneous/heterogeneous endowments, strong/weak identity, and absence/presence of peer punishment. We find that without punishment, a strong identity can raise cooperation in homogenous and heterogeneous teams, but that the effect depends on the strength of the identity. When punishment is introduced, the impact of punishment depends on the strength of the identity-building activity and the effectiveness of punishment. Furthermore, we find no evidence of stronger cooperation or punishment in teams with strong identity. These findings provide important implications for management policy makers in organizations: ex ante income heterogeneity should be implemented in teams with caution, and the decision of whether identity or punishment is a more effective norm enforcement mechanism in teams is rather sensitive to their interaction and relative strengths.

1. Introduction

Teams have increasingly become viewed as an important way to enhance the efficiency of organizations and firms. A key aspect of successful teams is cooperation among their members (Che and Yoo, 2001). However, organizations face several challenges to efficient teamwork. For example, the benefits of working as a team may be undercut by the incentives to free ride, which cannot be completely controlled through formal contracts if compensation is based on team output rather than personal input (Alchian and Demsetz, 1972). Moreover, experiments have shown that cooperation typically cannot be sustained by intrinsic altruistic motives alone (e.g., Andreoni, 1995; Fischbacher et al., 2001; Fischbacher and Gächter, 2010). Rather, (centrally) building a common identity among employees and allowing monitoring and sanctioning of team members have been considered effective in reducing free riding and promoting cooperation in teamwork settings. Social identity theory (Tajfel and Turner, 1979, 1985) has received increasing attention in the organizational literature (see, e.g., Akerlof and Kranton, 2000, 2005, 2008). A number of experiments have shown that salient identification with an organization or a team can increase cooperation (e.g., Eckel and Grossman, 2005; McLeish and Oxoby, 2011).[2] Punishment, in terms of both pecuniary consequences such as reduced salaries and non-pecuniary ones such as social pressure and disapproval, has also been shown to be an important means to increase cooperation (Fehr and Gächter, 2000b; Masclet et al., 2003; Kandel and Lazear, 1992; Mas and Moretti, 2009).[3]

An additional aspect of teams is that they are often composed of individuals who are unequal in productivity, ability, and motivation. Payments tend to be differentiated partly to induce greater individual effort and partly to incentivize employees contributing to the team output to stay away from distinct outside options (Balafoutas et al., 2013). Previous public good experiments investigating the role of

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[2] A closely related strand of literature focusing on identity conflict between two groups in general finds favoritism toward ingroup members and discrimination against outgroup ones in terms of cooperation (e.g., Charness et al., 2007; McLeish and Oxoby, 2007), coordination (e.g., Chen and Chen, 2011; Chen et al., 2014), social preferences (e.g., Chen and Li, 2009), and norm enforcement (e.g., Ruffle and Sosis, 2006; Bernhard et al., 2006; Goette et al., 2006, 2012a, 2012b).

[3] However, some other studies question the beneficial effects of punishment (Egas and Riedl, 2008; Houser et al., 2008; Abbink et al., 2010), and some even find anti-social punishment directed at relatively cooperative people (e.g., Herrmann et al., 2008; Nikiforakis, 2008; Cinyabuguma et al., 2006).

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income distribution (in terms of homogeneous or heterogeneous endowment) in cooperation have shown mixed results: Cherry et al. (2005) report a negative effect of heterogeneity on aggregate cooperation, Chan et al. (1996), Visser and Burns (2006), and Prediger (2011) find the opposite, and Hofmeyr et al. (2007) find no significant difference. However, when it comes to individual behavior in unequal income teams, low-income people are often found to cooperate relatively more than their high-income counterparts (e.g., Buckley and Croson, 2006; van Dijk et al., 2002). Further, some studies explore whether the power of punishment in norm enforcement in symmetric settings can carry over to asymmetric settings, and obtain the affirmative answer that punishment in heterogeneous populations shows similar or even higher efficacy (e.g., Nikiforakis et al., 2010; Visser and Burns, 2006; Prediger, 2011).[4] Nikiforakis et al. (2012) and Reuben and Riedl (2013) look particularly at the normative rules underlying contributions to public goods in homogeneous and heterogeneous groups and at the punishment behavior intended to enforce the rules. As these papers suggest, heterogeneous income matters for cooperation for reasons such as disagreements in fairness principles of equality, equity, and efficiency, and self-serving selection of these principles.

In this paper we study the following three dimensions and how they affect cooperation: identity, punishment, and income distribution. While identity and punishment in isolation have been shown to increase cooperation, their potential interaction and relative importance have not, to our knowledge, been investigated. Clearly, when deciding on team incentives and organization, the relative importance of and interaction between identity and punishment are of central importance. In addition, there are only a few studies looking at the impact of identity on punishment behavior, but the results are inconclusive.[5] Chen and Li (2009) find that individuals are less likely to punish an ingroup member for misbehavior, whereas McLeish and Oxoby (2007) find that unfair offers to ingroup members incur greater use of costly punishment than those to outgroup members.

Moreover, although the effect of income distribution on team cooperation both in the absence and presence of punishment has been investigated, whether and how income distribution affects the role of identity has not. One implication from social identity theory is that once an individual has gone through a cognitive change and emotional investment process to categorize herself as part of a unit with shared goals, values, and norms, her behavior tends to conform to the norms of that unit, which could lead to a higher degree of team cohesion and more effective teamwork (Lembke and Wilson, 1998). Thus, an additional goal of this paper is to demonstrate whether the disagreements and self-serving biases in normative rules governing cooperation in heterogeneous income teams can be ameliorated or even resolved by building a strong identity such that a contribution norm can be agreed upon and enforced.

We use laboratory experiments to examine the interactive effects of identity and punishment and of identity and income distribution on team cooperation, as well as the interactive effect of identity and income distribution on punishment behavior. We induce a strong common identity via an identity-building activity called the "human knot" game; this activity was not used in the weak-identity treatments. We measure cooperation by looking at contributions in a public good game. We distinguish two team endowment distribution environments in the public good game: in one, endowment is homogeneously distributed among team members; in the other, each member is given a different endowment according to their productivity ranking within the team, yet the total team endowment is the same as that of the homogeneous endowment teams. Productivity ranking is determined by the performance on a quiz. To compare the difference in behavior with and without punishment, we add a second sub-stage to the public good game in some of the treatments where subjects are given the opportunity to punish other team members. Since existing theory and evidence do not provide guidance on how strong the identity and punishment need to be, we explore their relative strengths by adopting another more powerful identity-building activity using an online chat and two different punishment effectiveness levels.

We find that when punishment is not possible, strong identity induced by the human knot game increases cooperation not only in heterogeneous teams as a whole but also at some of the endowment levels. Strong identity induced by the online chat, by contrast, successfully enhances cooperation in homogeneous teams. When a punishment opportunity is introduced, the effect of punishment depends on the effectiveness of punishment and the strength of the identity-building activity. With the human knot game, punishment with an effectiveness of 1:3 increases cooperation even under strong identity for both endowment distributions and also for almost all endowment levels within heterogeneous teams. However, with a stronger identity-building approach – the online chat – and a less effective punishment, i.e., 1:2, punishment does not increase cooperation. Moreover, strong identity, regardless of the way it is induced, fails to further enhance cooperation or increase punishment.

2. Experimental design

The experiment uses a $2 \times 3 \times 3$ incomplete factorial design. In one dimension, we vary the endowment distribution by giving subjects on a team the same or different endowments in order to create homogeneous or heterogeneous teams. In the second, we make the strength of identity strong or weak by conducting or not conducting an identity-building activity. The third dimension concerns whether or not subjects have the opportunity to punish other team members. Since it is not clear how the strengths of identity and punishment affect contributions, we adopt two identity-building activities and two punishment-effectiveness parameters to explore the relative importance of these two mechanisms. In order to keep the number of sessions at a reasonable level, we only vary endowment distribution under one identity-building task and one punishment-effectiveness parameter. This generates in total eleven different combinations of conditions, each of which is a treatment of the experiment as summarized in Table 1. The experiment is conducted in three stages. The first stage is an identity-building stage, the second is an endowment-determination stage, and the third a repeated linear public good game.

The identity-building stage was included only in the treatments with strong identity. Two different activities in separate treatments were employed to induce a strong identity believed to be of different strengths. One is a human knot game, which was played with all subjects in a session in another room before they entered the laboratory. This game was conducted in four treatments. All 24 subjects stood

Table 1
Experimental treatments.

Treatment	Endowment distribution	Identity	Punishment
Homo	Homogeneous	Weak	No
Hetero	Heterogeneous	Weak	No
Homo-Knot	Homogeneous	Strong (human knot)	No
Homo-Chat	Homogeneous	Strong (online chat)	No
Hetero-Knot	Heterogeneous	Strong (human knot)	No
Homo-Punish1:3	Homogeneous	Weak	Yes (1:3)
Homo-Punish1:2	Homogeneous	Weak	Yes (1:2)
Hetero-Punish1:3	Heterogeneous	Weak	Yes (1:3)
Homo-Knot-Punish1:3	Homogeneous	Strong (human knot)	Yes (1:3)
Homo-Chat-Punish1:2	Homogeneous	Strong (online chat)	Yes (1:2)
Hetero-Knot-Punish1:3	Heterogeneous	Strong (human knot)	Yes (1:3)

[4] Apart from endowment heterogeneity, heterogeneity can also be represented by different marginal benefits from a public good (e.g., Isaac and Walker, 1988; Fisher et al., 1995; Carpenter et al., 2009; Reuben and Riedl, 2009), or different fixed lump-sum payments such as show-up fees (e.g., Anderson et al., 2008).

[5] Besides punishment extended by the same agents playing the previous game, punishment can also take the form of third-party punishment (e.g., Bernhard et al., 2006; Goette et al., 2006, 2012a, 2012b).