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Social Norms, Behavioral Payment Programs, and Cooperative Behaviors: Toward a Theory of Financial Incentives in Normative Systems

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Descriptive and injunctive social norms communicated among groups are known to influence behavior, yet little is known about how they evolve over time and how financial incentives influence norms. This article tests hypotheses about the ways in which monetary incentives can disrupt normative impact while facilitating cooperative behavior. The results of a public goods experiment indicate that the presence of a financial incentive for behavior can reduce the impact of perceived descriptive norms on behavior, and this reduction continues once the incentive is removed. The findings show that group identification enhances the effects of perceived descriptive norms on contribution behavior. The study results form the basis for theory building on the role of financial incentives in normative systems (FINS).

Keywords: Collective Action, Cooperation, Financial Incentives, Group Identification, Social Norms.

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Social norms play a key role in behavior change, yet questions remain about how and when they are influential (Manning, 2009). In particular, three conceptual issues bear additional scrutiny in order to uncover when social norms are and are not influential in behavioral decision making, particularly regarding cooperative actions in groups. First, the influence of financial incentives in normative systems (FINS) remains a relatively unarticulated but potentially important point of theoretical development because the use of financial incentives to promote behaviors for the collective good has become prominent (Kerr, Vardhan, & Jindal, 2014). Second, a distinction has been made between perceived and collective social norms, existing at the individual and

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social level, respectively (Lapinski & Rimal, 2005), but the unique effects of each type of norm have neither been well articulated nor tested empirically. Third, theorizing about normative influence has highlighted the important role of group identification in normative systems, but the evolution of this relationship remains less well understood. This article addresses these issues; in particular, it undertakes a preliminary investigation of the effects of short-term monetary incentives on normative change and on peoples' behavior.

The research presented here is framed based on the integration of theories of social norms from communication and social psychology (e.g., Cialdini, Reno, & Kallgren, 1990; Rimal & Real, 2005) and behavioral economics (e.g., Bowles & Polania-Reyes, 2011) in order to explain and predict the ways in which monetary incentives influence social norms and behaviors. It heeds the call of Wildman (2008) for better integration across these disciplines. In this study, the *evolution of normative systems* is focal (Bendor & Swistak, 2001): examining how these systems adapt and change over time and how economic forces play a role. Understanding this issue is practically important because of the growing use of financial incentives in behavior change efforts and the fact that financial incentives are rarely sustained indefinitely. If financial incentives undermine social norms, development efforts that use temporary financial incentives as their base might ultimately be doomed to failure. As such, this article represents an initial step toward a theory of FINS. Methodologically, we adopt approaches from communication science and economics to address our research questions and hypotheses. In particular, we undertake a public goods (PG) experiment in which subjects receive a temporary incentive to cooperate.

Financial incentives are a reward with properties distinct from other forms of extrinsic motivation (Deci, Koestner, & Ryan, 1999). There are several reasons why the role of FINS should be important to researchers interested in extending theories of the communication of social norms (e.g., focus theory, Cialdini et al., 1990; the theory of socially normative behavior [TNSB], Rimal & Real, 2005). Axiomatic to this discussion is the belief that social norms concerning behaviors are developed and propagated through communication about those behaviors (Carcioppolo & Jensen, 2012; Hogg & Reid, 2006). We have solid evidence that various forms of social norms directly affect behaviors (Cialdini et al., 1990) and that social norms work together with other psycho-social variables, such as outcome expectations and social identification, to influence action (Rimal, 2008); however, norms effects are small relative to the effects of attitudes (e.g., Rivis & Sheeran, 2003). Moreover, the effects of norms on behaviors are typically measured cross-sectionally, providing a snapshot of normative influence despite the dynamic nature of group influence. Additional theoretical specification is necessary to uncover the power of normative effects over time. One direction for extending an existing theory in this realm is to consider how financial incentives for behaviors may both drive normative perceptions and moderate the relationship between social norms and behaviors.

Theories of social norms (e.g., focus theory, Cialdini et al., 1990; TNSB, Rimal & Real, 2005; the social norms approach, e.g., Borsari & Carey, 2003) have not

considered the role of financial incentives for behavior in any substantive way despite the fact that, like social norms, monetary rewards are well known to directly influence human behavior. Indeed, the entire field of economics is based on this premise. Much of the economics and institutions literature that addresses social norms does not define them. It tends to assume social norms to mean unwritten societal rules (e.g., Sethi & Somanathan, 1996; Ostrom, 2000; Ferraro, Miranda, & Price, 2011), and it does not distinguish between different forms of normative influence delineated in the communication literature. The economics literature treats social norms in ad hoc ways but considers their evolution something only implicit in the communication literature. For example, Sethi and Somanathan (1996) argue that norms evolve with the varying shares of uncooperative, cooperative, and punishing individuals in the population.[1]

The effects of monetary incentives stretch beyond direct influences on behavior; they influence the ways in which people perceive and respond to communication processes. There is robust experimental literature testing the effects of monetary incentives on attitudes (cf., Deci et al., 1999; Schlenker, Forsyth, Leary, & Miller, 1980) and meta-analysis data indicating that financial incentives can reduce intrinsic motivations (Deci et al., 1999). Studies of counter-attitudinal advocacy and forced compliance have posited self-presentational (Schlenker et al., 1980), dissonance-based (e.g., Festinger & Carlsmith, 1959), and incentive theory (Elms, 1967) explanations for the effects of incentives on attitude shifts. Our interest here, however, is in the role of money in normative systems as related to, but distinct from, attitudinal systems.

The use of financial incentives for influencing behaviors has reached new prominence in behavior change efforts, particularly in the realm of international development. Governments and donor agencies have initiated programs to pay people to engage in behaviors that will benefit themselves directly and the collective more broadly. These include initiatives that pay parents to send their children to get vaccinated or go to school (Fiszbein & Schady, 2009) and pay farmers to conserve or protect forests or water resources (Wunder, Engel, & Pagiola, 2008). We posit that members of social systems interpret these payments, and the resulting behaviors, such that they drive attributions about the prevalence of behaviors (descriptive norms), evaluations of social appropriateness of a behavior (injunctive norms), and about the actors involved. Specifically, we predict below that financial incentives enhance collective norms and may enhance or attenuate perceptions of descriptive norms and their effects on behavior.

The theorizing presented here is limited to payment programs that provide people with financial compensation for engaging in prosocial behaviors, which we term *behavioral payment programs* (BPPs), distinguishing them from traditional employment or exchange agreements. We limit the discussion to BPPs that provide cash for behavioral action as opposed to the in-kind exchange of goods or services, and that involve *conditional* payments, that is, payments that are made in exchange for a specific, verified behavior. BPPs might target individual or collective behaviors, a distinction that matters when considering issues of normative influence (Lapinski,

Rimal, DeVries, & Lee, 2007). In some BPPs, behaviors are enacted individually, without the need for others in a group or collective to engage in the behavior. Others require the entire group to act or else the behaviors of the individual will not result in benefits. For example, one person's action to avoid polluting a common water resource will have little or no impact if others continue to pollute it. In this study, participants receive individual payments, but the size of any individual payment is contingent on the actions of others. This mirrors BPP cases where the financial payment occurs to the individual, with additional benefits accruing as a result of collective action.

BPPs are inevitably initiated in the context of existing normative systems. Over time, they may have the power to form new social norms and bolster or extinguish existing norms. However, the impact of financial incentives on social norms and behaviors has not been considered. As such, the question emerges: *Does the introduction of financial incentives for a behavior have the power to form, change, reinforce, or undermine social norms*? There is mounting evidence that monetary incentives sometimes displace or "crowd out" other sources of motivation (Bowles & Polania-Reyes, 2011), but theoretical explanations of such outcomes remain limited. Kerr, Lapinski, and Zhao (2013) show that economic models to date have failed to distinguish and systematically incorporate the different types of norms identified in the communication literature (e.g., Lapinski & Rimal, 2005; Park & Smith, 2007) and that the economics and institutions literature has generally treated the evolution of norms in ad hoc ways. Theories on the communication of social norms are well situated to shed light on how financial incentives and social norms function and the policy implications of this interaction.

Social norms

Theory in communication and social psychology has refined thinking about the nature of social norms and their influence by conceptualizing different types of social norms (e.g., Cialdini et al., 1990; Park & Smith, 2007) and identifying the moderators of the norm–behavior relationship (Rimal & Real, 2005). Social norms are, in part, a function of interpersonal communication about behavior, verbal or nonverbal, among a group of people in a particular social context (Hogg & Reid, 2006). Communication has the power to influence normative perceptions about both the prevalence of behaviors and the attitudes of others about these behaviors (Cialdini et al., 1990). *Perceived* norms have been differentiated from *collective* norms such that perceived norms exist at the level of the individual, whereas collective norms exist at the level of the community or social system. Collective norms are believed to influence perceptions of normative behavior and subsequent behaviors, but they are not simply the aggregate of perceptions (Lapinski & Rimal, 2005; Rimal & Lapinski, 2015). Perceived norms have the potential to influence behaviors, particularly when norms are made salient or focal (Cialdini et al., 1990). The role of collective norms in driving this process is just being explored empirically (e.g., Rimal, Limaye, Roberts, Brown, & Mkandawire, 2013). Research on the TNSB shows that a number of perceptual variables moderate the relationship between perceived descriptive norms and

behaviors, including perceptions of *injunctive norms*, *outcome expectations*, *group identity*, and *ego-involvement* or *social identity* (see Mollen, Rimal, and Lapinski (2010) for a review).

In short, *descriptive norms* are conceptualized as perceptions about the prevalence of a behavior among members of a referent group (Cialdini et al., 1990) and directly influence behaviors (Rimal, 2008). These perceptions are formed through observation of, and interpersonal communication about, behaviors. *Injunctive norms* moderate the relationship between descriptive norms and behaviors and are distinct from descriptive norms in that they address the ways in which members of a social system think one should behave, and have both direct and moderated effects on behaviors (Lapinski, Anderson, Shugart, & Todd, 2013). Other moderators of the descriptive norm – behavior relationship have been identified by the TNSB, but group identification is the focus of the current theory.

Group identity moderates the relationship between descriptive norms and behaviors. Group identity refers to feelings of affinity with one's social group and the desire to be connected to that group (Rimal & Real, 2005). The concept of group identity in the TNSB is based on the social identity perspective (Tajfel, 1981), which asserts that individuals develop at least part of their self-concept from their communication with social groups and subsequent self-categorization into certain groups. Hogg and Reid (2006) argue that self-categorization into a group can affect normative behavior, but in order to do so, the group identity must be salient to the individual. Other, motivational approaches to the role of group identity in normative response suggest that when group identity is salient, it motivates norm-consistent behavior because individuals experience positive affect when they behave normatively (Christensen, Rothgerber, Wood, & Matz, 2004). Salient group identity also motivates normative behavior because individuals are aware that others in the group will endorse their compliance with those norms. Thus, the TNSB posits that when group identity is strong, the influence of descriptive normative information emanating from that group will be heightened (Rimal & Real, 2005). Consistent with other tests of the theory, the findings from Lapinski et al. (2013) indicate that childcare workers who strongly identified with their coworkers (i.e., who reported high group identification) reported greater hand washing in the presence of strong perceived descriptive norms than those who did not strongly identify with their coworkers.

Much of the support for the connection between descriptive norms and behaviors has been limited to examining the association between existing perceptions of descriptive norms and self-reported behavior using cross-sectional survey data (e.g., Borsari & Carey, 2003). Research has attempted to manipulate perceptions of descriptive norms through communication (e.g., Smith, Atkin, Martell, Allen, & Hembroff, 2006). Longitudinal, experimental studies of social norms are rare despite calls for more of such work to better understand the boundary conditions of normative influence (Mollen et al., 2010). As such, this study simulates longitudinal conditions in order to examine the evolution of collective and perceived descriptive norms and group identification over the course of an experiment.

Hypotheses and research questions

The abovementioned literature points to key issues that require additional scrutiny and provides the necessary background for a series of predictions about the role of FINS, distinctions between collective and perceived norms, and the moderating effects of group identification. Some background on the study design is necessary in order to describe the study hypotheses.

The study reported here is a 2 (sorted/not sorted) × 2 (short-term financial incentive/no incentive) PG experiment. Some participants were grouped according to their cooperation level, as measured by their behaviors in an initial round prior to the main experiment, and others were grouped randomly (sorted/not sorted groups). This method of sorting can reduce natural declines in cooperative behavior (Gachter & Thoni, 2005; Gunthorsdottir, Houser, & McCabe, 2007). It allows for the examination of whether the effect of financial incentives varies between groups that differ in their inclination toward cooperation. In order to examine postincentive social norms and behaviors, groups were also randomly assigned to either receive or not receive a temporary financial incentive to cooperate during the second phase of the experiment. Group identification and perceived descriptive norms (i.e., perceptions of the prevalence of cooperative behavior among group members) were measured throughout the course of the experiment. The behavioral outcome of this study was a participant's financial contribution to the collective; stakes were high because the experiment was conducted with tokens that were converted into cash payments. Longitudinal conditions were simulated by conducting 19 trials or rounds during the experiment. Aggregating across rounds allows for assessment of the *collective norm*; that is, assessment of all group members' actual behavior during the course of the experiment provides an assessment of actual behavioral prevalence. Importantly, because of the nature of the study design, it is focused on the case of *norm formation* (because of using newly formed groups) and *evolution* (because it involves multiple trials over time); these predictions do not consider norms in existing group structures. The first series of predictions addresses the role of financial incentives in the relationship between descriptive norms and behaviors.

Financial incentives may result in behavioral compliance, but their effects can crowd out other motivations (Deci et al., 1999; Frey & Oberholzer-Gee, 1997). That is, paying people to engage in a behavior can change the source of motivation from intrinsic to extrinsic and can reframe a behavior from altruistic to being driven by a market mentality (Bowles & Polania-Reyes, 2011). As such, when payment is removed, the behavior may cease altogether or be reduced below preincentive levels despite that behavior having other, nonmonetary benefits for the individual or the group. Importantly, when BPPs are introduced into social systems, they occur in the context of existing behaviors, normative expectations, and group dynamics. Although financial incentives certainly have direct effects on behavior, the effects may be moderated by the nature of the existing collective and perceived descriptive norm (among other variables not focal in this investigation). The nature of the

existing group norms should influence how people respond to a financial incentive and subsequent action once the payment is removed.

In the case of a noncooperative norm, contributions to the collective good are low, and incentives may be necessary to enhance cooperative behavior for the common good. Once the incentive is removed, however, people are likely to return to preincentive cooperation levels. In the case where there is a cooperative norm among group members, the introduction of financial incentives will induce additional cooperative behavior, but when those incentives are removed, it is not clear what will happen to behavior. It may be argued that the incentive combined with the cooperative norm (which could be enhanced by payment in the short term) would lead people to perceive that the descriptive norm for cooperation is positive, and the perception of behavioral prevalence could be sustained once payment ends.

This assumes, however, that the introduction of a financial incentive does not destroy the cooperative norm and, consequently, the perceptions of it. It is possible that once people see others being paid for behaviors, it causes them to make attributions for why they are performing the behavior. If people perceive that, for example, "That person is only doing the behavior because they are getting paid for it," they may discount prevalence as a function of the financial incentive, thus eroding the power of the descriptive norm to influence behavior. If the financial incentives end, the positive power of perceived descriptive norms will have been eroded. Although we have limited the present study to the case of descriptive norms, it is likely that injunctive normative perceptions might also be eroded or enhanced by the introduction of financial incentives. In short, it is clear from this logic that perceived descriptive norms will change over time (as people change their behaviors) as will the norms' influence on behavior; this effect will depend on the presence or absence of a financial incentive. Perceptions of what is normative might become more or less influential depending on how people interpret the presence of the financial incentive in driving other people's behaviors. Similarly, the initial level of cooperation will influence contribution behavior, with cooperation yielding more cooperation, but the introduction of a financial incentive might either enhance or undermine the cooperative norm, and this relationship should change over time. Because incentives may enhance or undermine the cooperative norm, nondirectional hypotheses are proposed for the first two predictions; thus:

H1: The relationship between perceived descriptive norms and contribution behavior will be moderated by presence or absence of a financial incentive.

H2: The relationship between participants' initial cooperation level and contribution behavior will be moderated by the presence or absence of a financial incentive.

H3: Receiving a financial incentive in the past ameliorates the positive effects of descriptive norms on contribution behavior when the incentive is removed.

Financial incentives for behavior should influence normative perceptions because of their effect on the collective norm. Recall that, in this case, for descriptive norms, the collective norm is analogous to the *actual prevalence* of the behavior in a group

(the collective), whereas the perceived norm is the *perception of the prevalence* of the behavior among group members (Lapinski & Rimal, 2005; Rimal et al., 2013). By sorting groups by their level of initial cooperation, our experiment artificially induces a norm regarding the level of cooperation. Normative information is provided by the observation of group members' actual behaviors (or the collective norm) over time. It may be the case that behavior change associated with the receipt of payment for cooperation serves to enhance the actual prevalence of the behavior in the group while also changing the ways in which norms are perceived. That is, when people in groups are offered a financial incentive to enact a behavior, they are likely to engage in that behavior in greater numbers than was the case prior to the incentive, thus enhancing the group's collective norm for behavioral prevalence. Other members of the group will observe this behavioral prevalence, and *perceptions* of the prevailing descriptive norm will be enhanced.

Rimal et al. (2013) examined the role of collective norms in self-reported behaviors by aggregating a community's reported behavioral intention as an index of the collective descriptive norm for several behaviors (e.g., condom use, HIV testing). They used the population mean excluding an individual's own behavior as an estimate of the collective descriptive norm. The current study operationalizes collective norms as the actual behavior of group members; this may be a more valid estimate of the collective descriptive norms than what has been used in past research. As such, the following predictions and research question were proposed:

H4: The relationship between initial cooperation level and perceived descriptive norms will be (a) positive and mediated by collective norms; (b) collective norms will be positively associated with perceived descriptive norms.

RQ1: What is the role of financial incentives in the relationship between collective norms and perceived descriptive norms?

Axiomatic in communication research is the belief that behavior is more closely linked to subjective perceptions than to objective assessments of the social environment. Our thinking on this issue is driven, in part, by the literature on risk perception, where although objective and perceived risk can be closely associated (Caruso et al., 2009), perceived risk is believed to be more influential on behaviors than objective risk. For example, it is highly improbable that one will be killed in an airplane crash, yet subjective risk perception may cause one to avoid flying. Put differently, objective probability assessments of risk are often immaterial to behavioral decisions. If we apply this logic in the context of social norms, it can shed some light on the relative influence of collective and perceived norms, which are objective and subjective, respectively.

The literature on normative restructuring (e.g., the social norms approach, Perkins & Berkowitz, 1986) is premised on the idea that people may have perceptions of the norm that are inconsistent with objective reality, and that perceived and objective norms (analogous to what Lapinski and Rimal (2005) call collective norms) should be brought into alignment because it is perceived norms that should be most closely

associated with behaviors. The relative effects of collective versus perceived norms, however, have not been tested empirically because it is methodologically challenging to do so; the measurement of collective norms is not established or easily accomplished. Rimal et al. (2013), who measured collective norms, did not report perceived descriptive norms and, as such, did not examine the relative effect of perceived versus collective norms on behaviors. Although perceived and collective norms may be associated with each other, when controlling for this covariation, individual behaviors should be more highly associated with perceived norms than with collective norms. It is predicted here that:

H5: *Ceteris paribus*, the effect of perceived descriptive norms on contribution behavior, will be stronger than the effect of collective norms.

Finally, the effects of descriptive norms on behaviors depend on group dynamics such as how one sees oneself in relation to group members (Rimal & Real, 2005). The more closely one identifies with a referent group, the stronger the effect of normative information emanating from that group on peoples' behaviors (Lapinski et al., 2013). In this study, we propose to replicate prior research by predicting that group identification will moderate the relationship between perceived descriptive norms and contribution behavior by functioning as a magnitude moderator. Thus, a strong perceived descriptive norm for cooperation will result in greater contributions for people who are more strongly identified with their groups. However, the role of group identification in the collective norm – behavior relationship has not been tested. Because collective norms are an objective assessment of behaviors (as opposed to perceptual), it is not likely that group identity plays a role in their effects. Thus, group identification does not moderate the effects of *collective* descriptive norms on contribution levels. More cooperative collective norms tend to raise a participant's contribution independent of his or her level of group identification when controlling for other experimental variables.

H6: Group identification will enhance the effects of *perceived* descriptive norms on contribution behaviors (a); the interaction term for the effects of group identification in the *collective* descriptive norm – behavior relationship will be within sampling error of zero (b).

Method

Overview

A 2 (sorted/not sorted) × 2 (short-term financial incentive/no incentive) between subjects, PG experiment was used to test the study hypotheses and research questions. All treatments involved three phases, each consisting of six rounds of a standard PG game (the standard PG game is explained below). In the first phase, participants played a standard PG game without BPPs. In the second phase, the groups in the two incentive treatments received a BPP. In the final phase of all treatments, participants returned to playing the standard PG game without incentives. In the two sorted treatments,

participants were separated into groups based on their behavior in an initial "sorting" round; participants in the unsorted treatments played the initial round but were not sorted. Participants were blind to the sorting process. Group identity and perceived descriptive norms were measured via self-report (after rounds one and six in phase one and after round six in phases two and three). Collective norms, cooperation level in the initial round, and behavioral similarity were calculated from participant behaviors. Individual contribution to a public account, the primary dependent variable, was measured by determining the number of tokens contributed to the collective pool.

Participants

Study participants ($N = 192$) were recruited via random e-mail invitations from a list of eligible participants maintained by the Michigan State University Agricultural Economics Experiment Lab. The participants in this pool are from a variety of majors, levels in the institution, and backgrounds across the university. Participants' earnings in the experiment ranged from about $23 to $38.

Procedure

The study design involved a computer-based PG experiment. In the PG game, participants make decisions about investing their private resources into a public account whose benefits they have to share with others, as opposed to a private account whose benefits they control individually. Collective benefits are maximized if people invest in the public account, but a selfish individual has an incentive to invest only in the private account (Fischbacher & Gachter, 2010; Gunthorsdottir et al., 2007).

The study used a standard linear PG experiment in which participants were informed that they were taking part in a study of decision making. Four players were in a group; in each round, each player was given 20 tokens to allocate between a private and public account. An investment of one unit in the private account yields a return of one unit, and an investment in the public account yields a return of 1.6 units that is divided among the four players such that the individual investor in the public account gains a return of 0.4 from his own investment and also a return of 0.4 from other individuals' investments in the public account. In other words, contributing a token to the public account yields a private marginal return of 0.4 and a social marginal return of 1.6. This means that any given player has an incentive to free ride by investing only in the private account, but the best outcome for the group as a whole is for everyone to invest in the public account. There are $i = 1, \ldots, N$ subjects, each with positive endowment w_i. Subject i contributes g_i to the PG and the remainder $w_i - g_i$ to the private good. In the standard PG game without a BPP, the payoff for individual i can be expressed as follows:

$$\pi_i = w_i - g_i + 0.4\sum_{j=1}^{N} g_j$$

In the incentive treatments, during rounds 7–12, a financial incentive for contributing to the public account (a BPP) is implemented and then removed for the

Table 1 Observations (Obs), Mean (*M*), and Standard Deviation (*SD*), Minimum (Min), and Maximum (Max) for All Study Variables ($N = 192$)

Variable	Obs	*M*	*SD*	Min	Max
Donation behavior	3,456	10.59	8.07	0	20
Perceived descriptive norms	3,072	9.44	2.96	3	15
Initial group cooperation level	3,456	10.54	5.84	0	20
Behavioral similarity	3,456	3.05	2.98	0	11.55
Collective norm	3,456	32.56	20.16	0	60
Group identification	3,264	17.01	5.13	4	28

remaining rounds. In particular, an incentive payment of 0.6 tokens is provided for each token invested in the PG. In this situation, even an individual investor who expects no one else to invest in the PG can expect equivalent returns from investing in the private good and the PG. The payoff with the incentive payment for individual *i* is as follows:

$$\pi_i = w_i - g_i + 0.6gi \; + \; 0.4\Sigma g_j$$

In other words, when the incentive payment is offered, an investment in the PG yields a private return of 1 if no one else invests in the PG and a return of 2.2 if all four players invest in the PG. A total of 10 sessions were run, with 4–6 groups per session; each group played 19 rounds of the game. Instructions to participants are presented in the Supporting Information.

Measures

The study design included six measured variables: collective norms, perceived descriptive norms, group identification, behavioral similarity, cooperation level, and contribution behavior (described above). Self-report scales were used, as in prior research, presenting evidence for scale construct validity and reliability (e.g., Lapinski et al., 2013; Rimal & Real, 2005). Multiple-item measures were subjected to confirmatory factor analysis (CFA) using Amos. Measurement models were tested at all four points in time followed by a test of the overall model. Factor invariance across time was assessed by examining confidence intervals around the factor loadings.[2] Table 1 reports the descriptive statistics for all variables.

Collective norms were operationalized as the actual contribution behavior of one's group members in the prior round of the experiment, excluding a participant's own behaviors; that is, the lagged collective norm was used as the predictor. Higher numbers indicate greater behavioral prevalence.

Perceived descriptive norms were measured with three Likert-type items drawn from previous research on social norms (Lapinski et al., 2013) using 5-point response scales, in which higher scores indicate greater prevalence perceptions. Sample items include "I think that most people in my group are cooperative" and "The majority of

people in my group are playing this game cooperatively." CFA indicated that the items could be summed together in a unidimensional scale; reliability coefficients ranged from $\alpha = .90$ to .94 across time.

Group identification was measured using indicators of perceived similarity, with group members using four items with response scales ranging from 1 to 7, with higher scores indicating greater similarity (Rimal, 2008).[3] The question stem stated: "On the whole, how similar do you think most people in this group are to you?" Example items include "in their values" and "in the way they think." CFA indicated that the items could be summed together in a unidimensional scale; reliability coefficients ranged from $\alpha = .86$ to .91 across the four administrations of the measures.

The initial group cooperation level was operationalized as the mean contribution level by all members of a group during the initial "sorting" round. Higher numbers indicated greater cooperation with the group. Behavioral similarity/dissimilarity was operationalized as the standard deviation of the individual contribution levels for a group at round zero. Group members who are more similar to one another should have a smaller standard deviation of contributions relative to those who are dissimilar.

Results

Overview of data analysis procedures

All data were analyzed using multiple regression. For predictions related to the individual contribution behavior (H1 – 3, 5, and 6; RQ1), each participant's contribution level in each round of the experiment was regressed on the explanatory variables using ordinary least squares (OLS; see Table 2 for these variables). While we report the estimated standardized coefficients, we also ran the regression models (with unstandardized coefficients) using clustered robust standard errors, where the clustering is by groups, and the resulting statistical significance levels remain mostly unchanged. The explanatory variables include not only those directly related to our hypotheses (e.g., descriptive norms, financial incentives, and so on) but also other covariates that could potentially influence the contribution behavior (e.g., experiment rounds and phases). OLS estimators are the best linear unbiased estimator (BLUE), meaning that they are unbiased and the most efficient in the class of linear regression models.[4] The five columns in Table 2 correspond to the different specifications of the model, with the distinction being in terms of which variables are included in the estimation. The variables used in the estimation were varied for two purposes: (a) to single out the effects of certain variables and (b) to make sure that the estimation results are robust across different specifications.

For H4, we adopt the standard Sobel mediation test. The procedure involves three OLS regressions, the dependent variable (perceived descriptive norms) regressed on an exogenous variable (initial group cooperation level) only, the dependent variable regressed on both the exogenous variable and the mediator (collective norms), and the mediator regressed on the exogenous variable.

Table 2 Regression Analysis for Predictors of Contribution Behavior, Standardized Beta Coefficients, and T-statistics

	(1)	(2)	(3)	(4)	(5)
Financial incentive	0.25***	0.44***	0.57***	0.25***	0.56***
	(13.96)	(14.36)	(10.16)	(14.28)	(9.93)
Initial group cooperation level	0.26***	0.33***	0.28***	0.24***	0.30***
	(15.55)	(17.41)	(16.47)	(14.14)	(15.48)
Perceived descriptive norm	−0.04**	−0.03**	0.00	−0.37***	−0.29***
	(−2.51)	(−2.02)	(0.15)	(−8.16)	(−5.89)
Phase 2 × Perceived Descriptive Norm			−0.00		−0.03
			(−0.03)		(−0.47)
Phase 3 × Perceived Descriptive Norm			0.12*		0.09
			(1.75)		(1.33)
Collective norm	0.39***	0.35***	0.36***	0.44***	0.38***
	(20.92)	(18.70)	(19.33)	(8.20)	(7.16)
Group identity	0.03*	0.03**	0.03**	−0.25***	−0.22***
	(1.90)	(2.09)	(2.09)	(−6.84)	(−5.97)
Financial Incentive × Initial Group Cooperation Level Interaction		−0.21***			−0.14***
		(−7.57)			(−4.80)
Phase 2 × Perceived Descriptive Norm × Financial Incentive Interaction			−0.33***		−0.18***
			(−5.88)		(−2.99)
Phase 3 × Perceived DN × Postfinancial Incentive Interaction			−0.16**		−0.16**
			(−2.49)		(−2.49)
Perceived Descriptive Norms × Group Identification Interaction				0.55***	0.49***
				(7.61)	(6.73)
Collective Norms × Group Identification Interaction				−0.07	−0.05
				(−1.14)	(−0.83)
Postfinancial incentive	−0.03	−0.02	0.11*	−0.03**	0.11*
	(−1.45)	(−1.27)	(1.73)	(−1.97)	(1.74)
Experimental round	−0.15***	−0.15***	−0.14***	−0.14***	−0.14***
	(−11.00)	(−11.14)	(−10.07)	(−10.86)	(−10.41)
Phase 2	−0.00	−0.00	0.01	0.00	0.03
	(−0.05)	(−0.13)	(0.17)	(0.06)	(0.53)
Phase 3	−0.03	−0.04*	−0.12*	−0.03	−0.09
	(−1.61)	(−1.76)	(−1.87)	(−1.34)	(−1.51)
N	3,072	3,072	3,072	3,072	3,072
*r*2	0.487	0.496	0.497	0.498	0.510
F	322.3	301.2	232.3	275.9	198.5
Ll	−9781.0	−9752.5	−9749.7	−9746.3	−9709.7

Note: Standardized beta coefficients; *t* statistics in parentheses. Financial incentive = whether or not a financial incentive was present — 1 = yes, 0 = no. Postfinancial incentive = whether or not a financial incentive was present in the previous phase (phase 2) — 1 = yes, 0 = no.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

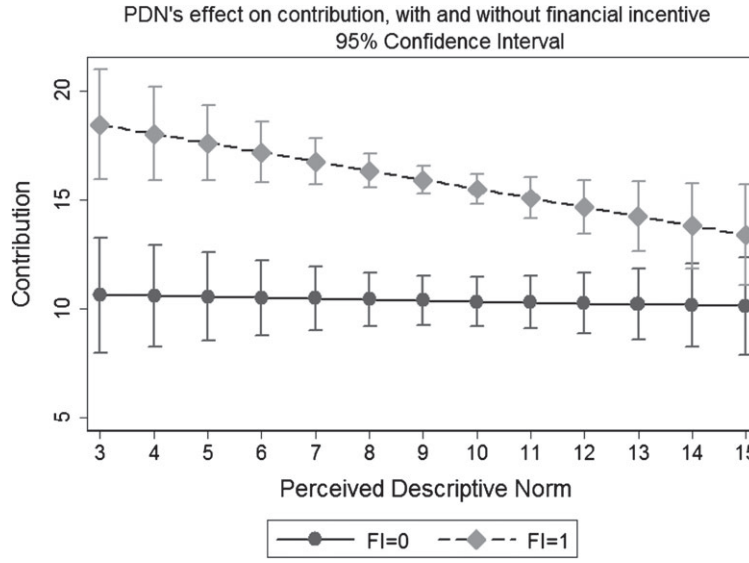

Figure 1 The moderating effect of financial incentive (0 = no incentive, 1 = incentive) on the perceived descriptive norms (PDN) – contribution behavior relationship (H1).

Predicting contribution behaviors

Several of the study hypotheses (H1 – 3, 5, and 6) address the variables that predict contribution behaviors; these will be presented first. Table 2 reports the regression models testing these predictions, including the standardized estimates. H1 predicted that the effects of perceived descriptive norms on contribution behavior would be moderated by the presence or absence of a financial incentive for behavior. The data were consistent with this prediction. Specifically, the interaction between the presence of a financial incentive in Phase 2 and perceived descriptive norms as measured in the prior phase had a significant influence on behaviors, such that the presence of the incentive reduced the impact of perceived descriptive norms on contribution behavior (Figure 1). That is, the effects of strong prevalence perceptions on contributions were attenuated by a financial incentive.

H2 predicted that the relationship between group members' initial cooperation level and contribution behavior would be moderated by the presence or absence of a financial incentive. The data were consistent with the prediction, $\beta = -.21$, $p = .001$, indicating that the presence of the financial incentive reduced the effects of the initial group cooperation level on contribution behavior. That is, groups who were initially cooperative showed increasing contributions without a financial incentive in place. When a financial incentive was in place, the effects of initial cooperation were attenuated (Figure 2). In short, the presence of a financial incentive for behavior reduced the positive effects of prevalence perceptions (perceived descriptive norms) and cooperativeness on behavioral decisions. The data were consistent with predictions 1 and 2.

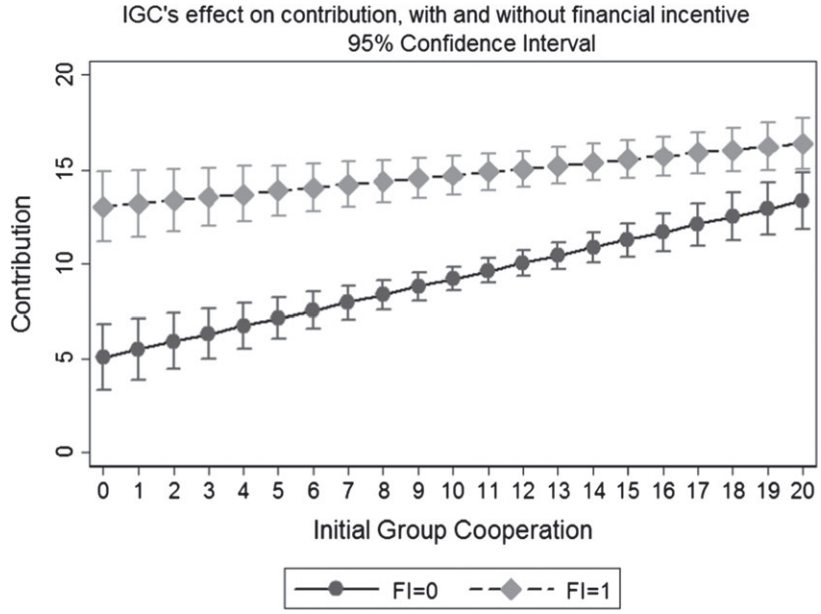

Figure 2 The moderating effect of financial incentive (FI, 0 = no incentive, 1 = incentive) on the initial group cooperation (IGC) – contribution behavior relationship (H2).

H3 predicted that the presence of a financial incentive would attenuate the effects of perceived descriptive norms on contribution behavior once the incentive was removed. The multiple regression analysis indicated that the data in the predicted direction and the effect were statistically significant. Specifically, these findings show that for those who received a financial incentive and then had it removed, the effects of perceived descriptive norms on behavior were attenuated; see Table 2 and Figure 3. Thus, the data were consistent with the predicted relationship.

H5 predicted that *ceteris paribus*, the effect of perceived descriptive norms on contribution behavior, would be stronger than that of collective norms. The data were not consistent with this prediction. Indeed, the direct effects of descriptive norms on behavior were negative. The direct effects of collective norms on donation behavior were consistently positive and significant, as shown in Table 2.

H6 predicted that group identification would enhance the effects of perceived descriptive norms on contribution behaviors but would not moderate the collective norm – behavior relationship. The data were consistent with this prediction. The interaction between perceived descriptive norms and group identity had a significant impact on contribution behavior, $\beta = .55$; $p = .001$, such that stronger group identification enhanced the effects of descriptive norms. The interaction between collective norms and group identification did not significantly influence contribution behavior, $\beta = -.07$; $p = .25$.

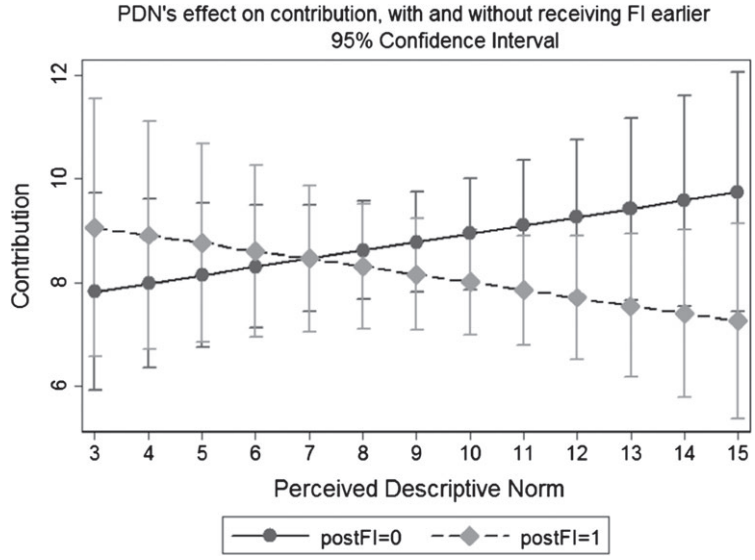

Figure 3 The moderating effect of having received an incentive in the prior phase of the study (0 = no incentive, 1 = incentive) on the perceived descriptive norms (PDN) – contribution behavior relationship in the final phase of the study (H3).

Predicting changes in norms

H4 and RQ1 examined changes in perceived descriptive norms driven by the other study variables. H4 predicted that (a) the relationship between the initial group cooperation level and perceived descriptive norms would be positive and mediated by collective norms and (b) that collective norms would be positively associated with perceived descriptive norms. The unstandardized estimates for this model are presented here and in Tables 3 and 4. The data indicated that the effects of the initial level of group cooperation drive collective norms, $B = 2.07$, $p = .001$, and that collective norms (i.e., group members' actual behavior from the prior phase) drive descriptive norms, $B = .064$, $p = .001$. The relationship between the initial cooperation level and perceived descriptive norms changed significantly, from $B = .211$ to $B = .08$, when the mediator was included. Sobel-Goodman tests were significant, $p < .01$, and indicate that the mediated model accounts for 61% of the variance in perceived descriptive norms; thus, the data are consistent with H4.[5]

RQ1 examined the ways in which financial incentives influence the relationship between collective and perceived norms. Table 5 shows the regression analysis, which reinforces the finding that collective norms influence perceived norms. The estimated coefficient of collective norms is positive and significant. However, there is some evidence that the effects of collective norms on perceived norms weaken when there is a financial incentive in place relative to when there is no financial incentive for contribution behavior. The coefficient of the interaction term for Collective Norms × Financial Incentive is negative and significant in Model (1), indicating that the presence of the

Table 3 Mediation Model (H4) Regression of Collective Norms (Mediator) on Initial Group Cooperation Level; Unstandardized Coefficients

	(1) Model
Initial group cooperation	2.077*** (0.214)
Constant	10.676*** (2.650)
N	3,456
*r*2	0.362
F	94.366
Ll	−14507.149

Note: Clustered (by group) errors in parentheses.
*$p < .10$. **$p < .05$. ***$p < .01$.

Table 4 Mediation Model (H4) Regression of Perceived Descriptive Norms on Collective Norms (Mediator) and Initial Group Cooperation Level (Exogenous Variable); Unstandardized Coefficients

	(1) Model	(2) Model
Collective norms		0.064*** (0. 010)
Initial group cooperation level	0.211*** (0. 036)	0.082** (0. 040)
Constant	7.160*** (0. 382)	6.439*** (0. 333)
N	3,264	3,264
*r*2	0.173	0.299
F	33.927	60.394
Ll	−7867.110	−7597.985

Note: Clustered (by group) standard errors in parentheses. Sobel-Goodman Tests indicate that 61% of the variance in perceived descriptive norms is explained by the mediator, Sobel coefficient = .129; $SE = .0062$, $z = 20.81$, $p = .001$.
*$p < .10$. **$p < .05$. ***$p < .01$.

financial incentive reduces the impacts of collective norms on perceived descriptive norms. However, this evidence is weak. The estimated coefficient is not statistically significant in Model (2).

Discussion

Framed in the literature on the communication of social norms and behavioral economics, this experiment provides some evidence for the theoretical model proposed for the role of FINS. The broad goal of FINS is to predict and explain the ways in which social norms and behaviors are shaped by financial incentives over time. The first set of predictions examines the role of social norms in predicting people's contribution

Table 5 Regressing Perceived Descriptive Norms on Collective Norms, Financial Incentive, and the Interaction Between Them; Unstandardized Coefficients

	(1) Model	(2) Model
Collective norm	0.087*** (0.008)	0.086*** (0.008)
Financial incentive		−1.774 (1.112)
Collective Norm × Financial Incentive Interaction	−0.021*** (0.006)	0.013 (0.023)
Constant	6.732*** (0.280)	6.774*** (0.281)
N	3,264	3,264
*r*2	0.297	0.300
F	64.495	43.547
Ll	−7601.755	−7596.610

Note: Clustered (by group) standard errors in parentheses.
*$p < .10$. **$p < .05$. ***$p < .01$.

to a collective pool. These data indicate a number of interesting findings. First, there was a significant interaction between the presence of a financial incentive and perceived descriptive norms such that the presence of the incentive reduced the positive impact of perceived descriptive norms on contribution behavior. Thus, in the short run, financial incentives appear to attenuate normative effects, especially when other moderators are not considered.

The findings for H2 show that the relationship between the initial cooperation level of participants and contribution behavior is moderated by the presence or absence of a financial incentive such that the presence of the financial incentive reduced the effects of the initial group cooperation level on donation behavior. Our data also show some evidence that the effects of financial incentives on contribution behavior can reduce that behavior when those incentives are removed. In short, financial incentives attenuate descriptive norms' effects on contribution behavior, and when that incentive is removed, contributions decline. Furthermore, a norm for cooperative behavior can be destroyed by the introduction, then removal, of financial incentives for behaviors.

When contextualized in the literature on BPPs, these findings have particular significance. If payment programs are introduced into a community where there is an existing norm for cooperation (but perhaps not at the level needed), the payment program must be sustained in order for the cooperative behavior to continue. This is often unlikely to be feasible given the fluid nature of BPP financing. As such, it indicates that BPPs might not be the best method for influencing behavioral decisions in some cases because of their disruptive effects on cooperative norms. Taken together, these findings indicate that understanding how financial incentives function in normative systems is key because they can function to bolster behavioral action in the short term but may ultimately destroy the power of a functional descriptive norm over time. From a practical standpoint, this means that once people are paid for a

particular behavior, these payments must continue in order to sustain the behavior. Our data show that group identity clearly plays a role in normative effects.

The interaction between perceived descriptive norms and group identity had a significant impact on contribution behavior such that the effects of descriptive normative perceptions were enhanced by group identification. The interaction between collective norms and group identification did not, however, influence donation behavior. This finding illustrates the idea that it is perception (as opposed to reality) that most closely influences action. It provides experimental, behavioral evidence to a large and mixed corpus of research highlighting the role of group identification in the relationship between descriptive norms and behavioral intention (e.g., Hogg & Reid, 2006; Lapinski et al., 2013), which shows that the effects of perceived descriptive norms become stronger as group identity becomes more pronounced. The present study is limited to the case of newly formed groups; the findings may be different for groups that have a significant history of interaction, primarily because perceptions of group identity may be more polarized or more stable in groups that have functioned over long periods of time. Most interestingly, the moderation effect did not occur for collective norms. Group identification did not enhance the effects of the objective behavior of group members (collective norms) on individual behavior, providing evidence for the important role of perception, relative to objective information about behavioral prevalence, in driving human action.

The effects of the study variables on normative perceptions were largely consistent with the predictions. The data were consistent with a mediated model in which the initial group cooperation level drives collective norms, which in turn influence perceptions of prevalence. The relationship between collective and perceived norms is a function, in part, of the presence or absence of financial incentives. Collective norms have a weaker effect on perceived norms when there is a financial incentive in place. This provides some evidence of the discounting hypothesis. Financial incentives may cause people to dismiss others' enactment of a behavior as driven by external, as opposed to intrinsic, motivations. That is, when people are getting paid to perform a behavior, others may discount prevalence information because they perceive that people are only undertaking that behavior for the payment rather than because it is important.

There were several findings in this study that were not consistent with the predicted effects. In particular, H5 predicted that *ceteris paribus*, the effect of perceived descriptive norms on contribution behavior, would be stronger than the effect of collective norms. When looking at the main effects, the data were not consistent with this prediction. Ultimately, the perceived norm – behavior relationship is most commonly superseded by interaction effects (e.g., Rimal, 2008), so the lack of data consistent with the predictions is not entirely surprising. In this case, the direct effects of descriptive norms on behavior were weak and negative. The direct effects of collective norms on donation behavior were consistently positive and significant.

This study focused on a particular type of behavior, donation to a collective financial pool. It was chosen very carefully because of our interest in collective action and its

drivers. Importantly, this study shows the important role of social norms, group identification, and financial incentives in collective action. Care should be taken when considering how these study findings might be similar to or different from other kinds of behavior. Group (but not individual) contribution behavior was observable by other group members, and there was probably a fair amount of behavioral ambiguity because of the nature of the game; both of these attributes are likely to enhance normative influence (Rimal, Lapinski, Turner, & Smith, 2011). Furthermore, by looking at a financial outcome, the study may have inadvertently created a monetary mindset about the behaviors, and this might explain the weak effects of perceived norms. It is an empirical question whether these findings could be replicated with other nonmonetary behaviors or those with less ambiguity enacted in private. This study is also limited by the nature of the experimental design. Although PG experiments have a long history in economics (Henrich, Boyd, & Bowles, 2004), the extent to which the findings of PG experiments may or may not generalize to real-life behaviors remains an area for additional inquiry. For example, additional research might examine the extent to which there is evidence of this study's findings using other methodologies.

The role of injunctive norms in the effects observed here remains a significant point for additional inquiry. Preliminary findings support the discounting hypothesis that once people see others being paid for behaviors, it causes them to make attributions for why they are doing the behavior (e.g., "That other person is only doing the behavior because they are getting paid to do so"), eroding the power of the descriptive norm to influence behavior. Although the present study is limited to the case of descriptive norms, it is likely that injunctive normative perceptions might also be eroded or enhanced by the introduction of financial incentives. That is, if people care enough to think more about the prevalence information, they may come to believe that not only are others only enacting the behavior because they are being paid to do so but also that they do not really care about or think that the action is important (injunctive norms), thus attenuating the role of injunctive norms on behavioral response. Alternatively, BPPs may signal importance and cause people to inflate estimates of the injunctive norm. Future research can explore this question.

This article examined the short-term effects of FINS and provides an initial test of our thinking on the role of FINS. The bulk of the evidence in this study was consistent with the predicted relationships, yet there is much left to understand in this realm. Other moderators of the norm–behavior relationship should be considered in this model and tested for their effects on collective action. Furthermore, behavioral decisions other than donation (e.g., conservation actions) provide fertile ground for additional work.

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Notes

1 Economics scholars have examined the intersection between incentives and social motivations, accumulating evidence for the "crowding out" or displacing effects of money; yet, they devote little attention to the mechanics of norm formation and change. See Appendix S1 and work by Chen, Lupi, He, and Liu (2009) and Chen et al. (2012) for additional details on this literature.

2 The CFA analysis was run separately for each administration time (four separate models were tested). Following Byrne (2001) and Kenny (2015), criteria for evidence of the factor structure was set a priori: (a) size of the factor loadings and cross-loadings; (b)fit indices including $C_{\text{Min}}/df\ ratio < 5.0$, $RMSEA < .10$, and $P_{\text{Close}} > .05$; and (c) size of residual covariances for items on the same factor. These data indicate that the factor loadings were relatively strong (ranging from .74 to .93); the fit indices indicated acceptable model fit across all four time periods, and the residual covariances were small to moderate (ranging from .01 to .15 for items on the same factor). Model fit appeared to improve slightly over time with, the fourth administration yielding the strongest fit statistics. As a simple examination of measurement invariance across time, factor loadings were compared for items across time by drawing confidence intervals around them. All factor loadings were within sampling error from each other, with the exception of the factor loadings for one of the perceived descriptive norm items. Because this was a reversed scored item, and seeing this type of variability in reverse scored items is common in measurement analysis, this item was nonetheless retained. Following these analyses, the entire model was run with all time periods included following Byrne's recommendation. These data indicate acceptable model fit across time ($C_{\text{Min}}/df = 4.53$; $RMSEA = .068$; $P_{\text{Close}} = .04$). Details available from the first author.

3 Although group identity is conceptualized as a compilation of similarity and aspiration (Rimal & Real, 2005), the aspiration items were not appropriate given the nature of our design, where group members have only a cursory knowledge of other group members.

4 By unbiasedness, we mean that the expected values of the estimated coefficients of the explanatory variables equal their respective true values. Linear regression models, where the explanatory variables are included in a linear fashion, are often used both for their simplicity and their robustness (i.e., the coefficient estimates are "stable" across different specifications of the regression model). See Appendix S1 and Cameron and Miller (2015) for additional details.

5 Running the Sobel test with bootstrapped standard errors indicates that the indirect effects are still significant. Based on a replication of 1,000 times, the Z value of the indirect effect is 19.1, while the original estimation was 20.81. Both are statistically significant.

Supporting Information

Additional supporting information may be found in the online version of this article: Appendix S1. Additional details on endnotes and instructions for participants.

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