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Giving to whom? Altruism in different types of relationships

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ABSTRACT

Experiments show that people give money away to other people, even when contributions are anonymous. These findings contradict the common economic assumption that people maximize their own payoffs. Here we take the approach that human altruism is shaped by a set of cognitive models for distinct types of relationships. Specifically, we apply relational models theory which distinguishes between communal relationships based on need, authority relationships based on power, and trade relationships based on reciprocity. We test whether relational models theory can explain altruism in the dictator game, a standard method for observing altruism. For each relational model, we manipulate its key variable (need, power, or reciprocity) by varying hypothetical descriptions of the dictator game, while holding constant real monetary incentives. In the communal scenario participants transfer more money to recipients with greater need for the resource (Experiment 1), in the authority scenario participants transfer more money to recipients who were higher status (Experiment 2), and in the exchange scenario, participants transfer more money to recipients who previously delivered goods to the dictator. In sum, we find that relationships, even when hypothetical, strongly affect altruistic behavior – modal dictator contributions range from 0% to 100% – and relational models theory correctly predicts these effects.

1. Introduction

People transfer resources to other people in different types of relationships – sharing with family, trading with merchants, and ceding to authorities. These transfers are the foundation of economies and they can increase wealth in society by promoting specialization and buffering individuals against risk (Smith, 1776). People's economic interactions are fundamentally *social* because they occur in relationships of different kinds. Moreover, each type of relationship has specific expectations about how individuals will distribute resources (Fiske, 1992). This idea suggests that psychological theories about human relationships can potentially clarify how resources move through economic systems.

Until recently, economic models focused on a single type of resource transfer: self-interested trade under enforceable contracts. However, experimental evidence has shown the inadequacy of self-interest models, leading to efforts to revise economic assumptions (Camerer, 2003; Henrich et al., 2001; Smith, 2008). A prime example is the dictator game in which one participant is given an endowment of money and decides how much to give to another participant. Even in anonymous

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laboratory settings, participants' behavior violates self-interest: Rather than giving nothing, participants give on average 20% of the endowment (Camerer, 2003; for a comprehensive review, see Engel, 2011).

A common approach to understanding altruism is based on *social preferences* (Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999) which can be modeled by simple parameters describing how an individual values other people's payoffs. In this approach, an individual's altruism is incorporated in their self-interest by including other people's payoffs in the individual's utility function, weighted by social preference parameters. These economic models resemble theories in social psychology about *social value orientation* in which individuals vary in how much they value their own payoffs relative to other people's payoffs (Messick & McClintock, 1968; Van Lange, 1999). However, some researchers have argued that social values are flexible and sensitive to situations and relationships (Van Lange & Joireman, 2008), but there is no consensus about how to account for these factors. In sum, social preference models inherit from self-interest models an exclusive focus on payoffs and they do not differentiate among different types of relationships such as family, trade, and power relationships.

A related approach extends social preferences to account for the recipient's previous behavior and intentions (Dufwenberg & Kirchsteiger, 2004; Falk & Fischbacher, 2006; Rabin, 1993; see also work on *welfare tradeoff ratios*, e.g., Sell, Tooby, & Cosmides, 2009). These models allow altruism to vary based not only on the individual's payoffs but also on the recipient's potential payoffs for each possible decision in their choice set. This adds a new dimension – the partner's potential payoffs – to shape an individual's relative weightings of their own and other people's payoffs. Nonetheless, these models continue to be driven by payoffs: an individual's assessment of their partner is derived entirely from the partner's potential payoffs in previous decisions, and further, this assessment is put into action as a parameter specifying the individual's rate of return for the partner's payoffs.

Social preference theories improve on self-interest models but researchers have shown that they fail to account for an important set of empirical observations: Altruistic behavior exhibits *context effects* or *framing effects* and is highly sensitive to the *description* of resource allocation tasks, not only the raw payoffs modeled by social preferences (reviewed by Bowles, 2008; Engel, 2011; Levitt & List, 2007; Smith, 2008). For example, people give less money in the dictator game when they "earn" the endowment by completing a quiz (Hoffman, McCabe, Shachat, & Smith, 1994). Experimental instructions that convey greater social distance between a dictator and a receiver decrease giving behavior (Hoffman, McCabe, & Smith, 1996). Whether decisions are framed as individual or on behalf of a group influences altruism (Cason & Mui, 1997; Song, Cadsby, & Morris, 2004). Giving is sensitive to descriptions of an initial allocation as \$18 and \$2 or \$15 and \$5 (Bolton & Katok, 1998), particularly when money initially allocated to the other person is described as a "tax" (Eckel, Grossman, & Johnston, 2005). People give less money to recipients in the dictator game when they have the option to take money from them (Bardsley, 2008; List, 2007). People give more money to women than men (Saad & Gill, 2001), more money to friends than strangers (Brañas-Garza et al., 2010), and more money to recipients who are described as "relying" on the dictator (Brañas-Garza, 2007).

Although context effects are well-known empirically, it remains unclear how to explain them. Here we take a cognitive perspective by suggesting that the human mind computes *implicit payoffs*, in addition to explicit payoffs, by using cues associated with recurrent situations, and task descriptions affect behavior by providing these cues. To function in everyday life, human cognitive systems cannot track only explicit payoffs because summary payoff information is often unavailable. Indeed, the payoffs associated with different outcomes are not usually given to the individual (like in experiments) but rather must be computed by the mind. What is usually taken for granted in game formalizations – a description of outcomes and payoffs – poses severe computational challenges for the mind: Using only sense data, human cognitive systems need to construct sets of possible outcomes and to assign relative values to them. To accomplish this formidable task, cognitive systems rely on cues in order to recognize ancestrally recurrent situations and to impute values tuned by natural selection to reflect the statistical payoffs associated with those situations over evolutionary history (Pinker, 1997; Tooby & Cosmides, 1992). Thus, one potential explanation for framing effects is that people's decisions are not driven only by explicit payoffs (given by the experimenter) but also by implicit payoffs computed by cognitive systems based on available cues, including cues contained in task descriptions.

People's relationships might provide especially potent cues because basic relationships such as kinship, power, and exchange are ancient and reliable correlates of particular payoff structures. Here we test whether relationships might help explain the empirical result that descriptions can influence behavior in economic games: Descriptions can provide cues associated with different relationships, influencing which cognitive systems guide allocation decisions and which behaviors are activated by these cognitive systems.

1.1. Relational models theory

Theories of human relationships from social psychology can potentially help explain variation in altruistic behavior. As a highly social species, humans form a variety of distinct types of relationships with different functions (Bugental, 2000; Clark & Mills, 1979; Fiske, 1992; Kenrick, Li, & Butner, 2003). Here we focus on relational models theory (Fiske, 1992; Fiske & Haslam, 2005), which distinguishes among communal relationships based on meeting each other's needs, authority relationships based on asymmetries in power, and trade relationships based on reciprocity. Each of these relationship types is governed by distinct cognitive mechanisms with different evolved functions and different information-processing structures (Fiske, 1992). These cognitive systems provide a working model of each relationship including the payoff structure and a repertoire of behaviors for managing the relationship. They allow people to comprehend and distinguish different relation-

ships and they structure social interactions such as group decisions, collaborative production, resource allocation, and conflict management. Relational models theory is supported by evidence from a variety of sources including ethnographic fieldwork and psychology experiments showing that relational models explain how people categorize, recall, substitute, and misidentify their relationship partners (Fiske & Haslam, 2005). Researchers have also used relational models to better understand social taboos (Fiske & Tetlock, 1997) and indirect speech such as polite requests, concealed bribes, and sexual innuendo (Pinker, 2007).

Relational models theory proposes four basic relational models that shape people's social interactions across cultures: communal sharing, authority ranking, equality matching, and market pricing (Fiske, 1992). First, in communal sharing relationships individuals are undifferentiated such that they value partners like they value themselves, make decisions by consensus, distribute resources based on need, and share responsibilities. Communal relationships include family relationships and they correspond to kin relations in non-humans based on cognitive mechanisms that evolved through *kin selection* (Hamilton, 1964).

Second, in authority ranking relationships individuals are ranked by status and higher ranked individuals are more valued than lower ranked individuals. Decisions are made by the highest ranked individual, resources are distributed based on orders from high-ranking individuals, and collaboration is organized by a chain of command. These relationships correspond to linear dominance hierarchies in non-human animals and they are based on cognitive abilities such as fighting assessment (Arnott & Elwood, 2009) and transitive inference (Paz-y-Mino, Bond, Kamil, & Balda, 2004) that evolved for reducing the costs of resource disputes.

Third, in equality matching relationships individuals keep track of everyone's contributions and try to avoid being cheated. Group decisions can be made by voting and resources are transferred according to previous credits and debts. These relationships require cognitive abilities such as recognizing repeated interactions and cheater detection (Axelrod & Hamilton, 1981; Trivers, 1971) that evolved to capture the benefits of reciprocity.

Fourth, in market pricing relationships individuals also keep track of partners' contributions but they can additionally pay debts based on ratios or rates such as prices and wages. Market pricing is similar to equality matching except that exchanges can occur not only as one-to-one matches but also using different types of goods and in different proportions. Because both equality matching and market pricing have the same function – capturing gains from reciprocity – we will here combine these models and refer to them as *exchange* relationships.

1.2. The present experiments

We propose that people's transfers of resources are shaped by cognitive models for different types of relationships. Put simply, to understand giving behavior it is important to ask "giving to whom?" Variation in giving behavior is caused not only by individuals' different social preferences but also by different relationship contexts. On this perspective, there are a variety of altruistic behaviors spread across separate behavioral repertoires associated with different types of relationships. If so, then human altruism can be described in greater detail than is possible with social preferences. Researchers can seek to understand the different computations used for each type of relationship and the sets of cues that determine which relational model will be applied to a given social interaction.

We investigate these ideas by testing whether relational models theory can be used to produce novel context effects on giving behavior in the dictator game. In our experiments, the payoffs of the dictator game are held constant, while only the description of the game varies. This implies that social preference models predict no variation in altruistic behavior in these experiments because these models are based only on payoffs and do not account for task descriptions. In contrast, relational models theory predicts that people's behavior can be affected not only by explicit payoffs but also by cues that activate relational models. When a relational model is activated, it engages the particular behavioral repertoire associated with that relationship – including giving and withholding behaviors. Importantly, the relevant cues for relational models are not limited to explicit payoffs because most everyday social interactions do not have explicit payoffs.

We test this hypothesis by designing task descriptions with cues that are predicted by relational models theory to either increase or decrease giving behavior within each relational model. The first experiment examines the communal sharing model. This model predicts that people will give more resources to those who are in greater need of the resources. Across conditions, we use hypothetical task descriptions to vary whether the dictator or the recipient has greater need for the resource. The second experiment examines the authority model by varying whether the dictator or the recipient has greater power. The third experiment examines the trade model by varying whether or not the recipient previously transferred resources to the dictator.

The methods in these experiments are relatively novel because they combine hypothetical vignettes with real cash incentives. This methodological approach potentially offers several advantages. First, this approach puts relational models theory in stark opposition to social preference models because they hold that behavior is driven by real payoffs, whereas relational models theory allows hypothetical scenarios to affect behavior through the cues they contain. Second, hypothetical relationships offer greater experimental control than real relationships because they eliminate confounds from individuals' relationship histories. Third, hypothetical scenarios offer a challenging test case for relational models theory because although they can provide cues of relationship context, these cues are relatively minimal and weak compared to cues in actual relationships. This idea implies that any effects observed with such minimal cues are expected to be magnified in real relationships compared to hypothetical relationships.

2. Experiment 1

Experiment 1 investigates the influence of communal sharing relationships on giving behavior in the dictator game. In communal relationships such as family relationships and close friendships, individuals transfer resources to other people according to their needs (Fiske, 1992). We use a hypothetical task description to vary whether the dictator or receiver is depicted as having greater need for the resource. In the scenario, a brother divides 10 oz of steak with his sister, and we vary which sibling is hungrier. Each hypothetical ounce of steak is worth real cash to the participants, creating the payoff structure of a dictator game. Relational models theory predicts that participants will give more resources to receivers when they have greater need.

2.1. Method

2.1.1. Participants and procedure

We recruited participants ($n = 160$; 43% female) using Amazon's Mechanical Turk website to complete a short online study for payment. Mechanical Turk is an online labor market in which individuals sign up to complete online tasks for payments. Mechanical Turk has been used in previous research and has been found to generate results similar to more traditional samples (Buhrmester, Kwang, & Gosling, 2011; DeScioli & Kurzban, 2009; Horton, Rand, & Zeckhauser, 2011). Participants' mean age was 28 ($SD = 10$). Participants completed the task in ~5 min, they earned 30¢ for participation, and they could earn up to an additional $1 depending on their decisions in the interaction in which the dictator divided $1 with the receiver. (Note that $1 is a relatively large sum in the Mechanical Turk market.)

Participants read general instructions explaining that they would have an online interaction with another participant, each participant would be assigned a role in a hypothetical scenario, and their decisions would be matched with the other participant to determine payments. Participants were assigned to either the high-need condition or the low-need condition varying whether the recipient had greater need for the resource than the dictator or less need than the dictator, respectively. In the high-need condition, participants read:

> *There is a Brother and a Sister. The Brother has 10 ounces of steak. The Sister has 0 ounces of steak. They both enjoy steak and there is no other food available. The Brother is not too hungry at the moment. The Sister is very hungry. The Brother can decide to give 0 to 10 ounces of steak to the Sister. (The Sister will not make a decision in this interaction.)*

Participants in the low-need condition read the same scenario except that the brother is very hungry and the sister is not too hungry. Participants read that each ounce of steak is worth real money (10¢ per ounce) that will be added to their payment for completing the task. Half of the participants were assigned to the dictator role and half were assigned to the receiver role. Dictators decided how many units to transfer to the receiver (Fig. 1). Receivers indicated how many units they thought that the dictator would transfer. Participants completed a comprehension quiz and errors disqualified them.[1] Participants completed demographic information and wrote comments about the study.

2.1.2. Baseline dictator game

For comparison, we conducted a standard dictator game with a different set of participants ($n = 86$; 79% female; age: $M = 33$; $SD = 12$) without specifying relationships by using the scenario:

> *There is a Proposer and a Receiver. The Proposer has 10 economic units. The Receiver has 0 economic units. The Proposer can decide to transfer 0 to 10 economic units to the Receiver. (The Receiver will not make a decision in this interaction.)*

2.2. Results and discussion

Fig. 2b shows that participants in the dictator role gave more money in the high-need condition ($M = 55\%$, $SD = 19\%$) than in the low-need condition ($M = 28\%$, $SD = 19\%$), $t(78) = 6.41$, $p < .001$, $d = 1.43$. The modal contribution was 50% when the receiver was hungry versus 30% when the dictator was hungry. Similarly, receivers expected to receive more money in the high-need condition ($M = 49\%$, $SD = 18\%$) than in the low-need condition ($M = 34\%$, $SD = 14\%$), $t(78) = 4.11$, $p < .001$, $d = 0.93$. In comparison, in the standard dictator game participants in the dictator role gave $M = 36\%$, $SD = 22\%$ of their endowment, and receivers expected $M = 30\%$, $SD = 24\%$ (Fig. 2a).

These results show that minimal cues associated with communal relationships influence giving behavior in the dictator game. When the receiver was described as more hungry than the dictator, we observed substantial generosity, even in anonymous internet interactions with a protocol that was essentially double-blind (Mechanical Turk allows no identifying information about participants), and despite previous research that found high selfishness in strictly anonymous experiments (Hoffman et al., 1994). Participants' giving behavior was sensitive to cues of needs, holding real payoffs constant, even

[1] To complete dictator-receiver pairings, a few receivers with comprehension errors were permitted to participate, given that receivers made no consequential decisions.

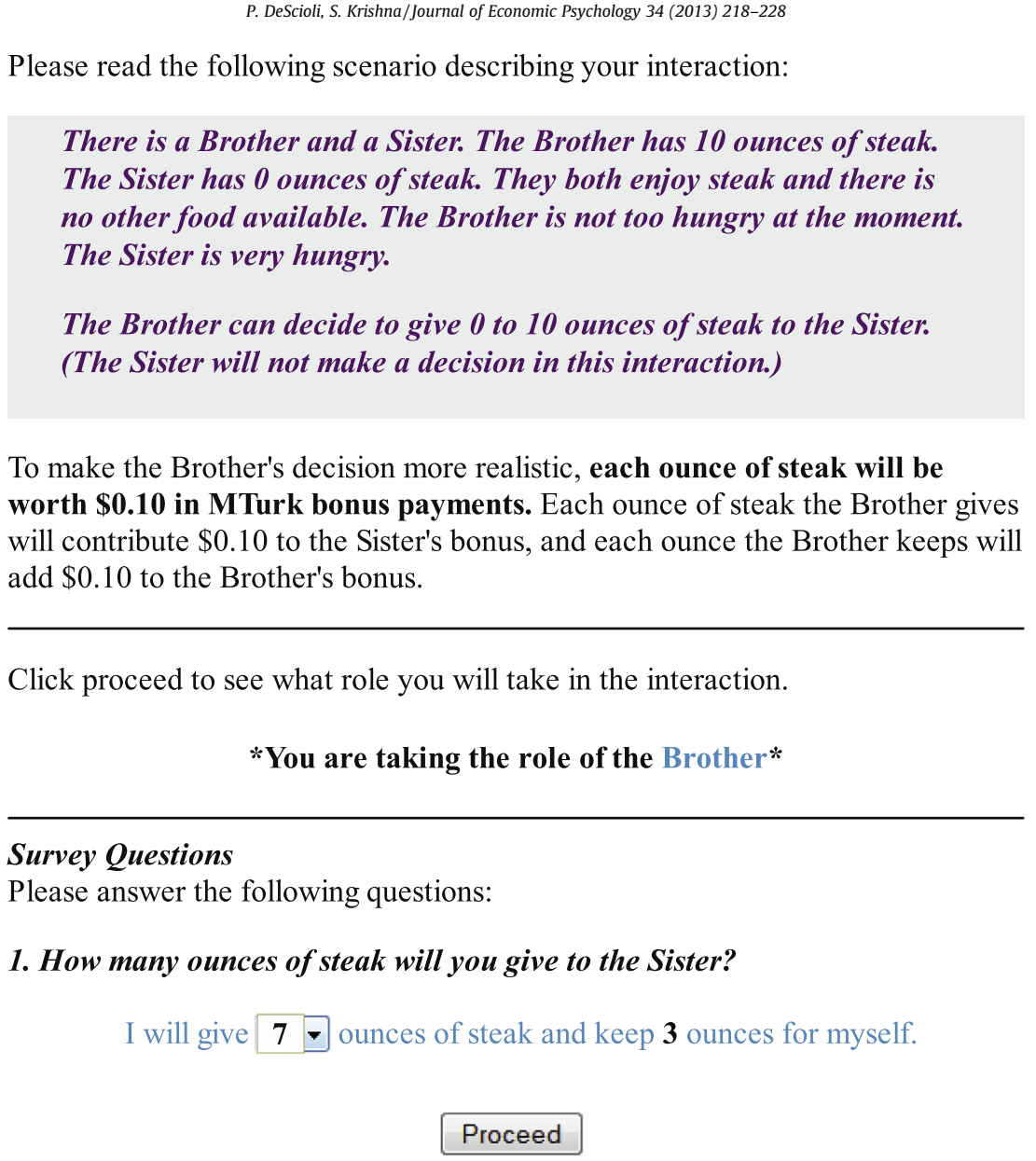

Fig. 1. Screenshot from Experiment 1 showing the dictator's decision page for the high-need condition.

though they knew the cues were hypothetical. This finding violates the predictions of self-interest and social preference models. In contrast, this novel context effect is predicted by relational models theory.

3. Experiment 2

Experiment 2 investigates the influence of authority relationships on giving behavior. In authority relationships, individuals transfer resources to other people according to the decisions of the higher authority (Fiske, 1992). We use a hypothetical task description to vary whether a receiver who demands resource expenditure is higher or lower status than the dictator. In one condition, a soldier decides how many push-ups to perform, each costing one unit of energy, in response to a higher-ranked general's orders to do ten push-ups. In the second condition, the general decides how many push-ups to perform after being ordered to do ten push-ups by the soldier. The logic of authority indicates that by ordering the general to do push-ups, the soldier engages in insubordination and the general has no obligation to comply (Fiske, 1992). Relational models theory predicts that participants will transfer more resources to a receiver who orders them to do so when the receiver is higher-ranked than the dictator.

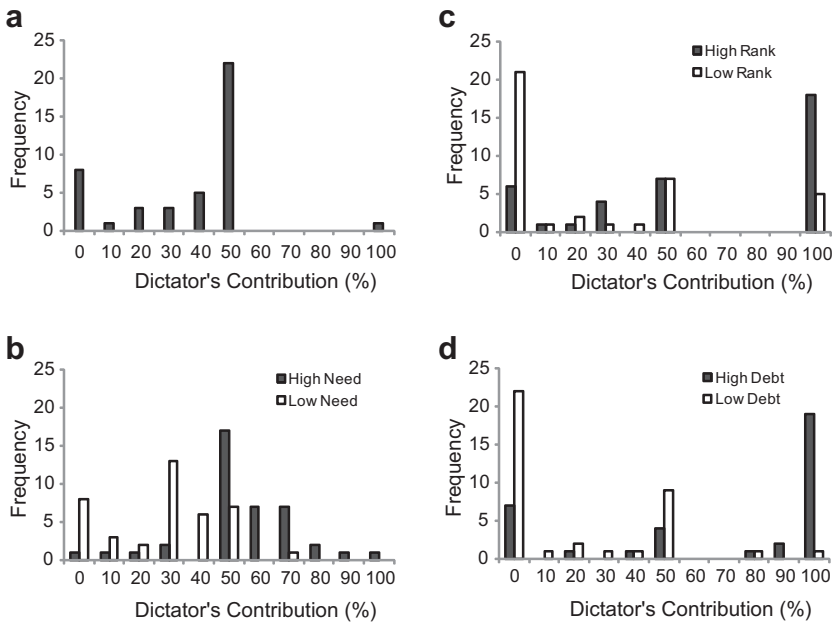

Fig. 2. Dictator contributions for Experiment 1 baseline (a), Experiment 1 communal (b), Experiment 2 authority (c), and Experiment 3 exchange (d).

3.1. Method

3.1.1. Participants and procedure

We recruited participants ($n = 150$; 41% female) using Amazon's Mechanical Turk. Participants' mean age was 28 ($SD = 10$). The procedure and payments were the same as Experiment 1 except the scenarios differed. Participants were assigned to either the high-rank condition or the low-rank condition varying whether the recipient was higher status than the dictator or lower status, respectively. Participants in the high-rank condition read:

> *There is a General and a Soldier. The General is higher rank than the Soldier and the Soldier is expected to follow the General's orders. The General tells the Soldier to do 10 push-ups. The Soldier has 10 units of energy and each unit can be used to perform 1 push-up. The Soldier can decide to perform 0 to 10 push-ups for the General. (The General will not make a decision in this interaction.)*

Participants in the low-rank condition read the same scenario except after the general gives their orders, participants read "The Soldier refuses and tells the General to do 10 push-ups," and then the general (rather than soldier) plays the dictator role. Participants read that each unit of energy used for push-ups transfers money (10¢ per push-up) to the person who ordered the push-ups to be done.

3.2. Results and discussion

Fig. 2c shows that participants in the dictator role gave more money in the high-rank condition ($M = 62\%$, $SD = 40\%$) than in the low-rank condition ($M = 26\%$, $SD = 35\%$), $t(73) = 4.19$, $p < .001$, $d = 0.97$. The modal contribution was 100% when the receiver was the general versus 0% when the receiver was the soldier. Similarly, receivers expected to receive more money in the in the high-rank condition ($M = 61\%$, $SD = 36\%$) than in the low-rank condition ($M = 8\%$, $SD = 24\%$), $t(73) = 7.32$, $p < .001$, $d = 1.74$. Consistent with relational models theory, these results show that cues associated with authority relationships can affect giving behavior, even when the relationship is hypothetical.

4. Experiment 3

Experiment 3 investigates how trade relationships influence giving behavior. In trade relationships, individuals transfer resources to other people based on what they receive from them (Fiske, 1992). We use a hypothetical task description to vary whether or not the dictator previously received resources from the receiver. In the scenario, a customer decides how much to pay a merchant for an order of 10 economic units worth of goods, and we vary whether or not the merchant fulfilled the order. Each hypothetical economic unit is worth real cash (10¢ per unit) to the participants, creating a dictator game. Relational models theory predicts that participants will transfer more resources to receiver when the receiver previously gave resources to the dictator.

Table 1
Regression of dictator contributions (%) by condition.

Relationship	Variable	*b*	*SE*	*t*	*p*
Baseline	Constant	36.28	4.57	7.93	<.001
Communal	High need	+18.72	6.59	2.84	.005
	Low need	−8.28	6.59	−1.26	.21
Authority	High rank	+25.88	6.73	3.85	<.001
	Low rank	−10.75	6.68	−1.61	.109
Exchange	High debt	+32.86	6.83	4.81	<.001
	Low debt	−16.54	6.68	−2.48	.014

Note: Regression for contributions (%) in the dictator game for seven conditions. The constant is the mean contribution for the baseline condition and the coefficient for each relationship condition shows the difference from the baseline. The overall model shows that relationship context significantly influenced contribution decisions, $F(6, 264) = 15.92$, $p < .001$, $R^2 = .27$.

4.1. Method

4.1.1. Participants and procedure

We recruited participants ($n = 146$; 59% female) using Amazon's Mechanical Turk. Participants' mean age was 32 ($SD = 12$). The procedure and payments were the same as Experiment 1 except the scenarios differed. Participants were assigned to either the high-debt condition or the low-debt condition varying whether the dictator was indebted to the recipient or did not owe the recipient payment, respectively. Participants in the high-debt condition read:

> *There is a Customer and a Merchant. The Customer has 10 economic units. The Customer orders 10 economic units worth of goods from the Merchant. The Merchant delivers all of the goods that the Customer ordered. The Customer has not paid the Merchant. The Merchant has 0 economic units. The Customer can decide to pay 0 to 10 units to the Merchant. (The Merchant will not make a decision in this interaction.)*

Participants in the low-debt condition read the same scenario except "delivers all of the goods" was changed to "delivers none of the goods."

4.2. Results and discussion

Fig. 2d shows that participants in the dictator role gave more money in the high-debt condition ($M = 69\%$, $SD = 41\%$) than in the low-debt condition ($M = 20\%$, $SD = 27\%$), $t(71) = 6.10$, $p < .001$, $d = 1.43$. The modal contribution was 100% when the receiver (merchant) delivered all of the goods versus 0% when the receiver delivered none of the goods. Similarly, receivers expected to receive more money in the in the high-debt condition ($M = 57\%$, $SD = 39\%$) than in the low-debt condition ($M = 18\%$, $SD = 29\%$), $t(71) = 4.83$, $p < .001$, $d = 1.14$. These results show that cues associated with trade relationships influence giving behavior, even when giving is not supported by enforceable contracts and the trade relationship is hypothetical.

5. Cross-experiment analysis

We performed a cross-experiment analysis to directly compare the results from each relationship condition to the baseline dictator game. We combined the contribution data from all seven conditions across experiments: the high and low conditions for each relationship context (communal, power, and exchange) and the baseline condition. We conducted a regression analysis with dummy variables for each of the six relationship conditions. Table 1 reports the results. We observed significant differences from baseline in the expected direction for four relationship conditions, a marginally significant effect in the expected direction for authority: low rank, and a non-significant trend in the expected direction for communal: low need. There seems to be greater differences from baseline in the conditions expected to increase rather than decrease altruism. This might indicate that it is more difficult to increase selfishness than altruism, or alternatively, that the baseline dictator game itself tends to motivate low contributions.

Because contributions were censored at 0% and 100%, we additionally conducted a tobit regression analysis to compare contributions in the relationship conditions to the baseline condition.[2] The results are reported in Table 2. We observed significant differences from baseline in the expected direction for five relationship conditions and a non-significant effect for communal: low need.

6. General discussion

In three experiments, we found that relational models theory correctly predicted novel context effects on altruistic behavior in the dictator game. Our experimental design used hypothetical task descriptions to provide cues of relationship context.

[2] We thank an anonymous reviewer for this suggestion.

Table 2
Tobit regression of dictator contributions (%) by condition.

Relationship	Variable	*b*	*SE*	*t*	*p*
Baseline	Constant	31.34	7.59	4.13	<.001
Communal	High need	+23.70	10.82	2.19	.029
	Low need	−9.70	10.94	−0.89	.38
Authority	High rank	+42.23	11.59	3.64	<.001
	Low rank	−23.18	11.64	−1.99	.048
Exchange	High debt	+51.85	11.94	4.34	<.001
	Low debt	−34.14	11.78	−2.90	.004

Note: Tobit regression for contributions (%) in the dictator game for seven conditions. The overall model shows that relationship context significantly influenced contribution decisions, $\chi^2(6) = 78.71$, $p < .001$.

We varied need in a communal relationship, power in an authority relationship, and the delivery of goods in a trade relationship. These social cues had strong effects – modal contributions ranged from 0% to 100% – in the directions predicted by relational models theory. We observed these effects even though monetary incentives were held constant, the interactions were online and anonymous, and participants knew that the relationships were hypothetical.

These results contradict social preference models (Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999) because they are driven by payoffs and do not account for relationships or other contextual cues present in task descriptions. The results of these studies are also not well-explained by social value orientation (Messick & McClintock, 1968; Van Lange, 1999) because it is based on explicit payoffs which were held constant across conditions. Our findings indicate that factors outside of the explicit payoffs can influence people's allocation decisions, and additional theoretical tools will be required to account for these effects.

Previous research similarly showed context effects that contradict social preference models (Bowles, 2008; Levitt & List, 2007; Smith, 2008). However, it is important to not only demonstrate violations of existing models but also to work toward an improved theoretical framework. Research enumerating a variety of context effects might eventually allow the development of broader theories that can encompass, organize, and simplify our knowledge of how task descriptions influence altruism. For instance, a recent theory (Dufwenberg, Gächter, & Hennig-Schmidt, 2011; Ellingsen, Johannesson, Mollerstrom, & Munkhammar, 2012) proposed that framing can influence behavior in coordination games by influencing players' beliefs about other players' beliefs, affecting focal points in the game (Schelling, 1960).

The present experiments show how theories of relationships from social psychology can help systematize and organize our understanding of context effects. In these studies, relational models theory was used to successfully predict novel framing effects on giving behavior in the dictator game based on cues related to need, power, and trade. Relational models can potentially organize a number of context effects within a single theoretical framework. Further, it can consolidate our knowledge of economic decisions with a wide variety of other phenomena previously explained by relational models ranging from memory (Fiske & Haslam, 2005) to moral judgment (Fiske & Tetlock, 1997) to language use (Pinker, 2007).

It is possible that relational models can shed light on previously observed context effects. Motivated by reciprocity theories, Hoffman and colleagues (1996) found that increasing anonymity decreases altruism which is consistent with the exchange component of relational models theory. The present studies add an additional exchange-relevant variable (whether goods were delivered) and two additional relationship types based on power and need. Further, the ability to earn an endowment (Hoffman et al., 1994) or the ability to not only give but also take money (Bardsley, 2008; List, 2007) could provide relational cues, such as indicating a relationship involving work effort or exploitation rather than meeting a partner's needs. Additional relational models such as ingroup and mating relationships, proposed by Kenrick et al. (2003), might help explain other framing effects such as why group membership (Cason & Mui, 1997; Song et al., 2004) and the recipient's sex (Saad & Gill, 2001) affect altruistic behavior.

Importantly, researchers need to explain why both descriptions *and* incentives influence behavior. We suggest that monetary incentives too can act as cues that activate relational models. When the payoff structure of a game is similar to a familiar relationship context, it could trigger behaviors associated with that relationship. For instance, in cross-cultural studies the Orma people of Kenya viewed the public goods game as a *harambee*, a local fundraising event, and they contributed generously as a result (Henrich et al., 2001). This might also help explain why framing effects vary in strength across experiments: Cues derived from incentives interact with cues derived from experimental instructions and procedures. For example, eyespots increased altruism in the dictator game (Haley & Fessler, 2005) but did not increase giving in the trust game (Fehr & Schneider, 2010). The additional structure of the trust game (a second move in which the recipient decides how much to return to the sender) might signal, for instance, a relationship based on exchange rather than meeting a partner's needs. Cues that someone is being watched might have different effects for exchange relationships, causing people to not only show off their altruism, as in the dictator game, but also to avoid being cheated by an untrustworthy partner, preventing a reputation for gullibility. Given these ideas, we might expect the dictator game, due to its minimal payoff structure, to be particularly plastic and sensitive to task descriptions (Engel, 2011). As interactions increase in rules and structure, the incentives provide stronger cues for relationships, and as a result we would generally expect less influence from task descriptions.

By using cues from relational models, our stimuli created the possibility that participants' behavior was influenced by experimenter demand (Zizzo, 2010). However, we note that experimenter demand is itself a social phenomenon that is not accounted for by social preference models because it is unrelated to payoffs. Hence, this interpretation of the results continues to contradict social preference models. Second, participants would need to use relational models in order to infer the experimenter's expectations, particularly given the between-subject design. Third, people use relational models to coordinate their behavior with other people's expectations (Fiske, 1992), including experimenters who are also community members. The issue in this case is whether participants were substantially influenced by the experimenter *per se*, rather than by people's expectations more broadly. Participants' cash incentives and the anonymity of their online interactions weigh against this possibility.

The methods used in the present experiments are unusual and could lead to alternative interpretations. These experiments combine vignettes, commonly used in psychology, with monetary incentives, commonly used in experimental economics. Ideally, this combination can benefit from the strengths of both approaches: Vignettes allow researchers to study people's responses to context-rich stimuli, and incentives allow researchers to study behavior with real risks and rewards at stake. Monetary incentives can improve scenario studies by functioning like constant, standardized counterweights on one side of a balancing scale, pulling against the motivations caused by hypothetical scenarios on the other side of the scale. In the present studies, the incentives were held constant across conditions and variation in participants' responses can be measured in cash. Reciprocally, vignettes can potentially improve incentive studies by allowing researchers to present content-rich stimuli that might otherwise be impractical to generate in laboratory environments (like sharing meat with siblings in Experiment 1).

Nonetheless, the separation between fictional vignettes and real incentives might raise a concern that the patterns we observed do not occur in real relationships. For instance, maybe participants' responses do not reflect real behavior in relationships but rather communicative statements about how they want other people to act in these situations. That is, we could interpret participants' contributions as costly messages about how other people should behave.

This issue raises several key points. First, communicative actions are within the scope of relational models theory. Relational models contain a repertoire of relationship-maintaining behaviors that can include helping, sharing, appeasing, defying, trading, repaying, communicating, enforcing, conforming, and other social maneuvers. Communication of relationship expectations is an integral part of how relational models operate in social groups (Fiske, 1992; Fiske & Haslam, 2005). Hence, the communication interpretation is not an alternative but rather a narrower version of the relational models hypothesis which commits to communication as a key motive for contributions. Importantly, participants' decisions closely matched relational models theory, indicating that if these transfers were communicative messages, then they were messages *about relational models*, affirming the theory's explanatory value. In contrast, social preference theories predict no variation in giving behavior, communicative or otherwise.

Next, the communication hypothesis makes a straightforward and testable prediction. Communicative behaviors tend to increase with the presence and size of an audience (e.g., Kurzban, DeScioli, & O'Brien, 2007) and so communicative altruism is expected to increase in public environments. Given that our experiments were online and anonymous, the communication hypothesis predicts *larger effects* in real and public settings. For example, people should be more motivated to show a real sibling how to act than an online experimenter. Hence, this interpretation does not seem to diminish but rather to magnify the potential importance of the reported findings for understanding resource transfers. In general, we suggest that the simplest interpretation is that relational models directly motivated participants' giving behavior but future research can test alternative versions of the relational models hypothesis based on communicating expectations, conforming to expectations, and other social strategies.

Last, although the present methods are unusual, they seem well-suited for comparing relational models theory to social preference models. Social preference models offer no mechanisms for how hypothetical vignettes might affect resource allocations. In contrast, relational models theory explains how cues in hypothetical vignettes can activate relationship-relevant behaviors to affect contributions. Further, hypothetical scenarios offer advantages over real relationships because they eliminate confounds due to the histories between real relationship partners, offering greater experimental control. Moreover, our hypothetical scenarios pose a challenging test case for relational models theory because, unlike real relationships, participants are free to ignore the scenarios (and incentivized to ignore them). We suggest that if hypothetical relationships influence decisions, then real relationships should be expected to have even stronger effects. In the current experiments, relational models theory correctly predicted a textured pattern of variation whereas the main theoretical alternative, social preference models, incorrectly predicted no effects. Researchers can, of course, continue to develop alternative and refined models to account for these observations, but nonetheless, relational models theory offers improved explanatory power over previous models in these experiments.

The present findings suggest a further methodological advantage of providing a relationship context to participants' economic decisions. The standard methodological approach to economic games is to use neutral language that avoids cues of relationships. This approach is generally thought to enhance experimental control. However, if people's allocation decisions usually occur in specific types of relationships, then removing this information essentially creates an ambiguous stimulus, similar to an inkblot test. Participants might need to impose a relationship context on the stimulus in order to make their decisions. If so, then using supposedly neutral descriptions might create a source of variability that is outside of the experimenter's control.

The importance of relationships could also help to explain observed variation across cultures in giving behavior (Henrich et al., 2001). If relationship-free economic games are perceived as ambiguous stimuli, then one source of variation could be which relationship framework people tend to impose on the stimulus in order to make their decisions. If cultural groups differ in the types of relationships they tend to form, then this could influence their perceptions of ambiguous economic interactions.

Future research can further examine the cues that activate relational models and the variables that influence behavior within each relationship context. The present experiments focus on variables – need, power, and reciprocity – that influence behavior within particular relational models. Future work can look at additional relational models (Bugental, 2000; Kenrick et al., 2003) such as mating relationships and alliance relationships to test relevant variables in those relationship contexts. Similarly, in the present experiments we combined equality matching and market pricing models from relational models theory (see Section 1), and future work could test whether these models can be differentiated in economic games. Furthermore, future research can compare across different relational models by looking at how people use cues to distinguish one relationship context from another, how the effects of key variables vary across relationships, and how people resolve conflicting variables such as when needs conflict with power.

Finally, our results address a broader issue in psychology and economics about how to understand personal economic interactions (Smith, 2008). We suggest that theories focusing exclusively on payoffs overlook the critical mediating role of cognition – people's cognitive representations of their resource allocation decisions. For most of the social decisions that people make, there is no simple summary of the payoffs associated with different options. Prior to making a choice, people face the computational challenge of formulating the problem. Payoffs and potential outcomes cannot be directly perceived just as an object's depth and color cannot be directly perceived but must be statistically inferred from noisy and incomplete sense data (Purves & Lotto, 2003). When interacting with other people, humans use relational models to organize data from their interactions so that adaptive decisions can be made (Fiske, 1992). Hence, personal interactions are not driven only by explicit payoffs because simple payoff information is generally not available to guide decisions in real social interactions.

Moreover, inferring the payoffs is only the beginning of the computational challenges posed by social interaction. Once potential moves have been generated, payoffs have been assigned, and the best response is identified, there remains the problem of executing the chosen strategy in a complex social world. For example, after a mother computes that her best strategy is to altruistically help her crying infant, there remains a formidable challenge – figuring out what the child needs and how to meet those needs. Analogous practical obstacles apply to negotiating power with a boss or an employee, bargaining with a merchant, courting a mate, showing group solidarity, and other common social interactions. Often it is the practical know-how of relationships, rather than the payoffs, that poses the most difficult challenges. People's relational models include not only welfare tradeoffs but also practical know-how – repertoires of relevant behaviors that can be deployed to manage relationships. Human altruism, on this perspective, includes a diverse set of different actions with distinct functions distributed across specialized cognitive models for different relationship contexts. Future research can use the methods developed here to further investigate the cues, representations, and behaviors associated with communal, authority, trade, and other types of relationships.

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