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Concerns about reputation via gossip promote generous allocations in an economic game

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Abstract

In the present study, a modified dictator game was used to test the hypothesis that the threat of gossip would encourage prosocial decision making. All participants were asked to distribute an endowment between themselves and an anonymous second party. Half of the participants were told that the second party would be discussing their economic decision with a third party. For some participants, this third party was someone to whom they had first disclosed personally identifying information. Participants who received the threat of gossip manipulation were more generous than control participants, but only when the third party could personally identify them was this difference significant. These data reveal that at least some prosocial decisions are motivated by actor's reputational concerns—concerns that are directly mediated by language.

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Keywords: Gossip; Reputation; Generosity; Prosocial behavior; Language; Economic decisions

1. Introduction

1.1. Gossip as an adaptive problem

Language may have served as a source of adaptive problems for our ancestors (Bering & Shackelford, 2004). These problems concerned successfully managing the social transmission of certain categories of information that, *if made public*, would have had consequences for the individual's reproductive success. Examples include information (whether deceptive or veridical) concerning changes to one's social status (e.g., reports of disputes with important allies), health (e.g., that one has a communicable disease), reproductive value (e.g., sexual promiscuity, pregnancy), history of cooperative exchange (e.g., that one regularly hordes resources from other ingroup members), and information about the reputation of one's kin or allies (see also Barkow, 1992).

Gossip is the mechanism by which social information (derived from direct experience) gets transmitted to *absent third parties*—individuals who would have remained ignor-

ant about a social event in the absence of language (Bering, *in press*; see also Dunbar, 2004). From an evolutionary psychological perspective, gossip epitomizes the adaptive problems introduced by language in that language made it possible for social transgressions to be communicated to absent third parties, thereby leaving one susceptible to third-party punishment (Fehr & Fischbacher, 2004). Thus, the threat of gossip may have encouraged the evolution of altruistic behavior by activating reputational concerns.

In the current study, we sought to test the hypothesis that generous behavior can be motivated by concerns about one's reputation that are specifically mediated by the threat of gossip.

1.2. Past research and the current study

The current study investigated whether the threat of gossip, whereby others are made aware of participants' economic decisions, promotes prosocial behavior in a modified dictator task. The dictator task has been used extensively in economic game theory to investigate selfish motives in social exchange among adults (e.g., Bohnet & Frey, 1999; Eckel & Grossman, 1996; Forsythe et al., 1994; Hoffman, McCabe, Shachat, & Smith, 1994; Hoffman,

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McCabe, & Smith, 1996; Kahneman, Knetsch, & Thaler, 1986; Rankin, 2006) as well as children (Beneson, Pascoe, & Radmore, 2007; Harbaugh & Krause, 2000).

The dictator task gets its name from the fact that the first player, the dictator, unilaterally determines the distribution of a monetary or token sum. The dictator is therefore provided a sum of money or tokens and is instructed to distribute the endowment between him or herself and a second individual, the receiver. The receiver is simply a passive recipient and has no sanctioning power over the dictator's actions (cf. the ultimatum game; e.g., Bolton & Zwick, 1995). Because the dictator is under no experimental orders to allocate to the receiver (and the endowment is no more the dictator's than it is the receiver's), any sharing of the endowment represents a departure from selfishness. By allocating to the receiver, the dictator provides the receiver a benefit at a cost to him or herself (i.e., the dictator's net gain suffers).

Past research using the dictator paradigm has investigated the role of "social distance" in encouraging selfish behaviors (Bohnet & Frey, 1999; Hoffman et al., 1996). For example, Hoffman et al. (1996) found dictators to be more selfish when they were socially isolated from the experimenter in addition to their counterparts. The authors concluded that when the opportunity to build a reputation with the experimenter is removed, the incentive to be generous in the dictator task decreases. In the current study, we extended this line of research by investigating participants' concerns about being personally identified via gossip in the context of a dictator task.

In the current study, participants performed an anonymous dictator task as the *Allocator* (*dictator* was replaced with this more neutral term). As in previous studies, participants were instructed to distribute an endowment between themselves and an anonymous second party (the *Receiver*). However, in contrast to previous studies, some participants were led to believe that a third party (either someone who could or could not personally identify them) would learn about their economic decision via the Receiver. In the current study, the third party did not have punitive power (cf., Fehr & Fischbacher, 2004). The third party merely served as a confidant to the Receiver, and the Allocator was made aware of this relationship between the other two players prior to making his or her decision. Importantly, some participants were prompted to disclose personally identifying information (e.g., their names and place of residence) to the third party. This manipulation compromised the participant's anonymity via prospective gossip between the Receiver and the third party.

Based on findings from previous dictator game studies (e.g., Kahneman et al., 1986), we predicted that many participants would distribute the endowment equitably (5-5) regardless of condition. Past research has shown that even in anonymous laboratory settings, participants often defer to a fairness norm of reciprocal exchange (Hoffman et al., 1996). Second, we hypothesized that participants who were told that the Receiver would be communicating their economic

decision to a third party would be more generous in their allocation of tokens to the Receiver than participants who were not given this information. Finally, we predicted that this effect would be even greater for participants whose reputation was threatened by their disclosure of personally identifying information to the third party prior to their economic decision.

2. Methods

2.1. Participants

Seventy-three undergraduate and postgraduate students from the Queen's University, Belfast (25 male; 48 female) ranging in age from 18 years 1 month to 51 years 10 months (mean, 23 years) participated. One participant indicated that she was not motivated by the study's incentive (she had recently won two £100 lotteries) and was therefore eliminated from the study. This left a total of 72 participants with 18 in each of the four conditions. The majority of students ($n=68$) were Caucasian (primarily Irish and English descent).

Participants were recruited by a male research assistant either through classroom announcements or onsite recruitment at the university's student union. Participants were told that their participation would qualify them for a chance to win £100. This raffle incentive was incorporated into the design of the study.

2.2. Materials and basic procedures

Participants were tested individually after providing their informed consent. Special care was taken to ensure that participants believed there to be another participant, the Receiver, seated in a separate room and waiting for them to make their allocation decision (in actuality there was no Receiver). Participants were asked to perform an anonymous dictator task, which entailed freely "distributing" an endowment of 10 tokens between themselves and an anonymous second party (the Receiver). The optimal strategy, from an economic perspective, was for the participant to allocate all ten tokens to him or herself.

The 10 tokens represented 10 individual opportunities to be entered into a lottery drawing for a chance to win £100. Participants were asked to distribute the endowment, however they felt inclined, in single units. The allocation task involved a piece of paper, an empty envelope, and a writing utensil. On the piece of paper, at the top right, was the participant's randomly assigned ID number.

The datasheet presented participants with a visual array of 10 tokens. Beneath the tokens were two boxes, one labeled "Allocator (You)," and the other labeled "Receiver (Them)." All participants were instructed to write in each box a numeral (0–10) to designate how many tokens each player would receive. There was only one rule: the two numbers had to add up to 10. As a control measure, participants were asked to summarize in their own words the task instructions to verify their understanding. The few participants who

displayed any confusion about the task were provided clarification or correction at that time.

After making their distribution decision, participants were instructed to insert the piece of paper into an opaque envelope and then seal it. This was done to minimize subject-experimenter effects (i.e., motives to build a reputation with the experimenter). Participants then waited for the instructor to return to collect the sealed envelope. All participants were given roughly a minute to perform the allocation task.

2.3. Experimental design and conditions

In our 2 (*reputational concern*) \times 2 (*threat of gossip*) between-subjects factorial design, each variable was crossed so that participants were randomly assigned to one of four conditions, either experimental or control for each of the two main variables. The first independent variable, *reputational concern*, referred to the participants disclosing or not disclosing personally identifying information to a third party (a female confederate) in the experimenter's absence. The second independent variable, *threat of gossip*, referred to the participants being told or not being told that the Receiver would inform the third party of the participants' decision.

2.4. Reputational concern variable

Participants randomly assigned to the experimental condition of the *reputational concern* condition entered the laboratory to find a female confederate already seated (the same female confederate was always used). The confederate had an informed consent sheet and she appeared to be diligently reading this material. No communication occurred between the participant and confederate at this time. After signing the informed consent sheet, both individuals were instructed by the experimenter to reach under their chairs for their role assignments. Under each chair was a card with a letter printed on it (either A or B), which designated the role they would be performing. Seating arrangements were rigged so that participants were always assigned the role of Allocator (letter A), although they were told the roles had been assigned at random.

Although participants were informed that they would be performing the role of Allocator, they were not told what the role entailed. All they were told at that time was that they would be making a decision that would affect both themselves and another individual, the Receiver, who was seated in a second lab room. Furthermore, the confederate's role was never revealed to the participant. Participants were told only that the confederate would be performing a different role from them, the details of which would be revealed only to the confederate after she was moved to a separate room. Moreover, no title was ever ascribed to the confederate in the presence of the participant. Instead, the confederate was simply referred to as "Player B."

After assigning roles, the experimenter announced his intentions to step out of the room for a few minutes to check on the Receiver. With the experimenter removed from the

room, the confederate and the participant were left alone (while the experimenter listened covertly from behind the closed door), which provided the confederate the opportunity to engage the participant in a casual scripted conversation:

Hi, my name is _____. (If P does not reciprocate, request name) *What is it?* (As if C did not hear the first time; repeats name aloud) *Are you a student at Queen's?* (They always were) *What year are you?* (Wait for response) *What are you studying?* (Wait for response) *Where do students of _____ meet for classes?* (Wait for response) *I'm an anthropology student, so I spend much of my time along University Square.* *Do you live on campus?* (If P says "no," ask) *Where do you live?* (If P says "yes," ask) *Where's that?* (Experimenter enters after response is given).

Despite the unpredictable nature of informal conversations, the confederate was instructed to keep conversations as close to the script as possible. The script was arranged so as to solicit personal information from the participant that would, in principle, allow this other person to identify and locate the participant in the future. We reasoned that disclosure of one's name and clues to one's routine location (place of study, place of residence) would heighten the participant's reputation concerns and hence lead them to make strategic decisions for reputation management.

After the script was completed, the experimenter returned to segregate the participant and confederate into separate rooms. The experimenter escorted the confederate from the lab and then returned to instruct the participant on the allocation task.

Participants assigned to the control condition were never introduced to the confederate but, instead, were immediately instructed about the allocation task.

2.5. Threat of gossip variable

Participants randomly assigned to the *threat of gossip* condition were given additional information about the allocation task omitted from the control condition for this variable. They were instructed that upon learning the outcome of the allocation task, the Receiver would have the opportunity to "discuss" the outcome with a third party (the confederate whom they were introduced to earlier). This third party was either someone who was a stranger to the participant (for those who were assigned to the control condition of the *reputational concern* variable) or someone who could personally identify the participant based on their prior conversation (for those assigned to the experimental condition of the *reputational concern* variable).

2.6. Allocation scores

Each participant received a numerical score based on their allocation decision. Scores reflected the amount of tokens (single units) allocated to the Receiver on a scale from 0 to 10. Unlike previous studies, wherein offers were limited to 0 to half, or 0 or half, there were no constraints set on the

Table 1
Justification categories, definitions, and examples

Justification category	Definition	Example
Equity/fairness	Appeals to a principle of equity, fairness, or justice	“I just divided them up equally because that’s fair.”
Self advantage	Having the aim of putting themselves at an advantage over the Receiver	“...having power of distributor I could make it work to my advantage...”
Superstition	Appealing to a cosmic force (such as karma) or selecting a lucky number as justification for action	“I quite like the number 3... also this is the third month of the year and 2007 is the year...”
Reputation	Concerns about being identified or evaluated by others negatively	“When I was informed the receiver would know how many tokens I would give them and discuss this with Player B, I wanted to be fair.”
Generosity	Wanting someone else to succeed despite the disadvantage to self	“...I wanted to give someone else the best chance possible.”
Confusion	Statements revealing a failure to understand the probability or design structure of the task	“I have an equal chance of winning if I keep just one token or if I keep them all.”
Self optimization	Wanting to optimize one’s chances of winning	“To give myself the best chance. Yes, it’s greedy, but I have complete control...”

distribution task. Participants were permitted to allocate any number of tokens to the Receiver.

2.7. Justification responses

Participants were also asked to justify their allocation decisions. According to most evolutionary psychologists, we should not expect participant responses to reflect an understanding of the functional or “ultimate” causes (Bjorklund & Pellegrini, 2000; Kenrick, 1991) of their behaviors (i.e., that it is in service of genetic replication). However, if a participant in our study justified a generous allocation in terms of being apprehensive about others thinking that he or she was selfish, this would demonstrate a conscious understanding, to a certain extent, of the proposed adaptive problem. Careful attention was therefore paid to justification responses that indicated such a conscious understanding of the relationship between language and reputation.

Justification responses were coded by two independent raters (the first author and a research assistant blind to the

Table 2
Mean allocation scores by condition (n=18)

Reputational concern	Threat of gossip	M (S.D.)
Experimental	Experimental	5.44 (1.15)
Experimental	Control	4.17 (2.23)
Control	Experimental	4.67 (1.09)
Control	Control	4.22 (1.73)

purposes of the study) and assigned to one of seven categories: Equity/fairness, Self advantage, Superstition, Reputation, Generosity, Confusion, and Self optimization. Definitions and examples of these categories are provided in Table 1.

3. Results

3.1. Allocation scores

Mean allocation scores (and standard deviations) by condition are provided in Table 2. Allocation scores represent number of tokens allocated to the Receiver.

A three-way analysis of variance was conducted to assess the effects of sex, reputational concern, and threat of gossip on allocation scores. Although no sex differences were predicted, there is some evidence that sex differences in selfish behavior exist, with males tending to be more selfish than females (e.g., Eckel & Grossman, 1998). In order to assess the effects of sex in the current study, sex was therefore included in the model. However, no effect of sex was found [F(1,63)=.578, p=.450]. In fact, allocations of males (mean, 4.84, S.D., 1.57) were, on average, slightly greater than allocations of females (mean, 4.51, S.D., 1.72), although there were almost twice as many female participants (n=47) as males (n=25).

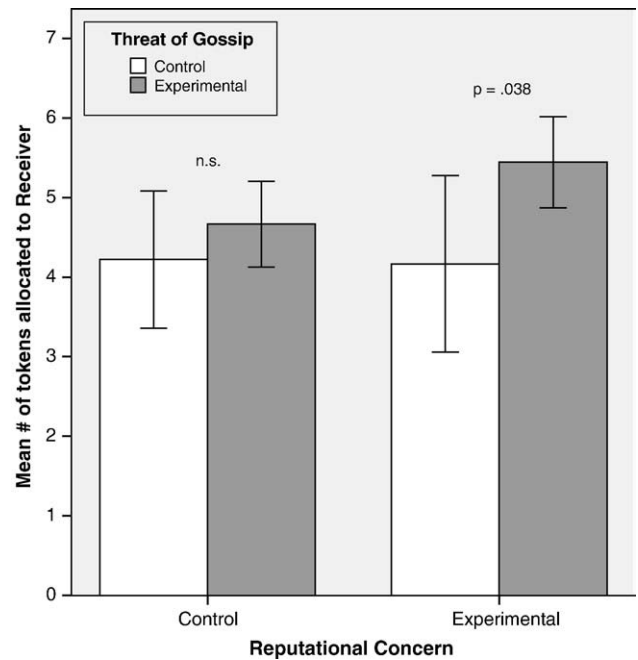


Fig. 1. Mean (and S.E.M.) number of tokens allocated to receiver as a function of reputational concern and threat of gossip (n=18 for each condition). For the threat of gossip variable, “experimental” refers to experiencing the threat of gossip manipulation (“control”=no threat of gossip). For the reputational concern variable, “experimental” refers to the third party being able to identify the participant (“control”=unable). The difference between grey bars was significant (p<.05); the difference between white bars was nonsignificant. The depicted p values refer to simple-effects tests of the threat of gossip variable at different levels of reputational concern.

Table 3
Allocation frequencies by amount allocated by condition ($n=18$)

Amount allocated	<i>Reputational concern</i> × <i>threat of gossip</i>			
	E×E	E×C	C×E	C×C
0	0	2	0	2
1	0	1	1	0
2	0	0	0	1
3	0	2	1	0
4	1	3	1	2
5	13	8	14	12
6	1	0	1	1
7	2	1	0	0
8	0	0	0	0
9	1	1	0	0
10	0	0	0	0

Abbreviations: E, experimental condition; C, control condition.

There was no main effect of *reputational concern* [$F(1,63)=.538, p=.466$]. In other words, disclosing personally identifying information to the confederate, by itself, had no effect on sharing behavior. There was a significant main effect, however, of *threat of gossip* [$F(1,63)=5.903, p=.018$]. Participants who were told that the Receiver would be communicating their economic decision with the third party (grey bars in Fig. 1) were significantly more generous in their allocations of the tokens than participants who were not led to believe that their decisions would be discussed (white bars in Fig. 1).

The two-way interaction of *reputational concern* and *threat of gossip*; however, was not significant [$F(1,63)=1.688, p=.199$]. Although an interaction of these two variables was expected, follow-up analyses revealed why no interaction was found.

Follow-up tests revealed two significant simple effects. When assessing only participants exposed to the *threat of gossip* variable, having participants disclose identifying information with the third party led to greater allocations, on average [$F(1,35)=4.361, p<.05$]. However, disclosing identifying information to the third party made no difference in the absence of the *threat of gossip* variable [$F(1,35)=.007, p=.934$]. This is what one might have expected, since only a person represented as having informational access to one's behavior poses a threat to the self's reputation.

When assessing only participants who disclosed identifying information with the third party, the *threat of gossip* variable had a positive effect on allocations [$F(1,35)=4.672, p=.038$]. However, the *threat of gossip* variable had no effect when participants did not meet and disclose identifying information to the third party [$F(1,35)=.850, p=.363$]. In other words, we did not find support for the hypothesis that the *threat of gossip* operates on its own to promote generosity. Rather, both variables are needed to encourage generosity, which explains why there was no interaction: if either variable is missing, the result is equivalent to having neither present.

As shown in Table 3, an equitable (five-token) allocation was the most frequent of decisions for all conditions, as

predicted. However, each condition produced a slightly different allocation pattern. In particular, one condition appeared in strong contrast to the other three conditions. Among participants who experienced both independent variables (E×E), only one participant gave less than five tokens, and this offer was only negligibly less than the equitable amount (four tokens). Moreover, a handful of participants ($n=4$) in this condition gave more than five tokens, and most of these allocations were substantial (more than six tokens). A different pattern emerged in the other three conditions. While equitable allocations were, again, the most frequent behavior in these conditions, few participants gave more than the equitable amount. In fact, the combined total for these three conditions only matched the total for the primary experimental condition. Moreover, a number of participants gave less than the equitable amount in these conditions ($n=8, 3, 5$, respectively), and the only cases of nil offers were found in these conditions.

Not unlike previous studies, across all of conditions, there were no participants who offered the full amount of 10 tokens. According to Fehr and Fischbacher (2004), offers greater than five are rare. Indeed, in line with past research, few participants from the control conditions offered more than 5 tokens. However, one empirical departure from previous findings was that several participants ($n=4$; 22.2%) from the primary experimental condition (E×E) offered over and above the equitable amount.

3.2. Justification responses

Although a substantial number of responses included justifications from multiple categories, in these equivocal cases, raters coded what they determined to be the more dominant response. A significant interrater agreement of 91.5% (Cohen's kappa; $n=73$ responses) was obtained.

Justification frequencies were organized by condition (as presented in Table 4) and are reported here in terms of amount allocated (e.g., less than fair, fair, or more than fair). By and large, participants who distributed the tokens equitably invoked Equity/fairness as behavioral justification across all conditions. A few participants, mostly from the

Table 4
Justification responses: category frequencies by condition (*reputational concern* × *threat of gossip*)

Justification category	Condition				Total
	E×E	E×C	C×E	C×C	
Equity/fairness	11	6	13	11	41
Self advantage	1	6	3	3	13
Superstition	0	1	1	0	2
Reputation	3	1	1	0	5
Generosity	3	0	0	1	4
Confusion	0	2	0	1	3
Self optimization	0	2	0	2	4
Total	18	18	18	18	72

E×E condition, however, justified their action in terms of avoiding negative reputational consequences (e.g., appearing “greedy,” “selfish,” or “mean”). Many of these individuals conveyed an initial motive to distribute the tokens to their advantage but then modified their behavior after considering, for example, “the idea of people discussing and criticizing (their) actions.” In the words of one participant from this primary experimental condition.

“I thought about giving myself more than the Receiver, but I did not want Player B [the third party] or the receiver to think I am selfish or taking more chances for myself. *If the Receiver had not been going to talk to Player B I would have had no qualms about allocating myself all the tokens!* [italics added]”

A few participants justified their “more than fair” allocations in terms of motives to be generous (Generosity). The majority of these participants were from condition E×E. Two “more than fair” participants (both from control conditions) exhibited a lack of understanding about the statistical probability of the task (Confusion), that is, they stated that their chances of winning the lottery were the same as long as they retained at least one token. Because there was no way of knowing whether these participants would have behaved differently in the absence of this confusion, however, and because removing these participants from the analysis led to no significant changes in results, they were retained in the subject pool.

Participants who gave “less than fair” offers justified their behavior largely in terms of giving themselves an advantage but not wanting to refuse the Receiver a chance at winning (Self advantage). All participants who distributed the full amount to themselves justified the act in terms of optimizing their chances of winning.

A subordinate justification, which may be referred to as “social distance” (Bohnet & Frey, 1999; Hoffman et al., 1996; Rankin, 2006), was also observed among participants who gave “less than fair” offers. Six participants indicated that the anonymity of the Receiver influenced their decision to distribute the tokens more selfishly. For example, one participant stated, “There is no reason for me to give the tokens to someone I don’t know and I would expect anybody else in the same situation to do the same.” Thus, consistent with previous findings, recipient anonymity appeared to influence the Allocators’ economic decisions. The current study, however, adds to previous findings by demonstrating that concerns about being identified via gossip encourage prosocial behavior.

4. Discussion

The present study sought to test whether the *threat of gossip* encourages prosocial behavior in a dictator game experiment. We hypothesized that cues about the likelihood of gossip (i.e., the transmission of strategic social information to an absent third party) would serve to promote

generous offers. This hypothesis was tested by manipulating whether or not participants were told that a counterpart, the Receiver, would discuss their economic decisions with a third party. Support for this hypothesis was not found. That is, the *threat of gossip* alone did not significantly increase participants’ offers.

However, it was also hypothesized that the *threat of gossip* would lead to more generous allocations on the dictator task if participants’ reputations were at risk. In order to manipulate concerns about reputation, half of our participants were left alone with a confederate who solicited personally identifying information from them (e.g., name and place of residence). From among these participants, half were later told that the Receiver would be disclosing to the confederate their economic decision. The findings strongly supported this second hypothesis. Participants assigned to the *threat of gossip* condition and who disclosed personally identifying information to one of the future gossipers were more generous than participants from all the other conditions. It would appear, then, that the *threat of gossip* only serves to promote generous behavior when people are given the opportunity to enhance their reputation.

The distribution of allocation scores also supported this conclusion. Participants in the primary experimental condition (E×E) almost never offered “less than fair” allocations, while participants in the other three conditions often did. Only one “less than fair” allocation was made in the E×E condition, and this allocation (four tokens) was only negligibly “less than fair.”

The current findings are consistent with past research on altruistic behavior in humans, some of which have also shown that concerns about reputation promote generous behavior in economic games (e.g., Barclay & Willer, 2007; Milinski, Semmann, & Krambeck, 2002; Nowak & Sigmund, 1998; Wedekind & Milinski, 2000). The present data extend this line of research by demonstrating how reputational concerns promoting generous behavior are mediated by language.

Several participants in the current study expressed apprehension about the second and third party discussing their economic decisions. Although justifications of this kind were relatively infrequent, we cannot conclude from this that reputational concerns were absent from participants’ conscious decision making. Reputational concerns in the primary experimental condition may have been eclipsed by the more salient motive to behave fairly. Nevertheless, regardless of how participants’ justified their actions, the fact that participants were more generous when their reputation was jeopardized by the *threat of gossip* suggests motivations for strategic social information management. Whether these motivations operate consciously, unconsciously, or at both levels, it is too soon to say.

In addition to the central hypotheses, we also predicted that many participants would abide by a general fairness norm (whereby participants distribute the endowment

equitably) regardless of condition, as suggested by previous findings (e.g., Kahneman et al., 1986; Hoffman et al., 1996). Indeed, the data supported this hypothesis. Equitable (five-token) offers were by far the most common and, with the exception of one control condition, accounted for more than half of the total allocations made. Although equitable behavior within the dictator game paradigm is robust, Hoffman et al. (1996) have demonstrated that by increasing the social isolation of the dictator, adherence to the fairness norm can, to a certain extent, be loosened. Several methodological factors may have contributed to the robust adherence to a fairness norm in our study across all conditions.

First, there is no doubt that the type of payment incentive influenced selfish motivations. A lottery drawing may not have the same incentive as real money, since payment is deferred and uncertain. Forsythe et al. (1994), for example, found that participants were significantly less likely to share the endowment when told that they would be allowed to keep the allocation.

Sampling bias may also have contributed to high rates of sharing in the present study. Most participants were recruited from the university's student union. Most people solicited were unwilling to comply with the male recruiter's request to participate in the study. Those who did comply may represent an atypical sample. That is, the kind of people willing to stop and listen to—and then comply with—a stranger's request may also be more likely than the average person to share an endowment with an anonymous second party. Also, it may be that the current experimental design did not fully control for experimenter effects (Hoffman et al., 1996). In the current study, opaque envelopes were used to prevent the experimenter from seeing the allocation and therefore to minimize subject–experimenter reputation building. It may have been that participants did not trust the experimenter not to look, however.

Most likely, a combination of these methodological factors contributed to high rates of equitable allocations across conditions. However, it should also be noted that, methodology aside, the most likely contributor to equity in the anonymous dictator game is the pre-experimental internalization of a fairness norm, which promotes positive fitness outcomes in nonanonymous, extralaboratory contexts (Hoffman et al., 1996).

In conclusion, the current research provides clear experimental evidence showing that concerns about being identified and gossiped about play an important role in promoting prosocial behavior. Future work in this area should seek to further clarify the relationship between the evolution of language and reputation.

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