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You scratch his back, he scratches mine and I'll scratch yours: Deception in simultaneous cyclic networks

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ABSTRACT

Markets with increasing specializations demand service exchanges among professionals, forming networks of delegations (e.g., A represents B, B represents C, and C represents A). In three studies, we explore "unethical favors" arising from such simultaneous cyclic networks where everyone decides simultaneously whether to misrepresent key information for their principals. Study 1 and 2 found that participants in such networks were more likely to lie than they would if they worked for themselves. This increased deception may be driven by the anticipation that their lies will be indirectly reciprocated. Indeed, Study 3 found that deception decreased when the chain of delegations was broken (i.e., A represents B and B represents C). Moreover, self-report measures suggested that increased deception in simultaneous cyclic network was indeed due to anticipated indirect reciprocity. Thus, although reciprocity fosters trust and cooperation it can also create an interlocked circle of deception.

1. Introduction

Markets with increasing specializations and diverse professions demand embedded ties where people exchange services, forming networks of mutual delegations (see Bolton and Dewatripont, 2005; Gibbons and Roberts, 2012 for a review). For example, considering a situation where CEOs of company A, B, and C sit on each other's board of directors (A on B's, B on C's, and C on A's) and determine each other's compensations, forming a cyclic network of compensation evaluation (A evaluates B, B evaluates C, and C evaluates A). Each CEO needs to decide whether to inflate another CEO's compensation. Inflation would increase CEO compensation but would reduce the payoff of corresponding shareholders. Furthermore, the CEOs could not coordinate their decisions and are effectively required to make the decision simultaneously. How likely would those CEOs inflate each other's salary? This is an example of an indirect, simultaneous cyclic network where there are no direct ties between any dyad. Individuals in the network, however, share indirectly reciprocal ties such that if everyone "scratches the back" of the person next in the chain, everyone will be better off. The question is whether such a simultaneous cyclic network is capable of sustaining a circle of deception – "you scratch his back, he scratches mine, and I'll scratch yours."

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In this paper, we explore "favors" that involve deception and inflict harm on a third party (e.g., stockholders). In particular, we show that individuals are more likely to cross moral boundaries and engage in deception for another person in the cyclic network than they would for themselves. We argue that this increased tendency to lie in simultaneous reciprocal relationships is driven by the anticipation that their lies would be reciprocated. Thus, although reciprocity fosters trust and cooperation it can also lock in a circle of deception.

We employed a modified ultimatum game (adopted from Boles et al., 2000) as our investigative vehicle. A standard ultimatum game (see Roth, 1995, for a review) involves two players. The proposer makes the first move by proposing a distribution of a monetary endowment. The responder then has the power to either accept or reject the proposal. If the responder accepts the proposal, the endowment is divided as specified in the proposal; if the responder rejects the proposal, both parties receive nothing. Although neoclassic, non-cooperative game theory predicts that the proposer should offer as little as possible and the responder should accept even the smallest possible offer, responders actually often reject sizable offers that are less than 50% of the endowment. Anticipating that, proposers tend to make substantial offers that are close to half of the endowment (e.g., Ruffle, 1998; Oosterbeek et al., 2004). The modified ultimatum game retains the basic structure of the standard ultimatum game but replaces the public information about the value of the endowment with a range of possible values for the responder (e.g., Croson, 1996; Croson et al., 2003; Guth and van Damme, 1998; Guth et al., 1996; Kagel et al., 1993; Mitzkewitz and Nagel, 1993; Rapoport et al., 1996). The proposer thus has private information of the endowment's exact value. As part of proposal, the proposer is asked to indicate its value. Thus, a proposer may lie about the size of the endowment to make a smaller offer seem larger and fairer, thereby increasing its chance of being accepted. We are interested in lying and cheating behavior and define deception as the transmission of information that implicitly encourages another party to make incorrect conclusions (Murnighan, 1991). We are interested in whether and to what extent the effect of delegation in a simultaneous cyclic network on proposers' deceptive behavior.

To create a simultaneous cyclic network, we assigned participants to a network that allowed for indirect reciprocity, in which given X proposers, proposer i makes an offer on behalf of propser $i+1$ ($1 \leq i \leq X-1$) and proposer X makes an offer on behalf of proposer 1; responders were assigned to a similar cyclic network. Moreover, everyone in the network has to decide on behalf of the person next to him or her simultaneously. Thus, we tested whether a cyclic network can increase unethical favors even when reciprocity was not enacted (e.g., person A reciprocates after a gift has been given by person B). We focused on the behavior of proposers and examined whether they would lie about the total size of the endowment to make the offer look fairer on behalf of another person.[3]

We conducted three studies. Study 1 employed the smallest network between two individuals (A decides for B and B decides for A, simultaneously). Even though this design implies direct reciprocity instead of indirect reciprocity, it informs us about the role of anticipated reciprocity in increasing deception. Study 2 extended the simultaneous cyclic network beyond two individuals and created large networks with varying sizes (20–30). Finally, Study 3 explored the underlying mechanisms by breaking the loop of a simultaneous cyclic network and including self-report measures that tap into anticipated reciprocity.

2. Related literature and behavioral predictions

Reciprocity in cyclic network. Reciprocity is thought to be a powerful force driving human evolution and cooperation (e.g. Axelrod, 1984; Alexander, 1987; Nowak and Sigmund, 1998, 2005; Dufwenberg et al., 2001; Guth et al., 2001; Buchan et al., 2002; Seinen and Schram, 2006; Engelmann and Fischbacher, 2009). In addition to the tendency that people reciprocate those who have done them favors, scholars also observed that people tend to engage in general, widespread cooperative behavior, with the expectation that they will obtain reciprocity from different sources. This kind of general or indirect reciprocity allows human beings to develop generalized trust and cooperation even without direct contact or a blood relationship. Dufwenberg et al. (2001) used a variant of the investment game to demonstrate indirect reciprocity in the laboratory. They retained the basic structure of the investment game, in which the investor decided whether to invest or not and the reciprocator decided whether to reciprocate or not. Rather than directly reciprocating the investor who sent them money, however, responders decided whether to reciprocate a completely different investor. The results showed that responders were as likely to reciprocate as responders did in a standard investment game! In another study, Greiner and Levati (2005) set up cyclic networks of 3- or 6-person groups where each person decided how to split five experimental currency units with the next person (e.g., A to B, B to C, and C to A). Every unit sent will be tripled. Thus, they examined how indirect reciprocity may play a role in motivating individuals in the network to help others. They found that even without reputation and strategic concerns, indirect reciprocity increased cooperation and mutual help.

We propose to extend the literature of indirect reciprocity in two directions. First, most research on reciprocity has focused on reciprocity without externality. In a standard investment game, for example, reciprocity only concerns the payoff redistribution of the investor and trustee. How would reciprocity work when reciprocation involves negative externality, reducing the welfare of a third party or violating clear social and normative codes? For instance, in the CEO example, the CEO

[3] It is possible that the simultaneous cyclic network design might introduce new strategic considerations given that past research has found that responders are less likely to punish unfair offers made from agents rather than principals (e.g., Coffman, 2011; Fershtman and Gneezy, 2001). To isolate this potential confound, we made it common knowledge to both proposers and responders that (a) responders would have no information about whether the proposal was made by an agent or a principal and (b) proposers would not know whether they make offers to an agent or a principal.

network could reduce the welfare of shareholders and contribute to the widening social inequality. It is certainly possible that the unethical favors at the expense of a third party might just be construed as the cost of gifts in the eyes of the giver and receiver and hence become indistinguishable from other forms of self-interest. However, Gneezy (2005) made a strong case to separate deception from the broader category of self-interested behaviors. Although neoclassic economics analysis expects self-interest of rational actors, and self-interest is a widely embraced norm of social interaction (Miller, 1999), deception has the potential to break clear moral boundaries. Thus, whether indirect reciprocity can indeed promote unambiguous deceptive behaviors is the first question we attempt to examine.

Second, existing studies on indirect reciprocity requires sequential moves. In practice, however, although it is possible to coordinate sequential actions in a cyclic network, with sufficiently large networks it is often not possible to move sequentially, nor was it possible to communicate decision results, making reciprocal decisions effectively simultaneous. Most existing studies on indirect reciprocity examined sequential moves. To our knowledge the only exception is Greiner and Levati (2005). In their study, the authors manipulated whether the decision was sequential or simultaneous. Further, participants engaged in multiple rounds of the game with either the same partner or a random person each round. Because in repeated rounds participants could indirectly reciprocate gifts from previous rounds, only in the first round of the simultaneous condition the indirect reciprocity decision is truly simultaneous.

We examine whether sequential move is indeed necessary to induce people to give unethical favors in a cyclic network. People often do good deeds to help others without knowing whether the recipients of their help will pass the favor on to others. Instead, people have a vague belief that if they help others, others will also help them. For example, belief in a just world is a concept that describes how good people deserve good things and good deeds will be repaid by good outcome (e.g. Lerner and Miller, 1978). Thus, when Trevor McKinney, the protagonist of the movie "Pay It Forward," paid a favor forward, he did not know that his favor would be passed on. Trevor's efforts created an ever-widening circle of reciprocity among people who were completely unknown to each other. In our paper we suggest and empirically test a strong form of indirect reciprocity where people do not condition their decision to cooperate on whether the person before or after them in a cyclic network has cooperated. Instead, we suggest that the cyclic network creates an expectation of reciprocity, the belief that if one helps others, others would also help him or her – "you scratch his back, he scratches mine, and I'll scratch yours."

Behavioral predictions. Rather than relying on the prominent behavioral theories such as outcome-based or intention-based social preference theories, we adopt the behavioral model formulated by Malmendier and Schmidt (2012) as our theoretical basis for our main behavioral prediction. Outcome-based theories such as altruism or inequity-aversion models (e.g., Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999) are inadequate to predict an effect here because favoring the proposer in the ultimatum game would harm the responder by the same amount. Theories of intention-based reciprocity models (e.g. Charness and Rabin, 2002; Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006) that assume that actions will influence social preference by signaling the intention or the motivation of the actor are not applicable in our context either as all players in the agency network act simultaneously in a one-shot game. In contrast, Malmendier and Schmidt (2012) argued that in a gift-giving environment, where a gift is unconditional and has no informational or incentive effect, a gift triggers an obligation to repay the gift (reciprocate), and importantly independent of the intention of the gift-giver and the distributional consequences. Furthermore, they argue such a gift-giving act creates a bond between the giver and recipient, extending the existing social-preferences models by endogenizing the reference group. In other words, the recipient, by receiving a gift from the giver, attaches a bigger weight on the welfare of the gift-giver, than to a third party. By the same token, we predict that a simultaneous cyclic network is akin to the gift-giving context as it creates a special bond among the people in the network and they attach a bigger weight on each other's welfare at the cost of the responder, who is an outsider of the cyclic network. Thus, our key behavioral prediction is that individuals are more likely to cross moral boundaries and engage in deception for another person in a simultaneous cyclic network than they would condone themselves and the effect is driven by the anticipation that their lies will be reciprocated.

3. Three experiments

3.1. Study 1

One important assumption we make regarding a cyclic network is that the structure increases deception without initiation of gift giving. In other words, a cyclic network can increase deception even though all decisions are made simultaneously. To first test this prediction, we used a simplified situation where Person A decides for Person B and at the same time Person B decides for Person A (i.e., $X = 2$).

One hundred and ninety-two undergraduate students majoring in commerce (89 were male, their average age was 20.86 years) from two universities located in a large urban city in Canada participated in the experiment. Each subject received 5 Canadian dollars as show-up fee. Upon arrival, they were randomly assigned to play the role of either a proposer or a responder of a one-shot modified ultimatum game and were led to one of two adjacent rooms (one for proposers and the other for responders). In the control, principal condition, both proposers and responders played the game on their own behalf. In the reciprocity condition, both proposers and responders were designated as agents for a principal. More importantly, participants were told that they would act as an agent on behalf of another person in the same room and at the same time that person would act as an agent on their behalf. Thus, for a reciprocal duo A's payoff depended on B's decision and at the same time B's payoff depended on A's decision. We emphasized that at no time during or after the experiment would

Table 1
Study 1 data summary means and standard deviations in parentheses of key measures.

	(1) Principals (n = 34)	(2) Direct reciprocity agents (n = 62)	(3) Commission agents (n = 56)	Mann–Whitney test across (1) and (2): Z-stat. (p-value)
Actual total = $13				
Proposers' reported total	11.88 (1.41)	11.65 (1.96)	10.96 (1.62)	1.24 (0.21)
Offer	5.53 (1.10)	5.24 (1.24)	5.29 (1.01)	0.34 (0.73)
Responder's acceptance rates	0.76 (0.44)	0.81 (0.40)	0.86 (0.35)	0.61 (0.54)
Actual total = $25				
Proposers' reported total	22.29 (3.55)	19.12 (5.34)	17.92 (5.66)	2.62 (0.008)
Offer	9.38 (2.51)	8.71 (2.87)	8.73 (2.69)	0.81 (0.41)
Responder's acceptance rates	0.94 (0.24)	0.84 (0.37)	0.89 (0.31)	0.86 (0.39)
Actual total = $27				
Proposers' reported total	23.53 (4.60)	18.00 (4.98)	20.07 (4.50)	3.43 (0.001)
Offer	10.79 (2.86)	9.21 (2.69)	10.54 (3.71)	1.39 (0.16)
Responder's acceptance rates	0.88 (0.33)	0.87 (0.34)	0.93 (0.26)	0.18 (0.85)
Actual total = $37				
Proposers' reported total	31.82 (7.02)	27.87 (9.16)	26.96 (9.89)	1.93 (0.05)
Offer	13.06 (4.68)	13.32 (4.18)	12.03 (3.09)	0.57 (0.56)
Responder's acceptance rates	0.88 (0.33)	0.94 (0.25)	0.96 (0.19)	0.97 (0.33)

Note: All monetary entries in the table are in Canadian dollars.

they find out who made what decision for whom. Finally, no responders knew whether their counterpart was an agent or a principal.

Participants made four simultaneous decisions, each of which with a different counterpart. The outcome of each of their four decisions was not revealed to them until the experiment ended. In the principal condition, their final payoffs were determined by one of their four transactions, randomly chosen. In the reciprocity condition, each person's payoff was determined by randomly choosing one of the four payoffs that their agent had made for them in the four transactions. Thus, the expected payoffs in each of the two conditions were identical. In addition, to make sure that our results were not unique to a particular sum of total money, we varied the endowment in the four transactions to be $13, $25, $27, or $37.

All participants received the same general instructions. The instructions were read aloud to the participants and they were then given time to ask clarification questions.[4] Throughout the experiment, participants were only identified by unique identification codes, making both their identity and decision anonymous. To stress the real, salient monetary consequences of their decisions, participants were assured that they would get paid in cash at the end of the game based on the game's outcome. Following the instructions, the experimenter gave the proposers a decision form, which asked them to communicate two pieces of information to their counterpart responders: the value of the endowment and the value of their ultimatum offer. We were interested in the proposers' deceptive behavior. After filling out the decision form, the proposers were asked to fold it up. The experimenter collected all the folded-up forms and delivered to the responders, who then decided whether to accept or reject the offer. This concluded their transaction. Throughout the experiment, an experimenter was permanently stationed in each room to give instructions and answer questions, and two additional assistants collected and delivered the decision record forms. At the end of the experiment, participants were asked to complete a short post-experiment questionnaire asking them for information on their gender, age and ethnic background. Then participants were paid individually in a third room.

Table 1 provides a summary of the means and standard deviations of the key variables in the study and Fig. 1 contains histograms of claims according to the pie sizes across treatments. The first two columns of Table 1 present the data from the principal and reciprocity conditions. The four panels present the data for each of the four different endowments. Proposer's reported totals are the amounts of the endowment values that the proposers indicated; their offers are the amounts of their ultimatum offers; and responders' acceptance rates are the percentage of the offers that responders accepted. Non-parametric Whitney tests across the principal and direct reciprocal agent conditions are reported in the last column. A number of observations are worth noting from Table 1. First, proposers offered more as their endowments increased, but the magnitude of their deceptions also increased. This pattern is consistent with results reported in a variety of previous studies using the ultimatum game (e.g., Boles et al., 2000). Second, consistent with our prediction, a significant portion of participants lied in the reciprocal condition. Thus, people seemed to be willing to do unethical favors even though the favors did not directly benefit themselves. Third, participants in the reciprocity condition made smaller endowment claims and hence lied more compared to those in the principal condition. Indeed, non-parametric Mann–Whitney tests show that within each of the four transactions there were significant differences between the reciprocity treatment and the principal treatment.

[4] The instructions for all treatments in this paper are available upon request.

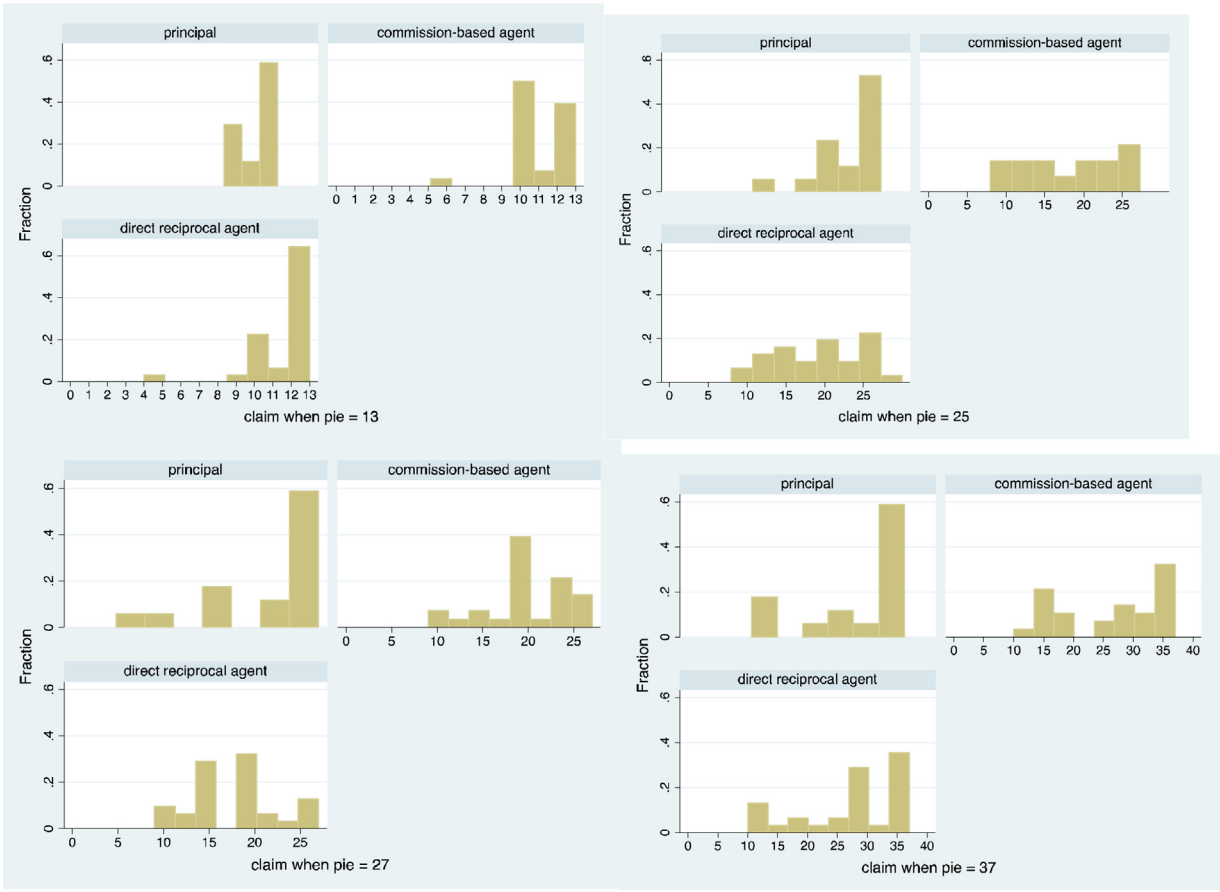

Fig. 1. Study 1: histograms of claims according to the pie sizes across treatments.

There are several ways to operationalize deception: (1) absolute difference between the reported and the true amount of the endowment; (2) proportional difference, that is the absolute difference divided by the actual value of the endowment; and (3) binary classification of an act as deceptive or not.[5] Because all three of these measures can each provide distinctive insights, we analyzed all of them, and refer to them as absolute deception measure, proportional deception measure and binary deception measure.

To test our hypotheses rigorously and parametrically, we must account for the panel nature of the data as each participant made four sets of decisions. Thus, we clustered each participant's error terms to control for the lack of data independence. We also employed a random effects general linear model for the absolute and proportional deception measures and a random effects binary logistic model for the binary deception measure, clustered at the individual level. To test whether reciprocal agents lied more than principals did, we dummy coded reciprocal agents as 0 and principals as 1, which served as the main independent variable. The value of the endowment was entered in the regression as a control variable.[6] Table 2 Panel A reports the regression results. First, the value of the endowment was a significant predictor. As endowment increased, so did deception, for all three measures. Second, and most importantly, the principal vs. reciprocal agent dummy variable was significant for all three deception measures, indicating that agents lied more than principals using all three measures of deception ($p = 0.003$, 0.003 and 0.058 respectively).

It is important to note that participants in the reciprocity agent condition made decisions simultaneously, which means that they could not have based their decision on whether the other person had lied for them. Thus the anticipation of reciprocity itself seemed to have been sufficient to induce deceptive behaviors among reciprocal agents. This speaks volume

[5] In all three studies, we checked for over-reports of endowment, i.e. proposers reporting an amount that was higher than their endowment. There was one such case in each of the three studies. Statistically, there are three ways to deal with these cases: (1) leave them in and treat them as it is; (2) remove them from the analyses as an outlier; or (3) censor each case, i.e., converting each of them to 0 rather than including a negative number in the absolute discrepancy measure and using 100% rather than more than 100% for the proportion measure. All three methods produced statistically equivalent results. The statistics that we have included here used method 3.

[6] We initially also had an interaction term between the role dummy variable and the control variable of endowment size in the regression. However, the interaction term was never significant and was thus dropped from the analysis.

Table 2
Study 1 determinants of proposer's unethical behavior: coefficients with *p*-values in parentheses.

	Absolute underreport	Proportional underreport	Binary underreport
Panel A: regression results			
Role dummy (reciprocity agent = 0; principal = 1)	−3.26 (0.003)	0.11 (0.003)	−0.87 (0.058)
Actual endowment	0.28 (0.000)	−0.005 (0.001)	0.04 (0.021)
Interaction	Dropped	Dropped	Dropped
Constant	−0.73 (0.423)	0.90 (0.000)	0.04 (0.513)
Panel B: comparison of the two agent conditions			
Role dummy (reciprocity agent = 0; commission agent = 1)	−0.14 (0.883)	0.01 (0.743)	−0.67 (0.108)
Actual endowment	0.34 (0.000)	−0.006 (0.000)	0.03 (0.064)
Interaction	Dropped	Dropped	Dropped
Constant	−2.05 (0.042)	0.90 (0.000)	0.69 (0.178)

to findings in the board director interlock literature where CEOs sit on each other's board tend to inflate each other's compensation (Bowen, 1994; Hallock, 1999). Our findings suggest that anticipated reciprocity could make this happen, even without the CEOs conspiring.

Given that proposers' deceptive behavior were found to be influenced by whether the proposer is a principal or an agent, we also looked at whether a responder may be more or less likely to accept a proposal when playing the role of an agent or deciding for the self. Unlike the standard ultimatum game, where accepting or rejecting an offer hinges on the proportion of the resource pool being offered to the responder, in the modified ultimatum game it is impossible for the responders to evaluate the relative value of an offer. Thus equity-based preference models (e.g., Fehr and Schmidt, 1999) are inadequate to predict a responder's behavior as he/she is not able to detect inequality that results from a particular offer. Intention-based models are not informative here either as due to information asymmetry a responder could not discern the motive of an offer. Indeed, earlier literature using this modified ultimatum game showed that, in the absence of the knowledge of the actual size of the resource pool, there is a significant relationship between the absolute size of an offer and the likelihood of accepting such an offer by the responders (Straub and Murnighan, 1995; Roth, 1995). Thus, we regressed the binary measure of proposal acceptance as the dependent variable (acceptance is coded 1 and 0 for rejection) on the following four independent variables: the role the responder takes, the absolute amount offered, the proportion of reported total that was offered, and the reported total amount to be split.[7] The logistic regression results show that while there is a significant and positive relationship between the absolute amount offered and the probability of such an offer being accepted ($p = 0.062$), whether the responder was an agent or a principal has no significant effect and neither do the other two variables.

So far we have compared the reciprocal condition with the principal condition where participants made decisions on their own behalf. We found that participants in the reciprocity condition were more likely to lie for each other even though they made decisions simultaneously and there was no contract between the actor and the beneficiary. We argue that the increased lying is at least partially due to the anticipated reciprocity by the agents that if they help others, others would also help them. However, given that most agent situations are defined by incomplete contracts (e.g., commission), we sought to compare the level of deception in the reciprocity condition to that in a commission condition where an agent's incentive is tied to her principal's incentive. We expect that participants would lie more in the commission condition than in the principal condition but we did not have an *ex ante* prediction between reciprocal condition and commission condition.

We recruited another one hundred and twelve participants for this commission condition. Both proposers and responders were designated as agents for a principal in a given transaction and their earnings were commission-based, i.e. their earnings were linearly related to those of their principals. Specifically an agent' payoffs were the sum of 25% of each of the payoffs that they made for their principals in their four transactions. Thus, the commission condition had the same expected value as the principal and the reciprocity conditions. For each session, one participant in the proposer room and one participant in the responder room, chosen at random, played the role of the principals.[8] The principal's identity was not revealed to the agents.

Results of this condition were summarized in the last column of Table 1. As predicted, a significant percentage of commissioned agents lie. Furthermore, commissioned agents lied significantly more than principals. Finally, we found no statistically significant differences between the commission condition and the reciprocal condition on the three deception measures ($p = 0.883$, 0.743, 0.108 for the deception measures, respectively). Table 2 Panel B summarizes the regression results. The lack of difference between the reciprocal condition and the commission condition is worth noting. In the commission condition, there was a direct link between incentive and action. Since agents were paid by a percentage of what they earned for the principal, their lies could directly benefit themselves. This was not the case in the reciprocity condition where two people independently determine each other's pay and there was no contract specifying benefits of lying. Nonetheless, reciprocity agents were just as deceptive as commission-based agents. Thus, the expectation of reciprocity seemed to be very strong.

[7] Since responders did not know whether they were dealing with an agent or principal, proposers' condition should not affect responders' behavior.
[8] At the end of each session, the experimenter randomly chose (1) a commission agent and (2) one of the four transactions that agent did.to determine the principal's payment.

Table 3
Study 2 data summary means and standard deviations in parentheses of key measures.

	(1) Principals (n = 34)	(2) Direct reciprocity agents (n = 62)	(3) Commission agents (n = 56)	Mann–Whitney test across (1) and (2): Z-stat. (p-value)
Actual total = $13				
Proposers' reported total	11.60 (1.66)	11.33 (1.53)	11.20 (2.02)	0.07 (0.94)
Offer	5.35 (1.57)	5.05 (1.27)	5.58 (1.04)	0.53 (0.59)
Responder's acceptance rates	0.66 (0.46)	0.86 (0.40)	0.78 (0.45)	0.52 (0.60)
Actual total = $25				
Proposers' reported total	19.92 (5.84)	15.94 (5.50)	17.53 (5.38)	3.13 (0.002)
Offer	9.71 (3.22)	7.89 (2.88)	8.45 (2.57)	0.93 (0.34)
Responder's acceptance rates	0.77 (0.45)	0.89 (0.37)	0.83 (0.38)	1.09 (0.27)
Actual total = $27				
Proposers' reported total	22.10 (6.01)	17.49 (5.51)	19.27 (5.42)	3.92 (0.001)
Offer	10.90 (3.28)	7.89 (2.88)	10.06 (3.47)	1.55 (0.12)
Responder's acceptance rates	0.78 (0.43)	0.92 (0.26)	0.97 (0.18)	0.04 (0.96)
Actual total = $37				
Proposers' reported total	28.90 (9.64)	24.31 (10.68)	25.30 (8.28)	2.39 (0.02)
Offer	14.08 (6.41)	11.45 (4.62)	12.64 (3.61)	0.68 (0.49)
Responder's acceptance rates	0.75 (0.65)	0.92 (0.28)	0.90 (0.31)	0.71 (0.47)

Table 4
Study 2 determinants of proposer's unethical behavior: regression coefficients with p-values in parentheses.

	Absolute underreport	Proportional underreport	Binary underreport
Role dummy (reciprocity agent = 0; principal = 1)	−3.36 (0.000)	0.12 (0.000)	−0.91 (0.006)
Actual endowment	0.37 (0.000)	−0.006 (0.003)	0.027 (0.007)
Interaction	Dropped	Dropped	Dropped
Constant	−1.17 (0.149)	0.88 (0.000)	0.47 (0.152)

3.2. Study 2

Study 2 investigated whether general, indirect reciprocity could lead to more deceptive behavior than a principal would do for him/herself. We created a cyclic network with everyone making decisions for someone else. As in Study 1, Study 2 included the four-level endowment value within-subjects factor and a between-subject factor (principal vs. indirect reciprocity vs. commission). [9] Two hundred and sixty-six undergraduate commerce majors (140 were male, their average age was 20.5 years) at a large urban Canadian university participated and received 5 Canadian dollars as show-up fee. The procedure closely followed Study 1. In the indirect reciprocal agent condition, however, rather than having two participants make decisions for each other, everyone made decisions for another person while they were simultaneously represented by a different person. Thus, for a session size with X people, person i represented person $i+1$ (where $1 \leq i \leq X-1$) and person X represented person 1. Session sizes ranged from 22 to 28. We conducted the study in two classrooms as in Study 1. Again, all decisions were made simultaneously.

Similar to Study 1, we predict that (1) a significant portion (greater than zero) of participants in the indirect reciprocal condition would lie; and (2) participants in the indirect reciprocity condition would lie more than those in the principal condition. Table 3 and Fig. 2 summarize the means and standard deviations of the key measures and histograms of claims according to the pie sizes across treatments, following the same layout as in Table 1 and Fig. 1. It is fairly obvious to see that the first two treatments, the principal and the commission conditions, showed robust replication of Study 1 as the results were qualitatively the same as in Study 1. Endowment's value continued to predict for all three measures of deception (i.e., more deception occurs when the pie becomes larger). Non-parametric Mann–Whitney tests' results were qualitatively the same as those in Study 1, namely that the two agent treatments were not significantly different from each other in terms of under-reporting of the endowment sum while both agent treatments were significantly different from the principal treatment.

The critical test for Study 2 focused on deception by indirect reciprocity agents versus principals. The regression results reported in Table 4 show analogous results to those in Study 1 as indirect reciprocity agents lied significantly more than principals.[10] Moreover, there was no statistically significant difference in the level of deception between the two agent

[9] For the principal and indirect reciprocity conditions, we manipulated responders' roles within. Specifically, in each of these two treatments in which we manipulated a proposer's role, half of the responders acted as principals on their own behalf while the other half were indirect reciprocal agents. Statistical tests show that the manipulation of responders' roles had no effect on either proposers' or responders' decisions. Thus, we pooled the data in all of our analyses.

[10] As a robustness check, we pooled the data of the two treatments that are common between studies 1 and 2 (the principal and commission-based agent treatments) when examining the treatment effects of direct and indirect reciprocity. The results are qualitatively the same.

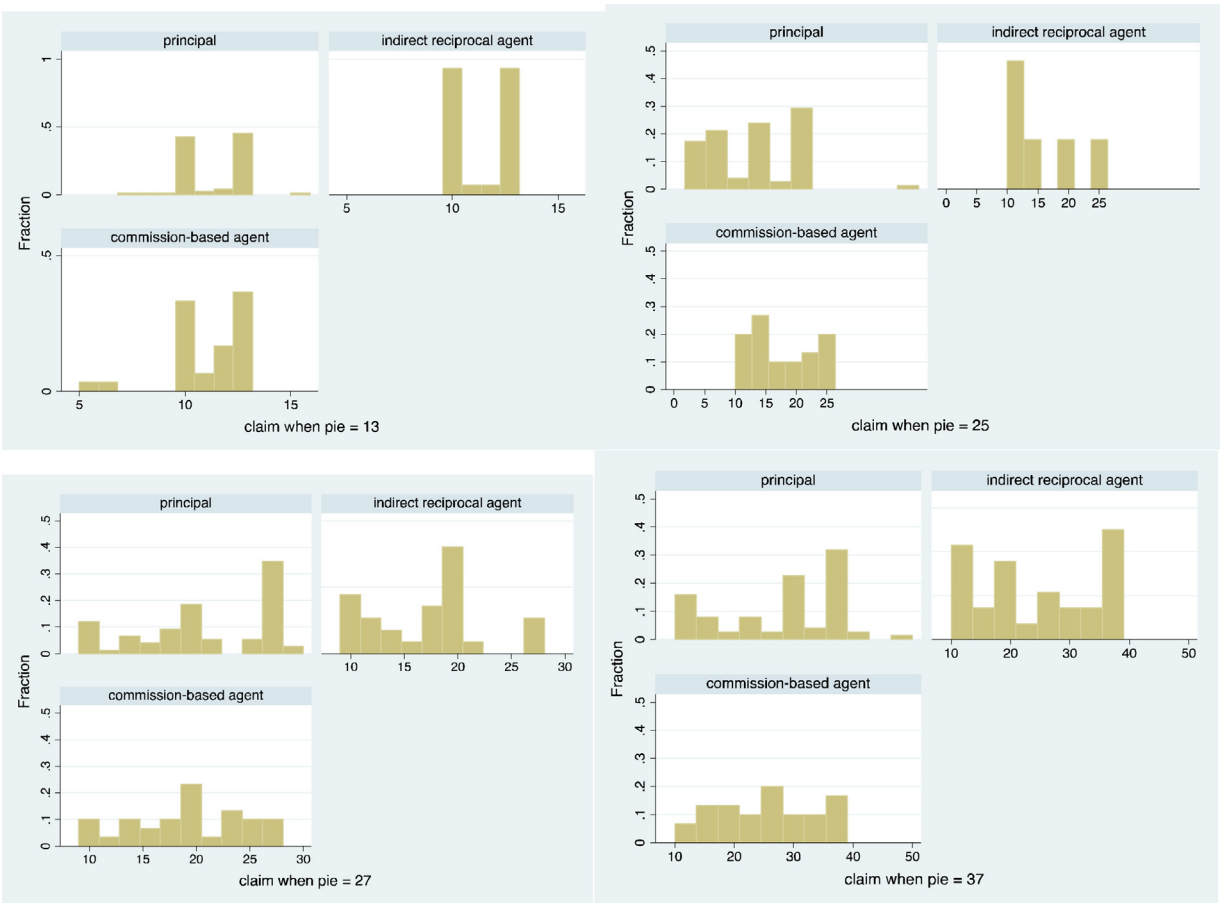

Fig. 2. Study 2: histograms of claims according to the pie sizes across treatments.

conditions. These findings are particularly striking for several reasons. First, as there is no direct reciprocity and hence no direct benefit from breaking moral boundaries for the other person, neither classical economic analyses nor the anticipation of direct reciprocity could explain why agents in indirect reciprocal relationships lied more than their principals did – or why they were just as likely to lie as they were when lying directly benefited them in the agent commission condition! These results are however consistent with a cyclic network perspective that incorporates the power of indirect reciprocity. Thus, even when individuals cannot extend or benefit from direct reciprocity, their interests can be connected and interdependent at the network level and this can lead to increased level of deception. Second, there has not been much work on the effect of group size on indirect, generalized reciprocity. The only paper we know of is by Greiner and Levati (2005) where they showed that smaller groups are more cooperative and reciprocating than larger ones. In this study we observed these effects in groups of 20–30 participants.[11]

These findings cannot be accounted by existing theories of indirect reciprocity that assumes sequential moves. We believe that the key motive is the anticipation of reciprocity. However, there are other possibilities. First, agents might simply be more likely to engage in unethical behaviors because they experience less moral responsibility for their actions. According to Bandura's moral disengagement theory (Bandura, 1999), individuals are more likely to engage in unethical conduct if they could psychologically distance themselves from the behavior and its consequences. Being in the role of an agent and making decisions for the principal allows agents to distance themselves from their actions. For example, agents could justify their behaviors by noting that their actions benefit their principals, not just themselves. This could explain why both the reciprocity and commission agents lied more than principals. Indeed, people are more likely to cheat when other people benefit from it (Gino et al., 2012) because the existence of other beneficiaries of one's actions discounts moral responsibilities associated with unethical behavior (see also Diekmann et al., 1997; Charness, 2000; Conrads et al., 2013; Erat, 2013; Erat and Gneezy, 2012; Gino and Pierce, 2010; Wiltermuth, 2011). Recent work in behavioral economics has shown that one

[11] We think part of the reason why our findings differ from Greiner and Levati (2005) may be because in our studies we dealt with deception. When participants were embedded in a large group they might have felt that their decisions were more anonymous than in smaller groups. To test this we need to examine positive behaviors in addition to deception.

Table 5
Study 3 summary statistics: means and standard deviations in parentheses of reported sum and offer to responders.

	Control – complete loop treatment			
	Role A ($n = 12$)	Role B ($n = 12$)	Role C ($n = 12$)	Pooled ($n = 36$)
Reported endowment	19.67 (5.61)	20.75 (4.98)	20.00 (5.31)	20.14 (4.73)
Offer	9.41 (2.68)	9.75 (2.42)	9.55 (2.53)	9.57 (2.68)
Acceptance	0.91 (0.083)	0.83 (0.112)	0.84 (0.078)	0.86 (0.058)
	Experimental – incomplete loop treatment			
	Role A ($n = 24$)	Role B ($n = 24$)	Role C ($n = 24$)	Pooled ($n = 48$)
Reported endowment	24.38 (5.51)	23.96 (4.71)	Passive no data	24.17 (5.51)
Offer	11.73 (3.12)	10.46 (3.67)		11.09 (3.43)
Acceptance	0.88 (0.069)	0.72 (0.094)		0.79 (0.059)

motive of the delegation mechanism is to shift and evade responsibility of an act that may cause negative externality. For example, Bartling and Fischbacher (2012) provided strong evidence that subjects delegated allocation decisions to a third party to shirk the responsibility of an unfair allocation decision and avoid punishment. In another paper, Hamman et al. (2010) investigated whether agents acted more selfishly than their principals in a dictator game where an individual could single-handedly decide how much of a set amount of money to offer to another person. They found that compared to offers made by individuals themselves, offers made by agents were much more aggressive. In many cases, agents offered almost nothing. This leaves open the question whether reduced moral responsibility is sufficient, on its own, to explain our findings.

Second, Study 2 findings may also have resulted from another alternative explanation. Specifically, people in the network played both roles of agent and principal at the same time, creating a dual-role that allowed agents who were also principals to empathize more how principals would want their agents to act (to maximize principals' interest). This may have motivated agents to lie. We test these alternative explanations in Study 3.

3.3. Study 3

Study 3 employed a between-subject design that manipulated the cyclic network to be a complete vs. incomplete loop. Two hundred and sixteen undergraduate commerce majors (91 were male, average age was 20.6 years) at a large urban Canadian university participated and were paid 5 Canadian dollars as a show-up fee. The decision task remained the same as in Study 1 and 2 except that each participant made one rather than four decisions (the endowment was $25). Again, this amount was only known to the proposer whereas the responder only knew that the amount was in the range of $10 and $40. Participants in the complete-loop (CL) condition were randomly assigned into groups of three and given the role of A, B or C. Everyone in a group acted as an agent, making decisions on behalf of a principal, who was another person in the group. Specifically, A acted on behalf of B, whose outcome depended solely on A's decision; at the same time, B acted on behalf of C and C acted on behalf of A. Of the 72 participants in the CL condition, 36 were proposers (12 As, 12 Bs, and 12 Cs) and 36 responders. In the incomplete-loop (IL) condition, participants were also randomly assigned into groups of three and given the roles of A, B or C. Also, A acted on behalf of B and B acted on behalf of C. A's outcome, however, was a fixed payment of $16 – agents' realized average earnings in Studies 1 and 2. Additionally C was a passive recipient who did not make any decision. Thus, the loop of reciprocity was broken and the instructions made sure that everyone was aware of this. Of the 144 participants in the incomplete loop condition, 72 were proposers (24 As, 24 Bs, and 24 Cs) and 72 were responders.[12]

After participants finished the decision task, they completed a post-experimental questionnaire that, besides demographic information such as age, gender and ethnicity background, also included a few measures that tap into anticipated reciprocity and moral responsibility, both of which were hypothesized to be potential mediators. To capture anticipated reciprocity, we included two items: "If all proposers' agents lie for each other, everyone will be better off" and "To what extent do you think the likelihood that your agent will lie for you will be increased if you lie for your principle." The first item closely resembles the theme "if you scratch his back, he scratches mine, and I'll scratch yours." The second item is clearly irrational. Nevertheless, the idea that people believe their action could influence how others treat them is consistent with the general belief of a just world that somehow people who help others will be helped by others (Lerner and Miller, 1978). The moral responsibility measure included three items, "My duty as an agent is to maximize the interest of my principals", "Lying about the total amount of resources is a strategic move to maximize the interest of principals", and "An agent should do whatever it takes to serve the interest of principals". We used nine-point Likert scales for these five items with responses ranging from 1 ("strongly disagree" or "not at all") to 9 ("strongly agree" or "very much so").

Table 5 summarizes the means and standard deviations of the key measures, proposers' claimed endowment value, their offers, and responders' acceptance rate across the two conditions as well as under roles of A, B and C. Histograms of claims

[12] We had more participants in the IL condition than in the CL condition because the three CL roles were equivalent so we could combine them to increase statistical power.

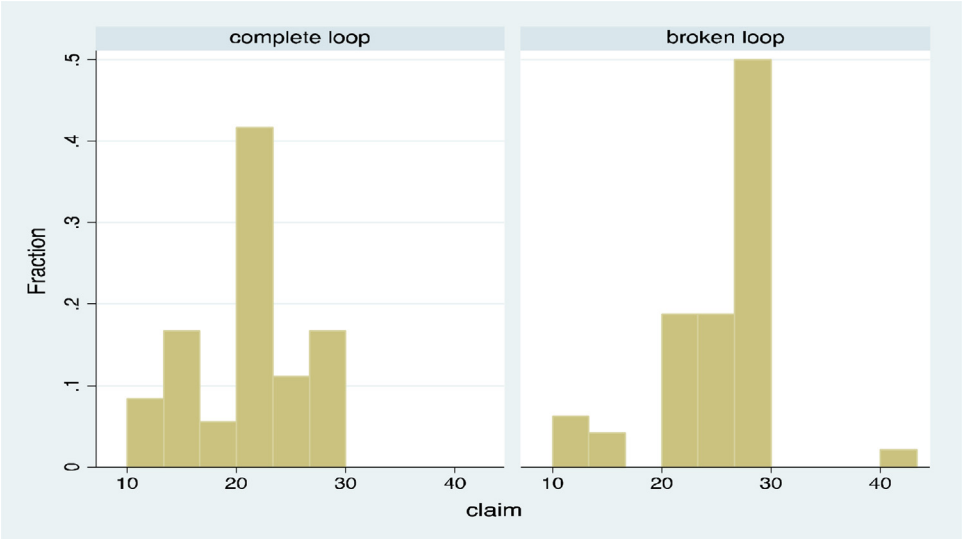

Fig. 3. Study 3: histograms of claims across treatments.

across treatments are reported in Fig. 3. Rather than constructing various measures of deceptive behavior as carried out in Study 1 and 2, we simply used the proposers' claimed endowment value as our dependent variable measure of deceptive behavior since the actual amount of money to be split in the game was constant ($25). We expected that participants would lie less in the IL condition because the loop of reciprocity was broken. This was indeed what we found: the average claimed amount were $20.14 (SD = 4.73) versus $24.17 (SD = 5.51), $F(1,82) = 13.72$, $p = 0.004$, in the IL and CL conditions, respectively. Also, in the complete-loop condition, in which all three roles were structurally equivalent, we found no significant difference in the claimed value of the endowment, $F(2, 33) = 0.16$, $p = 0.855$. In the incomplete-loop condition, however, the roles varied significantly. Thus we conducted separate analyses for As' and Bs' behaviors (C was passive) and compared them to As' and Bs' behaviors in the complete loop condition. These specific analyses also allow us to test alternative explanations for our previous studies' results.

We first focused on A's behavior. As discussed earlier, we were interested in disentangling the effects of indirect reciprocity and reduced responsibility. Specifically, if the increased deception in the indirect reciprocal network observed in Study 2 was solely due to reduced responsibility, A in both conditions should engage in similar amounts of deception because both A acted as agents making decisions for another person. However, only A in the CL condition could expect indirect reciprocity as their outcomes were determined by C. Thus, if indirect reciprocity played any role in determining deceptive behavior, we would expect A in the IL condition to lie less than A in the CL condition. A one-way ANOVA led to a significant effect: A in the CL condition claimed that their endowment was significantly smaller ($M = \$19.67$, SD = 5.61) than A in the IL condition ($M = \$24.38$, SD = 5.51), $F(1, 34) = 5.76$, $p = 0.02$. Since all three roles in the CL condition were structurally equivalent, we also contrasted A in the IL condition ($n = 24$) with the pooled data of the three roles in the CL condition ($n = 36$) ($M = \$20.14$, SD = 4.73) as a robustness test. The result was qualitatively the same, $F(1, 58) = 10.11$, $p = 0.002$.

We conducted similar analyses of B's behaviors to test whether the dual-role structure (being an agent and a principal at the same time) might have also influenced Study 2 agents. If the effects were due solely to the dual-role structure, B in both conditions should have been equally deceptive as they were agent and principal simultaneously. However, if their anticipation of indirect reciprocity in the CL condition was important, we should observe a difference in the two different conditions. This is what we found: a one-way ANOVA led to a significant effect: B claimed that they had a smaller endowment in the CL condition ($M = \$20.75$, SD = 4.98) than they did in the IL condition ($M = \$23.96$, SD = 4.71), $F(1, 34) = 4.09$, $p = 0.05$. This result again held when we compared B's behaviors in the IL condition with all three roles combined in the CL condition ($M = \$20.14$, SD = 4.73), $F(1, 58) = 9.42$, $p = 0.033$.

Note that A in IL condition has a different incentive structure (fixed $16 payment) than A in CL condition (determined by C). Thus, it is possible that A's behavior in the IL and CL condition by itself does not provide sufficient support for the role of indirect reciprocity. Nevertheless, B's behavior could also shed light on this issue. B in both CL and IL conditions has the same incentives, reduced responsibility through delegation, and dual-role experience. The only difference is that CL has the complete reciprocity loop, whereas in IL the reciprocity loop is broken. Thus, combining the results on A and B strongly suggests that anticipated indirect reciprocity played a role in increasing deception in simultaneous cyclic networks.

Finally, we tested whether the measures of moral responsibility and anticipated reciprocity mediated the relationship between network structure and deception. Again, we pooled the three roles of A, B, and C in the CL conditions since they were structurally and empirically equivalent. Because A and B in the IL condition were quite different structurally,

Table 6
Study 3 mediation tests: regression coefficients with *p*-values in parentheses.

	Dependent variables				
	Report	Report	Anticipated reciprocity	Reduced responsibility	Report
Panel A: role A					
Treatment dummy (CL = 0, IL = 1)	4.24 (0.002)		−1.72 (0.000)	−0.37 (0.248)	1.75 (0.193)
Anticipated reciprocity		−1.51 (0.000)			−1.27 (0.003)
Reduced responsibility		−0.77 (0.155)			
Constant	20.14 (0.000)	36.55 (0.000)	7.13 (0.000)	6.58 (0.000)	34.55 (0.000)
Panel B: role B					
Treatment dummy (CL = 0, IL = 1)	3.82 (0.003)		−1.56 (0.001)	−0.66 (0.031)	2.08 (0.113)
Anticipated reciprocity		−1.07 (0.005)			−0.86 (0.028)
Reduced responsibility		−0.68 (0.240)			
Constant	20.14 (0.000)	32.94 (0.000)	7.13 (0.000)	6.58 (0.000)	30.22 (0.000)

however, we conducted the mediation analyses separately on the two roles.[13] Table 6 reports the results. Following Baron and Kenny (1986), we first note that network structure had an impact on the level of deception as the complete loop network produced more lying than in the incomplete loop network ($\beta = 4.24$, $p = 0.002$ and $\beta = 3.82$, $p = 0.003$ for A and B, respectively). Next, we examined whether the network structure affected the two proposed mediators, anticipation of indirect reciprocity and reduced responsibility. The results showed that network structure predicted anticipated indirect reciprocity ($\beta = -1.72$, $p = 0.000$ and $\beta = -1.56$, $p = 0.001$ for role A and B, respectively) but not reduced responsibility ($\beta = -0.37$, $p = 0.248$ and $\beta = -0.66$, $p = 0.031$ for A and B, respectively). Thus, participants in the complete-loop condition were more likely to think that, if everyone lied for everyone else, everyone will be better off (mean = 7.13, SD = 1.30) than A ($M = 5.42$, SD = 1.92) and B ($M = 5.57$, SD =2.12) in the incomplete-loop condition but their sense of reduced responsibility was statistically equivalent across the two conditions (mean = 6.58, SD = 1.22 in the CL condition, $M = 6.21$, SD = 1.16 and $M = 5.92$, SD = 1.01, for A and B in the IL condition, respectively). Similarly, we found a significant relationship between anticipation of reciprocity and deceptive behavior ($\beta = -1.51$, $p = 0.000$ and $\beta = -1.07$, $p = 0.005$ for role A and B, respectively) but not for reduced responsibility ($\beta = -0.77$, $p = 0.155$ and $\beta = -0.68$, $p = 0.240$ for role A and B, respectively). Given that the sense of reduced responsibility was not influenced by our experimental manipulation, we dropped it as a potential mediator. Adding anticipation of indirect reciprocity as an independent variable, network structure became no longer significant (β change from 4.24 to 1.75, p changed from 0.002 to 0.193 and β change from 3.82 to 2.08, p changed from 0.003 to 0.113, for A and B respectively), while the effect of anticipated indirect reciprocity remained significant ($\beta = -1.27$, $p = 0.003$ and $\beta = -0.86$, $p = 0.028$ for role A and B respectively). Using the Sobel test (1982) with network structure as the independent variable, deception as the dependent variable, and both indirect reciprocity and reduced responsibility as the mediators, we found that the indirect effect was significant for anticipation of reciprocity ($z = -2.98$, $p = 0.003$ and $z = -2.75$, $p = 0.006$, for role A and B respectively) but not for reduced responsibility ($z = 0.97$, $p = 0.333$ and $z = 1.38$, $p = 0.168$ for role A and B respectively). These results clearly suggest that the anticipation of indirect reciprocity could increase deception.

4. General discussion

We explored whether individuals in a simultaneous cyclic network tend to do each other unethical favors. Study 1 tested whether individuals in the smallest cyclic network (i.e., A decides for B and B decides for A) are more likely to lie for each other than they would when they make decisions for themselves. Participants either acted for themselves as principals or were assigned to a pair where they made decisions for each other. We observed that agents lied more than principals did for themselves, even though lying did not benefit agents directly and agents had to decide simultaneously. Study 2 tested the effects of a larger cyclic network on deception. Participants again made decisions for themselves as principals or were assigned to a larger cyclic network where each person was represented by the person before them and at the same time represented the one down the chain. We found that the cyclic network increased deception compared to principals who made decisions for themselves, even when everyone in the network made decisions on behalf of others simultaneously. Study 3 explored the underlying mechanisms and further demonstrated that these effects cannot be simply accounted for by a sense of reduced moral responsibility. Instead, they seem to be driven by the expectations that, in a simultaneous cyclic network, if everyone "helps" everyone else, everyone will be better off. Thus, not only could reciprocity induce unethical behaviors but also the mere anticipation of reciprocity could lock in a circle of deception.[14]

[13] To carry out the mediation analysis, it is necessary to hold the assumption that the questionnaire data and the earlier behavioral data are independent from each other. Of course, it is conceivable that this assumption was not in fact the case.

[14] Across all three studies, even thought agents made lower claims about the value of the endowment than principals did, offers were actually not significantly different. It is somewhat puzzling why agents did not make lower offers after lying about the total pool. That said, lying about the total sum does benefit the principal even if the offer stays the same because it makes the offer look "fairer" and thus may increase the chance of the offer being accepted.

Our paper extends the literature in several directions. First, reciprocity is considered key to the evolution of human cooperation. Without reciprocity defectors would gradually drive out cooperators, making the norm of reciprocity critical for social functioning. People are able to trust and cooperate with one another, for instance, without writing everything into formal contracts. Notwithstanding the importance of reciprocity in the evolution of cooperation and general social functioning, however, our findings suggest that individuals embedded in dyads or a cyclic network of mutual delegation relationships have incentives to behave unethically in the absence of formal contracts or direct rewards. Thus we show that reciprocity may also lead to "unethical favors" interdependent individuals. There are many real world examples of this, e.g., two politicians who need each other's votes may be more likely to vote on issues that are otherwise against their values so that their "favors" may be returned. Similarly, CEOs who sit on each other's boards of director tend to set higher salaries for each other because they expect that their act will be reciprocated (Hallock, 1999).

What is much less obvious, but probably more damaging, is the tendency to lie in indirect reciprocal interactions that do not depend on apparent, direct interdependence. In our previous example of three CEOs who sit on each other's boards, there is no obvious incentive for any isolated pair to maximize each other's interests, let alone break moral boundaries for each other. Yet we found that anticipated indirect reciprocity at the network level drives individuals' behavior. In essence, we have extended the old saying to be: "you scratch his back, he scratches mine, and I'll scratch yours." This is particularly alarming because most policies and laws do not track networks of interdependence at such length. While the literature on CEO compensation has found that directly reciprocal companies tend to have higher CEO salaries, much less is known about companies involved in extendedly cyclic reciprocal networks. With the trend of the increasingly complex professional and work relations and the obscure nature of indirect reciprocal networks, our research represents a timely attempt to shed light on an otherwise hidden ethical culpability of delegation.

Second, most existing models of reciprocity assume sequential move or the initiation of reciprocity. In the investment game, for example, the investor first decides whether to "invest" in the responder, who then decides whether to reciprocate and split the profit. In these models, reciprocity is sometimes confounded with reputation building, that individuals reciprocate to build a positive reputation so as to attract future "investments." Reputation is especially important in indirect reciprocity than in direct reciprocity. In our studies, however, we relaxed the assumption of sequential move and had all participants made decisions simultaneously in a one-shot game. This did a couple of things: (a) reputation concerns become irrelevant and (b) there was no initiation of reciprocity and hence according to existing intension-based models of reciprocity people would not do each other "favors." Yet participants in our three studies went out of their way, to the extent that they violated moral norms, to do each other "favors" with no obvious benefits to themselves.

We argued that the persistence of gift or favors in the absence of the initiation of reciprocity is due to the anticipation that if one helps others, others will help them. Indeed, in Study 3 we found that participants in the complete loop condition (where there was indirect reciprocity) were more likely to endorse the statement that if everyone helped everyone else, they would all be better off than those in the incomplete loop condition (where there was no indirect reciprocity). Further, they also tend to believe that if they did other people favors by lying, others would be more likely to lie for them. Seemingly irrational and illusory since all decisions were made simultaneously, this belief is nevertheless consistent with the belief in a just world that good things happen to good people. Thus, rather than assuming that indirect reciprocity is sequential, we suggest that indirect reciprocity might have more to do with the general expectation that if one helps others, somehow others will also help them.

Third, our studies also shed light on unintended consequences of delegation. Previous studies that have investigated the unintended consequences of delegation have focused on self-interested behaviors (e.g., Hamman et al., 2010). Although self-interested behaviors can sometimes be costly and harmful to other parties involved, they are largely considered legitimate in economic transactions. In the organization world, however, behaviors that involve blatant shielding, distorting, and lying about critical information often cause significant damage to socio-economic exchanges as well as to larger economic systems. Our paper empirically shows that agents are not only likely to act in a more selfish manner but they are also capable of committing much more morally questionable acts – particularly when they are part of a simultaneous cyclic network of mutual delegations.[15]

Understanding when agents are likely to engage in unethical acts on behalf of their principals is particularly important because agents' actions tend to be seen as less wrong and punishable (e.g. Bartling and Fischbacher, 2012; Coffman, 2011; Fershtman and Gneezy, 2001; Paharia et al., 2009; Royzman and Baron, 2002). For example, Paharia et al. (2009) found that people rated hypothetical scenarios where a company directly engaged in unethical behaviors (e.g., raising the price of a drug for a rare form of cancer) to be more unacceptable than if the company had sold the drug to another pharmaceutical company, which then raised the price. Coffman (2011) examined third-party punishment behavior in a standard dictator game where the dictator could choose how much to allocate to the recipient or "sell" their decision rights to an agent. The results indicated that a third party bystander punished agents significantly less, even when their offers were significantly less (more unfair) than those of principals.

[15] We acknowledge that it is certainly possible that some principals attach a heavier weight to ethical conduct than others and expect their agents to behave ethically. If that's the case, agent's deception could harm the interest of the principal. However, we have no reason to believe that this is anything more than an individual difference, just like any agent could also attach more or less weight to moral conduct. Future research could explore how individual differences in morality may determine principals and agents' behavior.

5. Limitations and future directions

Several features of our empirical investigative strategy deserve attention as they are likely to moderate our findings. First, the logic of laboratory experimentation requires eliminating or controlling for all possible influences other than the critical factors under investigation. However, the laboratory environment, the one-shot nature of the game, and the starkness of the interactions necessarily limit the direct generalizability of the findings to more complex organizational settings. Outside the laboratory, people are likely to be simultaneously influenced by many factors and engage in much more complex interactions than a written note and monetary allocations to an anonymous party. Thus, although experimental designs maximize the chance of detecting causally valid relationships, they risk reduced external validity. Notwithstanding this, we incorporated features in our design to increase the chances that our findings are generalizable. For example, across all three studies, our participants interacted with real counterparts and made decisions with real monetary consequences. Also, rather than making decisions alone in isolated breakout rooms, our participants worked in market-like environments that included many agents and many principals (while at the same time anonymity was still guaranteed). Most importantly, the design of a daisy chain agent network captures the complexity of modern professional and work relations.

Second, due to the sensitive nature (i.e., a study on deception), we took extra care to give participants a sense of anonymity. Each experimental session had over twenty participants, and we reminded participants throughout the session not to put their names or any other self-identifying information on their decision forms. We also used a double-blind procedure so that our participants felt anonymous not only to their counterpart participants but also to the experimenters. This means that agents had no accountability as there was no chance that they would get caught, be punished, or suffer reputational losses. In organizational life, of course, anonymity is not always possible and people are often held accountable for their actions. Thus, organizational agents may be reluctant to engage in immoral behaviors because they may damage their reputation and can ultimately harm their interests. Thus, future research might examine the effects of accountability and reputation on agents' unethical behaviors. For example, rather than having agents engage in a one-shot game, future studies might have them play the game multiple times. In addition, after each game, agents' decisions and outcomes could be made public, and such data could be used as the basis for principals' hiring decisions. Similarly, a third party might monitor the transactions, as research has shown that third-party monitoring increases moral awareness and reduces the likelihood of unethical behavior (e.g., Fehr and Fischbacher, 2004).

Third, while the modified ultimatum game context explicitly presented participants with the option to lie, other contexts might offer more spontaneous and subtle forms of deception. We believe that a key advantage of confronting participants with an explicit choice between telling the truth and lying is that it ensures that their deceptive behavior is unambiguous and that honest behavior cannot result from a lack of perceived options (i.e., it simply did not occur to people that they could lie). Nonetheless, future studies might test whether the current findings also apply to more nuanced situations with other, naturally occurring forms of communication.

Finally, in our cyclic networks all proposers moved simultaneously. We compared that to when participants were making decisions for themselves. We showed that participants were more likely to lie than they would lie for their own benefit. More importantly, this was the case only when there was a complete indirect reciprocity loop but not when the reciprocity loop was broken. Thus, our findings suggest that anticipated indirect reciprocity is a driver for deception. That said, future research should include a cyclic network with sequential move as another benchmark. We expect that reciprocity should be stronger with the sequential move than simultaneous move.[16]

Authors' note

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jebo.2015.01.009.

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