Dishonesty, Tolerance, and Social Information

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Abstract.- This paper investigates whether exposure to dishonesty affects the likelihood that individuals engage in dishonesty and tolerate it. I construct a strategic setting suitable for the study of dishonesty in one shot and repeated settings in the laboratory. Half of all participants have the opportunity to engage in dishonesty and half are potentially harmed by the dishonest actions of others. Tolerance is studied through the behavior of the latter individuals who can punish dishonesty in a repeated setting at a cost. Treatments vary whether or not participants receive information about the behavior of others, and whether this information reflects honest or dishonest behavior. Results show that exposure to dishonesty can affect choices. Participants who make decisions in an environment that does not prime selfishness become more likely to engage in dishonesty when they are exposed to dishonest others. Exposure to dishonesty is found to weakly decrease the likelihood that individuals tolerate dishonesty. The study provides further evidence that dishonesty can be contagious, and suggests that tolerance does not fuel the downward spiral of behavior.

Keywords: peer effects; dishonesty; social norms; punishment; laboratory; contagion
JEL codes: C91, C99, D03, D83

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1. Introduction

Dishonesty is a complex collective action problem that affects all cultures. It originates at the individual level with the decision to engage in dishonesty but has severe aggregate consequences that affect social, political, and economic life. Even though society disapproves of dishonesty and in some cases condemns it through laws, the prevalence of this type of behavior suggests that for some individuals the benefits outweigh the costs. Standard economics has given attention to the material costs and benefits that influence decisions in this setting. Only recently have authors recognized that non-material rewards matter and that they can also affect the individual decision to engage in dishonesty.[2] This paper investigates dishonesty from the latter perspective, conducting two laboratory experiments that investigate how exposure to dishonesty affects the likelihood that individuals engage in dishonesty and tolerate it. The primary goal of the study is to investigate dishonesty and tolerance in a repeated setting, where the direct effect of social information on tolerance can halt or facilitate the contagion of dishonest behavior.[3]

The strategic setting constructed for the purpose of this study has subjects play a modified investment game in pairs. A first mover first decides whether or not to invest an endowment earned earlier in the experiment with a second mover. Investment with the second mover is always beneficial for the first mover and can generate either a high or a low return. When the first mover invests with the second mover the second mover observes the return on the investment and announces a return to the first mover. Truthful announcements split the net return equally between players. Untruthful announcements allow the second mover to take an unequal share of earnings. The probability that the return observed by the second mover is high is 3/4 and is common knowledge among participants. The first mover learns the return announced by the second mover, but does not find out whether the second mover told the truth or lied. Tolerance is studied through the behavior of first movers, who can make inferences about the (dis)honesty of the second movers they are matched with and can forego investment in a repeated setting at a cost. Subjects interact with the same participant ten times. Treatments vary whether or not subjects observe the returns announced by four second movers in one phase of a previous session of the experiment. In an Honest Information Treatment (HIT) subjects observe information reflecting honest behavior. In a Dishonest Information Treatment (DIT) subjects observe information reflecting dishonest behavior. In a No Information Treatment (NIT) subjects are not exposed to any social information.

Two experiments were conducted to investigate the effect that exposure to dishonesty has on first and second mover behavior. Experiment 1 studies the behavior of second movers and tests the hypothesis that exposure to dishonesty makes individuals more likely to engage in dishonesty. In order to minimize strategic considerations, Experiment 1 makes foregoing investment with the second mover extremely costly for first movers. Considerable efforts are also made in Experiment 1 not to prime selfishness. Participants thus have to realize that they can lie in the experiment and take earnings from the first mover, and decide on their own whether or not they want to do so. Experiment 2 studies the behavior of first movers and investigates how individual willingness to tolerate dishonesty changes with exposure to social information. Punishing dishonesty is less costly for first movers in Experiment 2. Experiment 2 also quizzes subjects on

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[2] See, for example, Gneezy (2005); Mazar, Amir, Ariely (2008); Gino, Ariely, and Ayal (2009); and Ariely (2012).
[3] I use the term social information here and in the rest of the paper to refer to information about the behavior of others.

the consequences associated with all possible investment and announcement scenarios to minimize the role that confusion can play in the experiment.

Results show that social information can affect the likelihood that individuals engage in and tolerate dishonesty. Second movers in Experiment 1 are found to be more likely to engage in dishonesty when they are exposed to dishonest others. The likelihood that a second mover announces a low return during the first decision round increases with the prevalence of dishonesty reflected in the social information as does the likelihood that participants play the subgame perfect equilibrium strategy of always announcing a low return on the investment. First mover behavior is not affected by social information in Experiment 1, but is affected by social information in Experiment 2. First movers in Experiment 2 are found to be less likely to tolerate dishonesty when they are exposed to dishonest others than when they are exposed to honest others. This behavior, though detrimental for welfare, suggests that tolerance does not facilitate the contagion of dishonesty.

A robustness check that investigates the extent to which the rate of honesty observed in Experiment 2 is explained by confusion has participants play the investment game as second movers against a computer. Results show that individuals have no problem behaving selfishly and lying to increase their earnings when lying takes money away from the experimenter and does not affect another equal participant. This last treatment validates the strategic setting employed in the study and suggests that it accurately captures the moral conflict individuals face when deciding whether or not to engage in dishonest behavior.

The paper makes several contributions to literature. First, it constructs a strategic setting suitable for the study of dishonesty in one-shot and repeated settings in the laboratory. Subjects can inherently recognize the dishonest nature of their actions and inflict a direct negative externality on another equal participant by lying when return is high. This occurs the majority of the time given the parametrization employed in the study. Second, the paper extends the set of conditions under which dishonesty has been found to be contagious. Previous studies in psychology (Gino, Ayal, Ariely 2009) and economics (Innes and Mitra 2013; Fosgaard, Hansen, and Piovesan 2013) have shown that exposure to dishonesty makes individuals more likely to engage in dishonesty when dishonesty implies cheating on performance tests, cheating when reporting the realization of events, or lying in sender-receiver games. This paper investigates the contagion of dishonesty in a setting designed to encompass a larger class of social dilemmas, such as theft and petty corruption, where dishonesty has direct harmful consequences on other equal individuals. Third, the paper investigates for the first time the effect that social information has on individual willingness to tolerate dishonesty, and whether or not tolerance attenuates or exacerbates the downward spiral of behavior. To the best of my knowledge no study has investigated how social information affects the prevalence of dishonesty in a repeated setting in the laboratory or in the field before, and the role that tolerance plays in halting or facilitating the contagion of dishonest behavior.

2. Related literature

The experimental economics literature on dishonesty and corruption is fairly recent. It emerged in 2000 with the work of Frank and Schulze (2000) who used a hypothetical question to study dishonesty. The work that developed thereafter has primarily used modified versions of the trust game of Berg et al. (1995) to study corruption. Abbink et al. (2002) were the pioneers in this approach and used the trust game to study bribing in the laboratory. In their experiment a firm decides whether or not to bribe a public official. The public official decides whether or not to accept a bribe and whether or not to grant a favor to the bribee. The original experiment used neutral instructions where actions did not have the negative connotations implied by corruption. Subsequent papers tested this implication by assigning subjects hypothetical roles. Abbink and Hennig-Schmidt (2006) showed no statistically significant differences in behavior generated by role assignment. Barr and Serra (2009), however, showed that in a petty corruption experiment where subjects were assigned the more familiar role of citizens instead of firms, loaded instructions matter. The experiment conducted in this paper overcomes the challenges encountered by this early literature by employing a modified trust game in which the nature of dishonesty can be inherently recognized by subjects and where there is no need to assign hypothetical roles.

Although an array of issues within bribery have been investigated using modifications of Abbink et al. (2002), related to this study are the papers that focus on the role of social norms and culture (see Eckel and Banuri 2012a for a review). Cameron et al. (2009) studied the propensity to engage in bribery and to punish it using a modified trust game with role assignment in four different countries: Australia, India, Indonesia, and Singapore. Eckel and Banuri (2012b, 2014) did so in the US and in Pakistan. Together these studies document variation in the likelihood that individuals engage in bribery and punish it across cultures, but do not find a clear and robust relationship between the prevalence of corruption in a country and the level of bribery observed in the experiment.[4] Barr and Serra (2010) conducted a bribery experiment using another modified trust game with role assignment in the United Kingdom. They recruited subjects from different nationalities and found that the individual likelihood to engage in bribery correlates with the prevalence of corruption in subjects' home countries.[5] The same type of correlation between the prevalence of corruption in a nation and socially undesired behavior was found by Fisman and Miguel (2007), who examined the parking behavior of UN officials protected by diplomatic immunity in New York City. Unlike these papers, which investigate social norms through the broad definition of culture, I manipulate the perceived social norm of honesty exogenously in the laboratory.

Other popular settings that have been used to study dishonesty in the laboratory include truth-telling in sender-receiver games (Gneezy 2005), and cheating when self-reporting scores on performance tests (Mazar, Amir, and Ariely 2008) or the realization of events (Fischbacher and Föllmi-Heusi 2013, Bucciol and Piovesan 2011). The deception game of Gneezy (2005) has a sender inform a receiver which of two options yields a higher payoff. The receiver takes an action that determines the payoffs of both players but has no knowledge about the structure of incentives. The sender can thus tell the truth or lie; the receiver has to choose whether or not to believe the message sent by the sender before making a choice. The strategic

[4] The studies use a three-player bribery game where a firm chooses whether or not to bribe a public official, the public official chooses whether or not to accept the bribe, and subsequently a third party affected by the bribery exchange decides whether or not to punish the briber and bribee. Cameron et al. (2009) examined behavior in a one-shot environment. Eckel and Banuri (2012b) studied choices in a repeated setting and varied across treatments (within country) whether or not the third party could punish. Their results show that punishment reduces bribery in the US but does not impact bribery in Pakistan. There is no difference in the prevalence of bribery across countries when the third party cannot punish bribery. Eckel and Banuri (2014) examine in this same environment the long-term effects of a short-term punishment institution.

[5] This correlation, however, is only statistically significant among undergraduates. The authors argue that socialization and time spent in another country changes the norms that individuals use to guide their behavior. A series of studies conducted by

setting employed in this paper has more desirable properties than the deception game of Gneezy (2005) because it eliminates any moral wiggle room by which subjects may justify their behavior as honest. In Gneezy (2005) lying can be rationalized as other-regarding if the sender believes that the receiver will not believe the message.[6] Independent of beliefs, the choices made by the potential victims of dishonesty determine the final payoffs. Engaging in dishonesty by lying thus does not directly inflict a negative externality on another participant. In Mazar et al. (2008) subjects self-report scores on a performance test. Scores determine payoffs; and subjects can cheat to earn more money by inflating scores. Fischbacher and Föllmi-Heusi (2013) and Bucciol and Piovesan (2011) study dishonesty in a similar setup but have subjects report the outcome of a die roll and a coin flip respectively, which determines their payoffs. The setting employed in this paper has more desirable properties than Mazar et al (2008), Fischbacher and Föllmi-Heusi (2013) and Bucciol and Piovesan (2011) because engaging in dishonesty implies lying and taking money from another equal participant rather than from the experimenter. Dishonesty can be rationalized as welfare enhancing in Mazar et al. (2008), Fischbacher and Föllmi-Heusi (2013), and Bucciol and Piovesan (2011) if participants care only about the money earned by subjects in the experiment.

The three papers that have investigated whether dishonesty is contagious in the laboratory have used the strategic settings of Gneezy (2005), Mazar et al. (2008), and Bucciol and Piovesan (2011). Gino et al. (2009) have subjects self-report scores on a performance test and manipulate the perceived social norm of honesty in the laboratory exogenously by hiring an actor who cheats bluntly in front of participants. Results show that observing a group member cheat increases the prevalence of cheating but observing an outsider do so decreases it. Interestingly, observing someone cheat without the group identity element increases honesty in the experiment.[7] Innes and Mitra (2013) study whether lying is contagious. They conduct an experiment in Arizona and India where subjects play the deception game of Gneezy (2005) and are given information about the percentage of players that sent untruthful messages in a previous session of the experiment. Their results show that the prevalence of truth telling decreases when subjects in the Arizona experiment are told that 85 percent of subjects in another session were untruthful (does not change when that percentage is 15, 40 or 60) and increases in India when subjects are told that 85 percent of subjects were truthful. Additional sessions of the experiment that allowed subjects to draw messages from a box containing all messages sent in previous sessions of the experiment show that observing 3 of 5 participants be untruthful makes individuals more likely to lie. This is not driven by an effect of social information on preferences over allocations. Fosgaard et al. (2013) manipulate the perceived social norm of honesty in the laboratory by pre-marking the sheet where subjects self-report the outcome of the coin flip and varying whether these marks reflect honest or dishonest behavior.[8] Two treatments were conducted that vary whether the pre-marked reports are in computer font or written by hand. The authors argue that the first treatment lets subjects know that dishonesty is permitted in the experiment whereas the second treatment manipulates the perception of how many other subjects have cheated. Results show that both treatments affect choices, but differently by gender. Females become more likely to cheat when the experimenters make dishonesty permissible in the experiment, but not when they learn that others have cheated. Males, on the other hand, become significantly more likely to cheat when they believe others have cheated. Unlike the existing

[6] Sutter (2009) examines this type of sophisticated deception in the setup of Gneezy (2005).

[7] The authors argue that this results from the fact that observing someone else cheat increases attention to standards, which increases honesty.

[8] These marks, however, do not reflect actual behavior. It could thus be argued that like Gino et al. (2009), Fosgaard et al. (2013) use deception.

laboratory studies on contagion, the present study does not use deception or loaded terms in the instructions. Subjects are presented with the sequence of choices made by other participants in a previous session of the experiment and have to individually interpret such information.

A related literature has recently emerged studying the effect of descriptive and inductive social norms on tax evasion.[9] Lefebre, Pestieau, Riedl, and Villeval (2014) show in a tax compliance game in the laboratory that social information has an asymmetric effect on the likelihood that individuals evade taxes. Learning that others exhibited a high rate of compliance does not affect behavior whereas learning that others exhibited low rate of compliance makes individuals more likely to evade taxes. Hallsworth, List, Metcalfe, and Vlaev (2014) conduct a large scale natural field experiment in the UK that sends payment reminders to individuals who have declared their income but have not yet paid their taxes. The reminders include messages that manipulate the descriptive social norm of payment. Results show that learning that 9 out of 10 other individuals have already paid their taxes makes individuals more likely to pay at least part of their taxes. Del Carpio (2014) provides property tax payers in Peru information about the rate of tax compliance and finds that such information increases the likelihood that individuals pay taxes. Castro and Scartascini (2015) do so in Argentina and find null average treatment effects, which mask heterogeneity by history of past compliance.

The present study differs from the existing literature along several dimensions. First, I investigate (dis)honesty in a controlled laboratory environment where dishonesty cannot be legally sanctioned. This is different from tax evasion as there are legal consequences associated with not paying taxes. Messages about the rate of tax compliance provided to individuals in field experiments convey information about the behavior of others, but also about the fact that the tax collection authority is monitoring taxes. This may change the beliefs people hold about the probability of being legally sanctioned. Second, I study dishonesty in a setting where dishonesty inflicts a direct negative externality on another equal participant, not the experimenter or the government. This is important because there are other reasons for which individuals may justify taking money from a richer and arguably more powerful person or authority. Third, I investigate the effect of both upward and downward social information on the prevalence of (dis)honest behavior. While the field studies on tax evasion have shown that tax compliance (honesty) can be contagious, they do not examine the destructive power of social information. Finally, I investigate for the first time the effect that social information has on tolerance, which can attenuate or exacerbate the effect that social information has on the likelihood that individuals engage in dishonest behavior.

3. Experimental design

The study employs a between-subject design with treatments that vary whether or not subjects receive social information about the behavior of other participants and whether or not such information reflects honest or dishonest behavior. It conducts two experiments, which employ the same session structure and basic experimental design. Experiment 1 investigates how exposure to (dis)honesty affects the likelihood that

[9] Related to this literature is also the economics and psychology work on social influence and social information conducted within the context of socially desired and undesired behavior (see, e.g., Cason and Mui 1998; Cialdini, Reno, and Kallgren 1990, 2000; Cialdini et al. 2006; Cialdini 2007; Croson and Shang 2008; Duffy and Kornienko 2010).

individuals engage in dishonesty. Experiment 2 investigates how exposure to (dis)honesty affects the likelihood that individuals tolerate dishonesty.

3.1 Session structure

In Phase 1 subjects perform the real effort task of Niederle and Vesterlund (2007) to secure an endowment for subsequent phases. The task consists of adding as many sets of five two-digit numbers as possible in five minutes. Participants secure $0.50 in endowment for every problem they solve correctly. Additionally, they receive a fixed sum of $2.00 that is independent of performance. Subjects know before performing the real effort task that the endowment they secure determines the earnings that they can receive in the experiment. They are not informed in Phase 1 about the activities that will be carried out in Phases 2 and 3 and are not aware of how their endowment will affect the earnings that they can receive in the experiment.

Instructions for Phases 2 and 3 are distributed after the completion of Phase 1. At the beginning of Phase 2 participants are randomly assigned roles as first and second movers. They are then matched with a participant of the opposite role. Phase 2 has subjects play an investment game repeatedly with the same participant ten times. Phase 3 rematches subjects with a different participant and has them play the same investment game repeatedly ten additional times. Roles are maintained throughout the duration of the session and no participant is matched with the same person twice.[10]

Subjects are informed at the beginning of Phase 2 that one of the 20 decision rounds that make up Phases 2 and 3 will be randomly selected to count for payment. They are given a quiz to check their understanding and are subsequently provided a solution key that is read out loud. The quiz and solutions are given to participants before any decisions are made. The instructions, quizzes, and solution keys employed in each of the experiments are provided in online Appendix B.

3.2 Investment game

The investment game played repeatedly by subjects in Phases 2 and 3 is depicted in Figure 1. A first mover (I) first decides whether or not to invest with a second mover (II) the endowment (x_1) he or she earned in Phase 1. Foregoing investment with the first mover provides a constant return (y) on the investment that is kept entirely by the first mover. Investment with the second mover generates a return on the investment that is shared between movers and can be either low or high. A low return doubles investment and generates a net profit equal to the invested endowment. A high return triples investment and generates a net profit equal to twice the invested endowment. When the first mover invests with the second mover, the second mover observes the return on the investment and announces it to the first mover. The second mover can thus tell the truth or lie. Truthful announcements provide an equal split of the net profit between movers. Untruthful announcements allow the second mover to take a larger share of the earnings when return is high, and to give up earnings when return is low. The return observed by the second mover is randomly selected by a computer and acquires a high value 3/4 of the time. The likelihood that the return selected by the computer is high is common knowledge among participants. The second mover, however, is the only

[10] The re-matching is done in such a way that the number of independent observations (subgroups) in each session is maximized.

participant who observes the actual return on the investment. The first mover can thus make inferences about the honesty of the second mover, but does not find out whether second mover told the truth or lied.

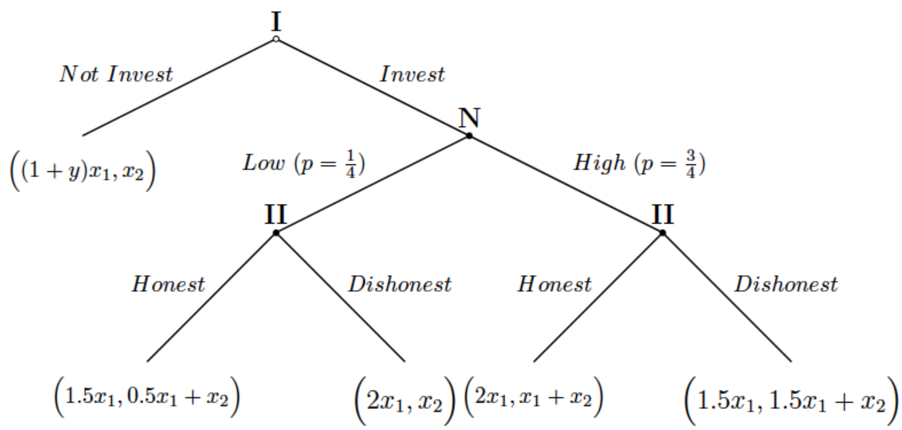


Figure 1: Investment game

Note: I, II, and N denote first mover, second mover, and nature respectively.

The Nash equilibrium of the stage game depicted in Figure 1 is unique if y<0.5, which is secured by the parameterization employed in each of the experiments. It consists of the first mover investing with the second mover and of the second mover always announcing a low return on the investment. The unique Nash and subgame perfect equilibrium of the finitely repeated game is for first movers to always invest with the second mover and for second movers to always announce a low return on the investment. That is, for second movers to announce the return honestly when return is low and dishonestly when return is high.

Deviations from the Nash prediction can emerge in the stage game if second movers value honesty, or alternatively care about payoff differentials. Two features of the design minimize the last concern. First, subjects earn their endowment in Phase 1, which minimizes any fairness considerations generated by differences in endowments. Second, honest announcements provide an equal split of net profits between players.[11] Second movers valuing honesty can be modeled by letting individuals have preferences denoted by $U(x_1, x_2) = m(x_1, x_2) - c(\theta, x_1, x_2)$, where $m(x_1, x_2)$ is the material payoff of the stage game and $c(\theta, x_1, x_2)$ is the cost of engaging in dishonesty. Parameter θ captures the strength of the social norm of honesty and can be interpreted as the prevalence of honesty in a reference group or in society. Suppose that $c(\theta, x_1, x_2)$ is positive and increasing in θ when lying inflicts a negative externality on another equal participant. Then second movers should engage in dishonesty when return is high only if $1.5x_1 + x_2 - c(\theta, x_1, x_2) \geq x_1 + x_2$. Since θ is not perfectly known, subjects will engage in dishonesty when $0.5x_1 \geq E[c(\theta, x_1, x_2)]$. Social information provides information about θ to participants and thus predicts that honesty should increase with the prevalence of honesty reflected in the social information.

[11] Individuals would need to be extremely inequality averse to justify dishonesty through fairness or equality considerations

First mover behavior in the stage game can be affected by social information about θ directly and indirectly. A direct effect may be present if first movers experience a disutility from being the victims of dishonesty that is increasing in the prevalence of honesty in society. Indirectly, information about θ may affect the beliefs that first movers have about the behavior of second movers and thus their investment. Note that in order for punishment to be profitable for first movers the disutility that they experience when they are the victims of dishonesty needs to exceed $(0.5 - y)x_1$; the payoff difference between investing with the second mover and obtaining a certain low return and foregoing investment.

The finitely repeated game introduces strategic considerations that can mute or exacerbate the direct effect that social information has on first and second mover behavior. For example, social information reflecting dishonest behavior may decrease $c(\theta, x_1, x_2)$ making dishonesty more permissible for second movers, but may also affect the likelihood that first movers punish dishonesty. If first movers become more likely to punish dishonesty when they are exposed to dishonest others, then this may counteract the incentive to engage in dishonesty that the fall in $c(\theta, x_1, x_2)$ generates for second movers. If first movers become less likely to punish dishonesty when exposed to dishonest others, then this may further increase the likelihood that second movers engage in dishonesty. The objective of this study is to investigate for the first time which of these forces prevails. That is, do the standard game theoretic predictions of the game with material payoffs hold? Or, is first and second mover behavior affected by social information? If social information affects choices, then what is the role of tolerance? Does it halt or facilitate the contagion of dishonest behavior?

3.3 Treatments

Treatments in each experiment vary whether or not subjects observe the behavior of other participants in a previous session of the experiment and whether or not such behavior reflects honest or dishonest behavior. In a No Information Treatment (NIT) subjects are not presented any information about the behavior of others. In an Honest Information Treatment (HIT) subjects are shown the sequence of returns announced by four second movers who behaved honestly in one phase of a previous session of the experiment. In a Dishonest Information Treatment (DIT) subjects are shown the sequence of returns announced by four second movers who behaved dishonestly in one phase of a previous session of the experiment. The sequences of returns presented to subjects in each of the information treatments were collected in a pilot session of the study and are displayed in Appendix Tables A1 and A2.

Experiments vary the payoff associated with the first mover's outside option and some implementation procedures. Experiment 1 investigates the effect that social information has on second mover behavior. It minimizes strategic considerations by making punishment extremely costly for first movers. That is, letting the return on the outside option be zero ($y = 0$), and thus providing no additional earnings to the first mover. Subjects were quizzed in Experiment 1 about the payoffs associated with truthful announcements only. Considerable efforts were made not to prime selfishness for two reasons. First, to let subjects realize on their own that they could lie and take earnings from the second mover; and second, not to affect the moral cost associated with engaging in dishonesty. That is, to let individuals decide on their own whether or not they want to engage in dishonest behavior.

Experiment 2 investigates the effect that social information has on first mover behavior. It employs a parametrization of the investment game that makes punishment less costly for first movers while maintaining the same equilibrium predictions of the game with material payoffs. The return to the outside option is $y = 0.4$. Experiment 2 employs the strategy method to avoid losing observations when first movers choose not to invest with second movers and employs implementation procedures that make it explicit to subjects that dishonesty is permitted in the experiment. Experiment 2 uses slightly different instructions than Experiment 1 and comprehension questions that go over the payoffs associated with all possible announcement scenarios. This was done to rule out confusion as a possible explanation for any lack of first mover punishment but primes selfishness in the experiment. Experiment 2 also conducts a robustness check that has participants play the investment game as second movers against a computer. This robustness check seeks to validate the strategic setting employed in this study by ruling out confusion as a possible explanation for the rate of honesty observed in the experiment.

The specific treatments conducted in each of the experiments are depicted in Table 1. The information presented to subjects was the same across experiments within each of the Information Treatments. Experiment 1 presented the social information to subjects once at the beginning of Phase 2. Experiment 2 also gave participants a handout with the social information that could be consulted any time throughout the duration of Phases 2 and 3. Incentivized questionnaires conducted at the end of Experiment 2 validate the social information presented to subjects.[12]

Table 1: Experimental design

Treatments	Experiment 1 y=0	Experiment 2 y=0.4
No Information (NIT)	X	
Honest Information (HIT)	X	X
Dishonest Information (DIT)	X	X
Computer (CT)		X

4. Results

A total of 216 students participated in 18 sessions of the study conducted at the Pittsburgh Experimental Economics Laboratory (PEEL). 108 individuals participated in the 9 sessions that make up Experiment 1 and 108 individuals participated in the 9 sessions that make up Experiment 2. Experiment 1 conducted 3 sessions per treatment while Experiment 2 conducted 4 sessions of each of the Information Treatments and 1 session of the Computer Treatment. Each session included 12 participants. The experiment was programmed using z-Tree (Fischbacher 2007).

Table 2 shows summary statistics by experiment and treatment. Half of all participants in each of the Information Treatments were assigned the role of first movers and half were assigned the role of second movers. Gender was balanced within sessions but not across roles. Participants solved an average of 11.23 problems correctly in Phase 1 and earned an average endowment of $7.60. The number of problems solved

[12] Subjects correctly assess that the sequence of investment returns shown to participants in HIT and DIT reflects honest and dishonest behavior respectively.

correctly in Experiment 2 was higher than in Experiment 1 (subject-level Wilcoxon Mann-Whitney rank-sum z=1.861, p=0.02).[13] Individuals made on average $18.50 dollars for participating in one session of the study, which lasted approximately 1 hour.[14]

Table 2: Summary statistics by experiment and treatment

Variable	Experiment 1				Experiment 2				Total
	NIT	HIT	DIT	All	CT	HIT	DIT	All	
N sessions	3	3	3	9	1	4	4	9	18
N subjects	36	36	36	108	12	48	48	108	216
% female	0.50	0.50	0.50	0.50	0.42	0.44	0.46	0.44	0.47
% first movers	0.50	0.50	0.50	0.50	0.00	0.50	0.50	0.45	0.47
% second movers	0.50	0.50	0.50	0.50	1.00	0.50	0.50	0.56	0.53
N problems correct Ph 1	10.31	10.25	11.36	10.64	11.17	11.08	12.71	11.82	11.23
(sd)	(3.91)	(4.26)	(3.42)	(3.88)	(2.62)	(4.52)	(5.27)	(4.74)	(4.36)
Endowment	7.15	7.13	7.68	7.32	7.58	7.54	8.35	7.91	7.61
(sd)	(1.96)	(2.13)	(1.71)	(1.94)	(1.31)	(2.26)	(2.63)	(2.37)	(2.18)

Because the experiments employ different implementation procedures and focus on the study of first and second mover behavior separately, the analysis of results is split by experiment. The behavior of second movers in Experiment 1 is discussed first. The behavior of first movers in Experiment 2 is discussed second.

4.1 Experiment 1

Table 3 presents statistics of first and second mover behavior. Since Experiment 1 made deviations from the subgame perfect equilibrium prediction of always investing with the second mover extremely costly for first movers, it is not surprising to observe that first movers invested with second movers 96 percent of the time. This rate of investment is slightly higher when subjects are exposed to social information reflecting honest and dishonest behavior but does not vary statistically significantly by treatment. 35 percent of first movers (n=19) chose to forego investment with the second mover at least once in Experiment 1; 20 percent of first movers (n=11) chose to forego investment more than once.[15]

Second mover behavior does not conform to the subgame perfect predictions of always announcing a low return on the investment. Second movers announced a high return 44 percent of the time. This reflects a rate of honesty when return is high of 54 percent across treatments and a rate of honesty when return is low of 87 percent. Only 17 percent of second movers (n=9) played the subgame perfect equilibrium of the game

[13] Differences may have emerged as a result of unwanted changes in the implementation, but are not statistically significant across treatments within each of the experiments. Experiment 1 was conducted in the Fall of 2011 while Experiment 2 was conducted in between April 2012 and October 2013.

[14] Earnings were higher in Experiment 2 than in Experiment 1 (subject-level Wilcoxon Mann-Whitney rank-sum test z=-1.503, p=0.133). This was in large part due to the high earnings made by individuals in the Computer Treatment. Pairwise comparisons across treatments in Experiment 2 show that subjects in the Computer Treatment earned more than subjects in the Information Treatments (subject-level Wilcoxon Mann-Whitney rank-sum tests z= 1.830, p=0.067 and z=2.022, p=0.043 when comparing the CT vs HIT and CT vs DIT respectively).

[15] The overall deviation of first mover behavior from full investment with second movers is statistically significant (subject -level one-sided sign-test p<0.05 within treatment).

and always announced a low return on the investment; 20 percent (n=11) were always dishonest when return was high and 54 percent (n=29) were always honest when return was low.

Table 3. First and second mover behavior, Experiment 1

	NIT	HIT	DIT	All
First movers				
% investment with second mover	0.94	0.97	0.97	0.96
% who play the SPE (always invest)	0.56	0.67	0.72	0.65
% who punish once	0.11	0.22	0.11	0.15
% who punish more than once	0.33	0.11	0.17	0.20
Second movers				
% high returns announced	0.44	0.51	0.38	0.44
% honest when return is high	0.53	0.61	0.48	0.54
% honest when return is low	0.85	0.83	0.93	0.87
% who play SPE (always announce low)	0.06	0.06	0.39	0.17
% always dishonest when return is high	0.17	0.06	0.39	0.20
% always honest when return is low	0.50	0.39	0.72	0.54

Note: SPE denotes subgame prefect equilibrium play. The statistics reflect behavior in all rounds of play (the super-game made up of Phases 2 and 3).

Deviations from full dishonesty when return is high suggests that second movers value honesty. Although the rate of honesty may be affected by the strategic considerations present in the experiment (i.e. first mover behavior and beliefs about first mover behavior), the high cost and low frequency of first mover punishment minimizes this concern. Deviations from full honesty when return is low, on the other hand, indicate that second movers used untruthful announcements when return was low strategically, to erase the consequences of having engaged in dishonesty or planning to do so.[16] Because of this observation, the remainder of the analysis studies the rate of high announcements more generally, controlling when possible for whether the return observed by the second mover is low or high.

In order to test the hypothesis that the rate of high announcements increases with the level of honesty reflected in the social information it is necessary to analyze whether second mover behavior changes with treatment. Consistent with the hypothesized treatment effects, Table 3 shows that the rate of high announcements increases with the level of honesty reflected in the social information. Second movers announce a high return 61 percent of the time when exposed to honest others (HIT), 53 percent of the time when not presented with any social information (NIT), and 48 percent of the time when exposed to dishonest others (DIT). These differences in announcements, although non-trivial in magnitude, are not statistically significant in the raw data when individual level non-parametric tests are employed.

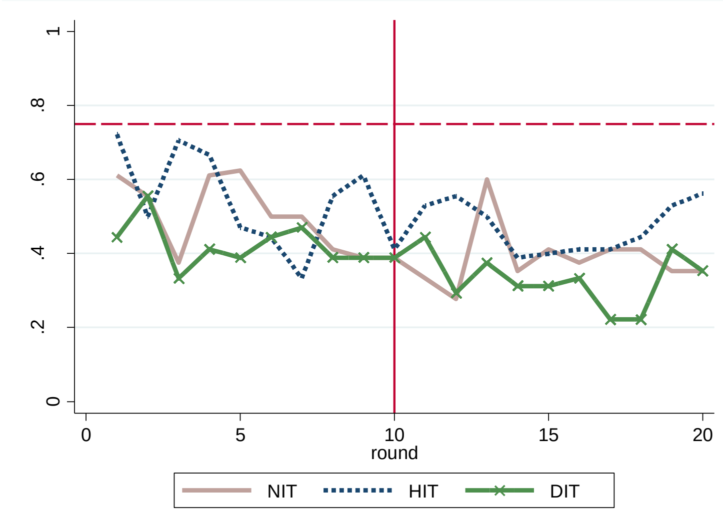
Figure 2 illustrates the relative frequency of high announcements by round and treatment. The dashed horizontal line indicates the percentage of high returns observed by second movers.[17] The solid vertical line

[16] An alternative explanation of dishonesty when return is low, of course, is error. Some participants may have been confused and could have made mistakes. Given the few number of low returns observed by second movers, this type of error translates into a high relative frequency.

[17] The return observed by each second mover was independently drawn for each second mover in every round. That is, there is variation in the returns observed by second movers across individuals, sessions, treatments, and rounds in Experiment 1.

indicates the break between Phases 2 and 3, which occurs in round 10. The first thing that becomes evident when looking at Figure 2 is that the comparative statics coincide with the hypothesized prediction during the first round of play. Subjects are more likely to announce a high return on the investment in the Honest Information Treatment (HIT), than in the No Information Treatment (NIT), and the Dishonest Information Treatment (DIT) respectively. These differences in first period behavior are analyzed parametrically in Table 4, which presents the results of OLS regressions of high announcements on treatment.[18] Table 4 shows that differences in the rate of high announcements in round 1 of Phase 2 are statistically significant between the Honest and Dishonest Information Treatments.

Figure 2. Second mover announcements by round, Experiment 1



Note: The horizontal dashed line indicates the percentage of high returns observed by second movers across all sessions and treatments. The vertical solid line indicates the break between Phases 2 and 3.

The rest of Figure 2 shows more subtle differences in the probability that second movers announce a high return on the investment across treatments. While there do not seem to be differences in the probability that second movers announce a high return between either of the Information Treatments and the No Information Treatment (NIT), in all but three rounds of play the probability that second movers announce a high return on the investment is higher in HIT than in DIT. These differences in behavior are not statistically significant when parametric regressions that take into account the repeated nature of the observations are employed.[19]

[18] A linear probability model (OLS) is employed rather than a logit or probit model because robustness checks that take into account the simultaneity of first and second mover choices are performed for other regressions presented in the paper and employ 3SLS.

[19] OLS panel regressions of high announcements on period, phase, treatment, and whether the observed return was high that cluster standard errors at the subject level are presented in Appendix Table A3. Specifications that cluster standard errors at the subgroup level using wild bootstrapping procedures provide similar results and are available upon request.

Table 4. OLS regression of second mover announcement in Period 1, Experiment 1

Dep. Var.: announced return high	(1)	(2)	(3)
HIT	0.111	0.132	0.108
	(0.164)	(0.158)	(0.153)
DIT	-0.167	-0.167	-0.136
	(0.164)	(0.158)	(0.156)
Observed return high		0.377**	0.371**
		(0.166)	(0.162)
Endowment			-0.030
			(0.033)
Investment			-0.057*
			(0.034)
Female			0.232*
			(0.129)
Constant	0.611***	0.297	0.837*
	(0.116)	(0.178)	(0.422)
Test (p-value): HIT = DIT	0.096	0.064	0.122
N	54	54	54

Note: Standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

The fact that average differences in the rate of high announcements are so subtle between treatments does not necessarily indicate that social information does not affect second mover behavior for several reasons. First, the sample size may be limiting the statistical power of the experiment and more data may be needed to estimate treatment effects more precisely. Second, treatments may be affecting other parts of the distribution of individual rates of high announcements. In order to explore this possibility Figure 4 presents histograms of individual rates of high announcements by phase and treatment. Figure 4 shows that there is a wide degree of heterogeneity in second mover behavior. While a significant fraction of participants are always honest when return is high and announce a high return close to 100 percent of the time, others never announce a high return on investment. This last type of behavior corresponds to the subgame perfect equilibrium prediction, and is analyzed in detail in Table 5.

Figure 4. Histogram of individual rates of high announcements, Experiment 1

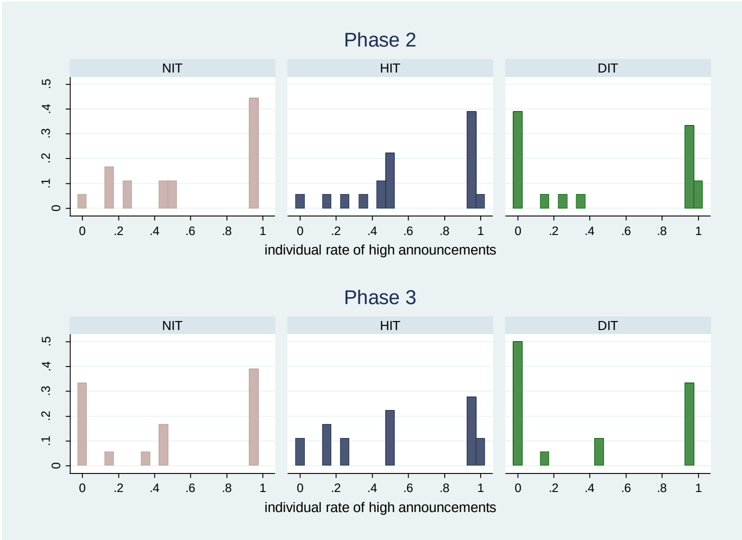


Table 5 presents the results of OLS regressions of subgame perfect equilibrium play on phase and treatment, which cluster standard errors at the subject level.[20] It shows that subjects are more likely to behave selfishly and play the subgame perfect equilibrium when exposed to dishonest others than when they are exposed to honest others. Subjects are also less likely to play the subgame perfect equilibrium play when exposed to dishonest others relative to the control treatment of no exposure to social information. That is, there is an asymmetric effect of social information on second mover behavior. Differences in the rate of subgame perfect equilibrium play are robust to controlling for the behavior of first movers. Simultaneous equation models that take into account the fact that first and second movers are simultaneously making decisions are presented in Appendix Table A4 and show a robust difference in the rate of second mover subgame perfect equilibrium play between the two Information Treatments.

Table 5. Second mover subgame perfect equilibrium play, Experiment 1

Dep. Var.: Second mover always announces low	(1)	(2)	(3)
HIT	-0.000	0.025	0.024
	(0.079)	(0.092)	(0.090)
DIT	0.333**	0.358***	0.339**
	(0.131)	(0.132)	(0.133)
Phase 3	0.278**	0.278**	0.278**
	(0.109)	(0.112)	(0.113)
HIT X Phase 3	-0.222*	-0.247*	-0.245*
	(0.123)	(0.132)	(0.133)
DIT X Phase 3	-0.167	-0.183	-0.182
	(0.133)	(0.135)	(0.137)
First mover always invests		-0.149	-0.135
		(0.092)	(0.093)
Endowment			0.016
			(0.026)
Investment			-0.003
			(0.020)
Female			-0.113
			(0.091)
Total effect HIT: Phase 3	-0.222	-0.222	-0.221
	(0.138)	(0.134)	(0.136)
Total effect DIT: Phase 3	0.167	0.175	0.157
	(0.167)	(0.166)	(0.169)
Tests (p-value)			
HIT = DIT	0.014	0.012	0.020
HIT X Phase 3 = DIT X Phase 3	0.560	0.518	0.525
HIT + HIT X Phase 3 = DIT + DIT X Phase 3	0.009	0.008	0.012
N	108	108	108

Note: Standard errors clustered at subject level in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Experiment 1 thus shows that social information affects the likelihood that individuals announce a high return on the investment. Second movers are more likely to announce a low return in the first round of play when they are exposed to dishonest others than when they are exposed to honest others. Exposure to dishonest others also increases the likelihood that individuals are never honest when return is high and play the subgame perfect equilibrium strategy of the finitely repeated game. Since first mover punishment of

[20] Specifications that cluster standard errors at the subgroup level using wild bootstrapping procedures provide similar results and are available upon request.

dishonesty was extremely costly in Experiment 1 and there was little deviation from full investment, to analyze first mover behavior and study how social information affects the likelihood that individuals tolerate dishonesty we turn to Experiment 2.

4.2 Experiment 2

Experiment 2 reduces the cost of foregoing investment with the second mover and quizzes subjects on the consequences associated with all possible announcement scenarios. Table 6 shows that these changes in implementation procedures affected the behavior of first and second movers. First movers invest with the second mover 87 percent of the time in Experiment 2. This deviation from the subgame perfect prediction of full investment is statistically significant (subject level one-sided sign-test $p<0.01$) and is not driven by the behavior of just a few participants. Only 27 percent of first movers (n=13) chose to always invest with the second mover; 14 percent (n=7) chose to forego investment with the second mover once, and 59 percent (n=28) did so more than once. The majority of participants thus used investment in the outside option to punish second mover dishonesty at a cost. Table 6 shows that the rate of investment with the second mover varies with treatment and is lower in the Dishonesty Information Treatment (DIT) than in the Honest Information Treatment (HIT). These differences in investment are not statistically significant in the raw data when non-parametric tests that compare investment rates across subjects are employed. Parametric analyses of first mover behavior that take into account the repeated nature of the observations are presented later on.

Table 6. First and second mover behavior, Experiment 2

	HIT	DIT	All
First movers			
% investment with second mover	0.88	0.78	0.83
% who play the SPE (always invest)	0.20	0.33	0.27
% who punish once	0.16	0.13	0.14
% who punish more than once	0.64	0.54	0.59
Second movers			
% high returns announced	0.22	0.25	0.24
% honest when return is high	0.26	0.30	0.28
% honest when return is low	0.91	0.94	0.92
% who play SPE (always low)	0.38	0.25	0.31
% always dishonest when return is high	0.38	0.29	0.33
% always honest when return is low	0.79	0.79	0.79

Note: SPE denotes subgame prefect equilibrium play. The statistics reflect behavior in all rounds of play (the super-game made up of Phases 2 and 3).

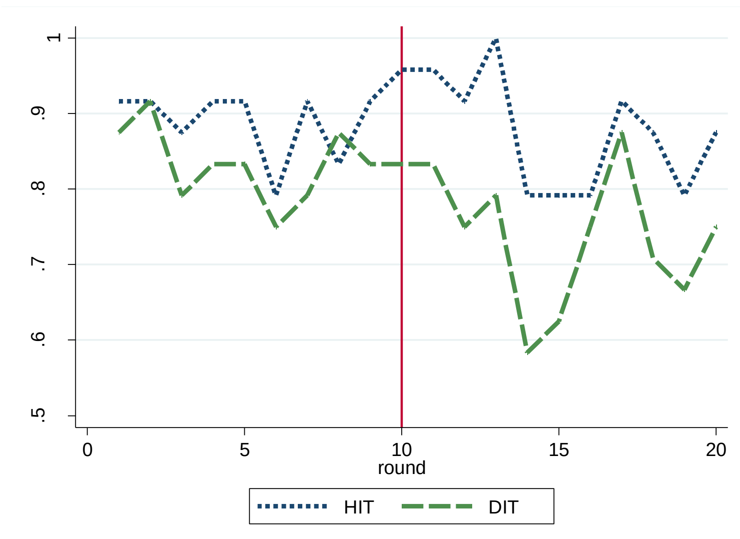
Second movers announced a high return on the investment 24 percent of the time. This rate of high announcements is lower than that documented in Experiment 1 (subject level Wilcoxon Mann-Whitney rank-sum z= 3.035, p=0.024) suggesting that changes in the implementation procedures made dishonesty more permissible in the experiment.[21] Deviations from the subgame perfect prediction of never announcing

[21] Differences within treatment are statistically significant in HIT but not DIT (subject-level Wilcoxon Mann Whitney rank-sum z=2.921 z=, p<0.01 and z=0.529, p=0.597 respectively). This suggests that the changes in implementation procedures had the same effect on second mover behavior as the negative social information presented to subjects in DIT in Experiment 1.

a high return are statistically significant (subject level one-sided sign-test p<0.01) but do not vary by treatment. 31 percent of participants (n=15) chose to always announce a low return on the investment and thus played the subgame perfect equilibrium of the game; 33 percent (n=16) were always dishonest when return was high, and 79 percent (n=38) were always honest when return was low. The fact that there is not full honesty when return is low corroborates the idea that second movers use dishonesty when return is low strategically to erase the consequences of their past actions or to influence the perception of honesty that first movers possess given that confusion can play a minimal role in this experiment.

The fact that announcements are low and do not vary by treatment suggests one of two things. First, implementation procedures may have primed selfishness and made dishonesty permissible in the experiment, causing behavior to hit a lower bound in the rate of honesty that can be observed. Second, the variation in first mover punishment and its effects on the strategic considerations of second movers may have prevented second mover dishonesty from increasing. The fact that second mover announcements do not fall to zero during the last round of play in each of the finitely repeated games (rounds 10 and 20) suggests that the second mechanisms unlikely explains results.[22]

Figure 5. First mover behavior by round, Experiment 2



Note: The solid vertical line indicates the break between Phases 2 and 3.

Figure 5 illustrates the rate of first mover investment with the second mover by round and treatment. It shows small differences in investment during the first 10 rounds of play (Phase 2), but large differences in investment during the last 10 rounds of play (Phase 3). In order to explore whether these differences in foregone investment are statistically significant, Table 7 presents the results of OLS regressions of first mover investment with the second mover on period and treatment that cluster standard errors at the subject level.[23] Results show that there is a statistically significant difference in the rate of first mover investment

[22] The rate of high announcements was 16.67 and 12.5 percent in round 10 and 20 respectively, pooling across treatments. Appendix Figure A1 illustrates the rate of high announcements by round and treatment.

[23] Similar results are obtained if standard errors are clustered at the subgroup level using wild bootstrapping procedures. Results are available upon request.

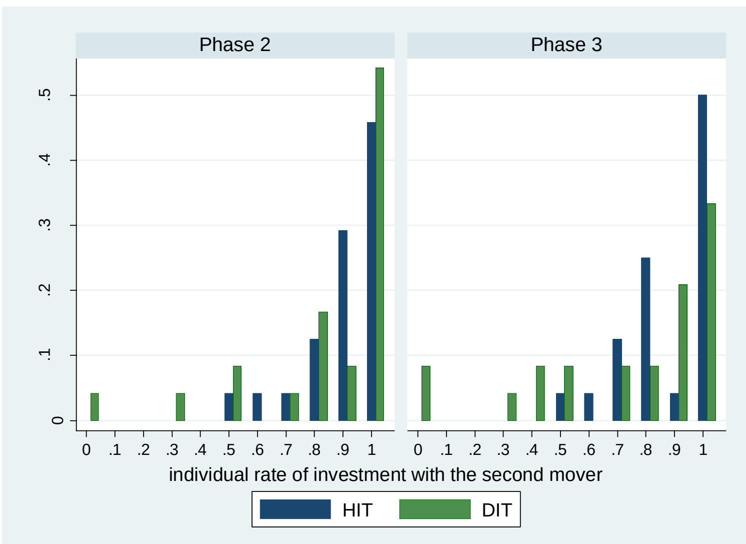
with the second mover across treatments. This result is robust to controlling for second mover behavior through the perceived rate of honesty, which equals to the probability that the number of high returns announced by the second mover and observed by the first mover are true. Second mover behavior, is of course, endogenous as it influences and is influenced by first mover behavior.

Table 7. OLS regression of first mover investment, Experiment 2

Dep. Var.: Invest with second mover	(1)	(2)	(3)
DIT	-0.100*	-0.095*	-0.064
	(0.060)	(0.053)	(0.054)
Period	-0.005	-0.011	-0.009
	(0.005)	(0.012)	(0.010)
Perceived honesty second mover		-0.088	-0.049
		(0.168)	(0.126)
Endowment			-0.023
			(0.018)
Female			0.003
			(0.055)
Phase 3	-0.063**	-0.061**	-0.062**
	(0.028)	(0.030)	(0.029)
Constant	0.942***	0.996***	1.135***
	(0.035)	(0.106)	(0.168)
N	960	960	960

Note: Perceived honesty second mover equals to the probability that the number of high returns reported by the second mover and observed by the first mover so far in the phase are true. Standard errors clustered at the subject level in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Figure 6. Histogram of individual rates if investment with the second mover by phase, Experiment 2



Exposure to dishonest others thus decreases the willingness of individuals to tolerate dishonesty. First movers choose to forego investment with the second mover at a personal cost, which is detrimental for welfare. Figure 6 illustrates the histogram of individual rates of investment with the second mover by phase and treatment. It shows that exposure to dishonesty increases the intensity with which first movers punish second movers (pre-emptively or after they have reported many low returns). Although between 35 and 55 percent of participants choose to never punish second movers in a given phase, some participants choose to forego investment more than 50 percent of the time.[24]

Is first mover punishment effective in inducing second mover honesty? Unfortunately the experimental design employed in this paper cannot answer this question as first and second mover decisions are made simultaneously and thus affect and are affected by each other.

Experiment 2 conducted a robustness check to investigate whether confusion can explain the rates of second mover honesty observed. It had participants in the Computer Treatment play the finitely repeated investment game against a computer programmed to always invest with the second mover. Results show that participants play the subgame perfect equilibrium and always announce low 98 percent of the time when matched with the computer. Deviations from the subgame perfect equilibrium prediction are not statistically significant.[25] Participants thus do not seem to have a problem being dishonest when return is high when their actions do not affect another equal participant.[26] This validates the strategic setting employed in this study and suggests that other environments used to study dishonesty in the laboratory, where dishonesty inflicts a negative externality on the experimenter, may not be ideal.

5. Conclusion

This study investigates the effect that exposure to dishonesty has on the likelihood that individuals engage in dishonesty. It conducts two laboratory experiments where participants interact repeatedly with each other. Strategic considerations are present, which can enhance or counteract the direct effect that social information has on the likelihood that individuals engage in dishonest behavior. Treatments expose participants to honest and dishonest others using exogenous social information collected in pilot sessions of the study. Results show that exposure to dishonesty can increase the likelihood that individuals engage in dishonesty. Subjects become more likely to take the most selfish action in the first decision round and to play the subgame perfect equilibrium strategy of always behaving selfishly when they are exposed to dishonest others in an environment where dishonesty is not primed. Exposure to dishonesty weakly decreases the likelihood that individuals tolerate dishonesty. This suggests that the effect of social information on tolerance does not facilitate the contagion of dishonest behavior.

The contributions of this paper are several. First, the study provides a strategic setting that can be used to study dishonesty in one shot and repeated settings in the laboratory. This is important, because existing environments used to study dishonesty in the laboratory have had some limitations. Second, the study

[24] The behavior of second movers matched with these extreme punishers may introduce some noise in the statistics of second mover behavior, as the consequences of their announcements are non-binding. The rate of high announcements in DIT is 23.11 percent when the behavior of the participants matched with the person who never invested with the second mover is excluded from the sample, and does not exceed 24 percent when the sample is restricted to participants matched with first movers who invest at least 70 percent of the time in a given phase.

[25] Three subjects announce high when return is low (in rounds 3, 6, and 14 respectively). One subject is honest when return is high in round 8.

[26] The rate of high announcements is higher HIT and DIT than in CIT (subject-level Wilcoxon Mann-Whitney rank-sum z=-3.297, p<0.01 and z=-2.640, p<0.01 respectively). See Appendix figures A1 and A2.

extends the set of conditions under which dishonesty has been found to be contagious. While previous papers have shown that there are peer effects in cheating and lying in one-shot decision environments and in tax evasion, they have not investigated settings in which dishonesty inflicts a direct negative externality on another equal participant and where individuals interact repeatedly with each other. Third, the study investigates for the first time the effect that social information has on individual willingness to tolerate dishonesty and shows that tolerance does not facilitate the contagion of dishonest behavior. To the best of my knowledge, no prior study has examined the role that tolerance plays in possibly halting or facilitating the downward spiral of behavior.

The findings of this paper have implications that extend beyond the two-person repeated game investigated in this paper. They suggest, together with some of the existing literature, that a non-material strategic complementarity exists that makes dishonesty contagious. Including it in dynamic models of dishonesty could help explain why dishonesty and corruption are so prevalent in some cultures and not in others and why it is so difficult to curb this type of behavior. The study of tolerance suggests that tolerance does not fuel the downward spiral behavior. More research is needed to understand the robustness of this finding and to identify when tolerance can facilitate and when it can prevent the contagion of dishonest behavior.

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Appendix A (for publication)

Table A1: Social information - Honest Information Treatment (HIT)

The table below shows the investment returns announced by four second movers in one phase of a previous session of the experiment. H represents HIGH and L represents LOW.

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10
Second Mover 1	H	H	L	H	H	H	H	H	H	L
Second Mover 2	H	H	H	H	H	H	H	H	H	H
Second Mover 3	H	H	H	H	L	L	H	H	H	H
Second Mover 4	H	L	H	H	H	L	H	H	H	L

Table A2: Social information - Dishonest Information Treatment (DIT)

The table below shows the investment returns announced by four second movers in one phase of a previous session of the experiment. H represents HIGH and L represents LOW.

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10
Second Mover 1	H	L	H	L	L	L	L	H	L	L
Second Mover 2	L	L	L	L	L	L	L	L	L	L
Second Mover 3	L	H	L	L	L	L	H	L	L	L
Second Mover 4	L	L	L	L	L	L	L	L	L	L

Table A3. OLS regression of high announcements by second movers, Experiment 1

Dep. Var.: announce high return	(1)	(2)	(3)	(4)
HIT	0.066	0.010	-0.030	-0.037
	(0.097)	(0.061)	(0.056)	(0.058)
DIT	-0.063	-0.079	-0.115**	-0.106*
	(0.113)	(0.047)	(0.051)	(0.056)
Period	-0.009**	-0.010**	-0.006	-0.006
	(0.004)	(0.004)	(0.004)	(0.004)
Observed return high	0.415***	0.384***	0.370***	0.368***
	(0.054)	(0.104)	(0.107)	(0.104)
Phase 3	-0.104***	-0.105***	-0.088***	-0.088***
	(0.026)	(0.026)	(0.028)	(0.028)
HIT X obs. return high		0.073	0.095	0.096
		(0.132)	(0.135)	(0.135)
DIT X obs. return high		0.020	0.052	0.046
		(0.139)	(0.146)	(0.144)
Rate of first mover investment			0.632***	0.605***
			(0.202)	(0.210)
Endowment				-0.003
				(0.022)
Investment				-0.010
				(0.015)
Female				0.098
				(0.085)
Constant	0.229***	0.253***	-0.372*	-0.288
	(0.062)	(0.047)	(0.195)	(0.292)
Total effect HIT: obs. return high		0.083	0.066	0.059
		(0.124)	(0.126)	(0.125)
Total effect DIT: obs. Return high		-0.058	-0.063	-0.059
		(0.145)	(0.144)	(0.144)
Tests (p-value)				
HIT=DIT	0.245	0.131	0.083	0.201
HIT X obs. high = DIT X obs. high		0.674	0.739	0.707
HIT+HIT X obs. high = DIT + DIT X obs. high		0.303	0.351	0.388
N	1037	1037	930	930

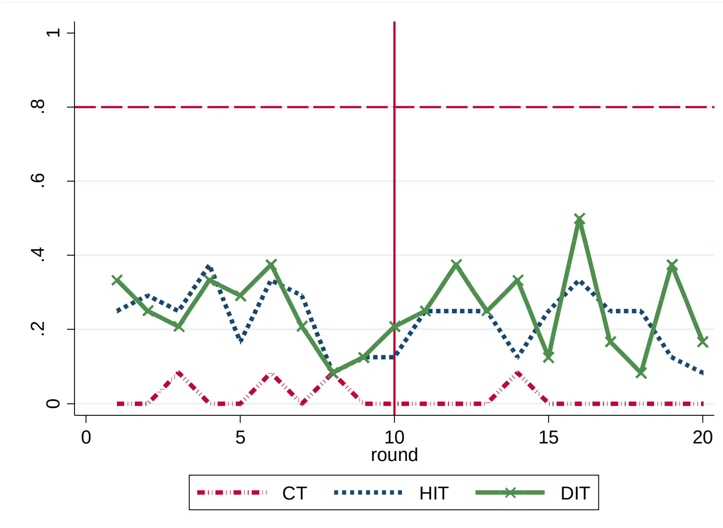
Note: Rate of first mover investment denotes the rate of past investment so far in the phase. Standard errors clustered at the subject level in parentheses. The number of observations in columns 3 and 4 is lower than in columns 1 and 2 because the inclusion of % first mover investment excludes the first decision round of each phase. *p<0.10, **p<0.05, ***p<0.01.

Table A4. 3SLS simultaneous equation system, Experiment 1

	Phase 2			Phase 3		
	(1)	(2)	(3)	(4)	(5)	(6)
	Equation 1 - Dep. Var.: Second mover always announces low					
HIT	0.004	-0.210	-0.229	-0.225	-0.226	-0.223
	(0.971)	(0.581)	(0.548)	(0.118)	(0.112)	(0.116)
DIT	0.304***	0.102	0.042	0.157	0.161	0.168
	(0.006)	(0.807)	(0.920)	(0.283)	(0.274)	(0.252)
Endowment	0.028	0.029	0.075	0.008	0.008	0.002
	(0.236)	(0.703)	(0.357)	(0.793)	(0.797)	(0.956)
Investment	0.018	-0.025	-0.021	-0.023	-0.025	-0.025
	(0.449)	(0.713)	(0.762)	(0.460)	(0.435)	(0.443)
Female	-0.100	-0.108	-0.153	-0.135	-0.130	-0.138
	(0.271)	(0.263)	(0.327)	(0.257)	(0.274)	(0.238)
First mover always invests		1.199	1.257		-0.074	-0.072
		(0.495)	(0.476)		(0.840)	(0.843)
Constant	-0.231	-0.782	-1.162	0.502	0.567	0.610
	(0.392)	(0.579)	(0.417)	(0.124)	(0.253)	(0.214)
	Equation 2 - Dep. Var.: First mover always invests					
HIT	0.170	0.171	0.169	0.017	0.017	0.097
	(0.152)	(0.150)	(0.206)	(0.901)	(0.900)	(0.728)
DIT	0.167	0.168	0.416*	0.055	0.055	-0.001
	(0.157)	(0.157)	(0.090)	(0.682)	(0.682)	(0.996)
Endowment	0.029	0.030	0.035	-0.003	-0.003	0.007
	(0.280)	(0.264)	(0.252)	(0.920)	(0.927)	(0.876)
Female	-0.110	-0.095	-0.173	0.322***	0.326***	0.343**
	(0.279)	(0.351)	(0.188)	(0.005)	(0.005)	(0.014)
SM always announces low			-0.744			0.340
			(0.229)			(0.732)
Constant	0.576**	0.559**	0.613**	0.548**	0.543**	0.348
	(0.015)	(0.018)	(0.023)	(0.043)	(0.045)	(0.592)
Tests (p-value):						
Eq. 1: HIT = DIT	0.007	0.109	0.168	0.008	0.008	0.007
Eq. 2: HIT = DIT	0.981	0.974	0.319	0.777	0.778	0.818
N	54	54	54	54	54	54

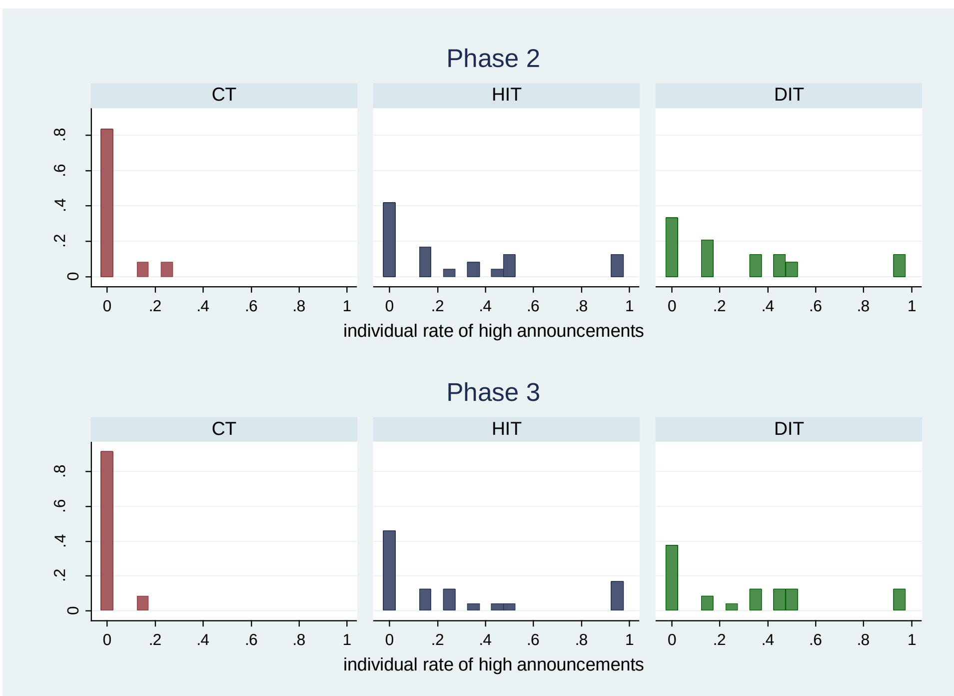
Note: Standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Figure A1. Second mover behavior by round, Experiment 2



Note: The dashed horizontal line indicates the percentage of high returns observed by second movers in all sessions and treatments.[27] The solid vertical line indicates the break between Phases 2 and 3.

Figure A2. Histogram of individual rates of high announcements by phase, Experiment 2



[27] The share of return observed by second movers does not coincide with the probability that the return observed by the second mover is high because 6 sequence of returns randomly generated by a system that provided high 3/4 of the time were chosen prior to conducting the experiments and were kept constant across treatments.

Appendix B (for online publication)

INSTRUCTIONS

[PHASE 1 – EXPERIMENTS 1 AND 2]

INTRODUCTION

This is an experiment about decision making and economic interaction. The experiment will consist of three phases. In phase 1 you will perform individually to secure earnings for later phases. In phases 2 and 3 you will be paired in groups of two people and will have to make decisions using the earnings you secured in phase 1.

The money you make in today's experiment will depend on your performance in phase 1 and on one of the decisions you [INFORMATION TREATMENTS - and the person you are matched with] make during the two subsequent phases. In addition you will receive $5.00 for showing up to the experiment. Your earnings in today's experiment will be paid to you in cash at the end of the session.

The instructions for phase 1 are listed below. The instructions for phases 2 and 3 will be distributed once we have completed phase 1.

No talking is allowed in today's experiment. If you have a question, please raise your hand and wait for an experimenter to come answer your question in private.

PHASE 1

In phase 1 of today's session you will be asked to perform a task. The task is to add as many sets of five two-digit numbers as you can in five minutes. Your performance on this task will determine your endowment in phases 2 and 3 [EXPERIMENT 1 - and will affect the money you can make in the experiment]. Your endowment in phases 2 and 3 will equal $2.00 plus $0.50 times your performance in phase 1. For example, if you solve 10 problems correctly your endowment will equal $2.00 + $0.50 × 10 = $7.00. If you solve 20 problems correctly your endowment will equal $2.00 + $0.50 × 20 = $12.00.

Each problem presented to you will appear as follows:

23	14	57	78	90

The five two-digit numbers displayed will be selected at random. For each new problem you have to provide an answer in the blank cell on the right. You may use paper and pencil to solve the problems, but the answer must be recorded in the blank cell. You must click the "OK" button to submit your answer and proceed to the next problem. Every time a new problem is presented, you will receive feedback on your performance. You will find out if the last answer you submitted was correct and will be notified of the number of problems you have solved correctly and incorrectly up until that point.

You will not be able to skip a problem and come back to it later. If you skip a problem by clicking "OK" when the right cell is left blank you will have spent time providing an incorrect answer. Once the five minutes are over no additional problems will be presented to you. A screen will indicate the number of problems you solved correctly in phase 1.

We are now ready to perform the task. Are there any questions before we begin?

INSTRUCTIONS
[PHASES 2 AND 3 – EXPERIMENT 1]
[DISTRIBUTED AFTER PHASE 1 IS COMPLETED]

PHASES 2 & 3

Phases 2 and 3 will each consist of 10 rounds. Your endowment in each round equals $2.00 plus $0.50 times your performance in phase 1. For example, if you solved 16 problems correctly in phase 1 you will have a $2.00 + $0.50 × 16 = $10.00 endowment.

At the beginning of phase 2 you will be randomly assigned the role of first mover or second mover. Your role will be the same in phases 2 and 3 of the experiment. Half of the people in this room will be assigned the role of first mover and half will be assigned the role of second mover.

In both phases you will be randomly matched with a person of the opposite role. For the ten rounds of phase 2 you will be matched with one person and for the ten rounds of phase 3 you will be matched with another person. You will not know the identity of the person you are matched with and he or she will not know who you are.

Phases 2 and 3 consist of a total of 20 rounds. At the end of the experiment we will have one participant randomly select one of the 20 rounds to count for payment. Your payment will equal your earnings from the selected round.

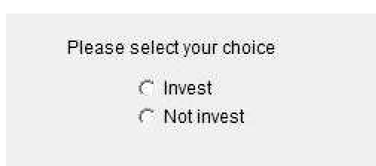
Investment decision

In every round you will be matched with a person and the two of you will participate in an investment decision.

The round proceeds as follows. The first mover first decides whether or not to invest his or her endowment with the second mover. The second mover then learns the first mover's investment decision, observes the return on the investment, and informs the first mover of his or her earnings.

The return on the investment can be either HIGH or LOW. When the return is HIGH the return on the investment is 200%, when the return is LOW the return on the investment is 100%. For example, if a first mover with an endowment of $10.00 decides to invest and the return is HIGH, then the return on the investment is 200% × $10.00 = $20.00. If the return is LOW, then the return on the investment is 100% × $10.00 = $10.00. The chance that the return is HIGH is 3/4 and the chance that the return is low is 1/4. The computer will randomly determine whether the return is HIGH or LOW. We call the return selected by the computer the actual investment return.

The first mover sees the following screen and makes an investment decision.



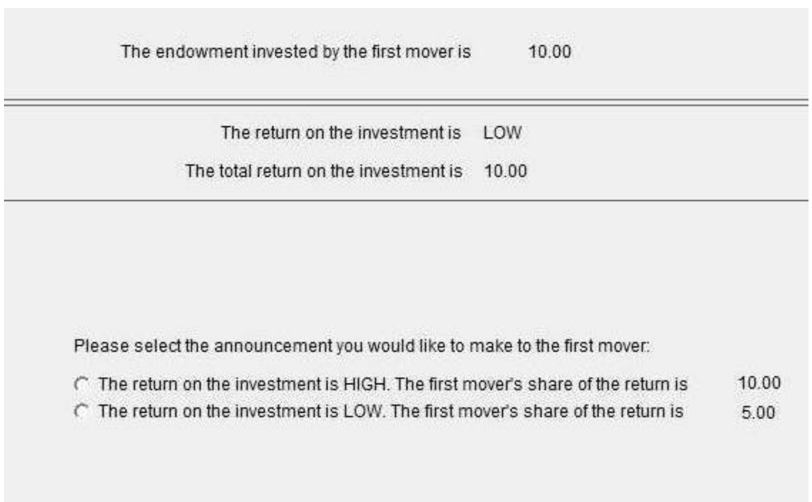
The second mover learns whether the first mover invested and finds out whether the actual investment return is HIGH or LOW. The second mover then announces a HIGH or LOW return on the investment to the first mover. We call this the announced investment return. The first mover only learns the announced investment return.

The total earnings the movers receive equals their initial endowment plus a share of the investment return. The first mover receives half of the investment return announced by the second mover. The second mover receives a share equal to the actual investment return that was not paid to the first mover.

The first mover's total earnings, when he or she invests, are thus equal to the invested endowment plus half of the announced investment return. For example, if the announced investment return is LOW, then the first mover's total earnings are his or her invested endowment ($10.00) plus half of the announced investment return (50% × $10.00 = $5.00), which equals $15.00. When the first mover decides not to invest, his or her total earnings from the round are simply equal to the initial endowment.

The second mover's total earnings, when the first mover invests, are equal to the second mover's initial endowment plus the actual investment return that was not paid to the first mover. For example, if the first mover's invested endowment is $10.00, the second mover's endowment is $9.00, and the actual and announced investment return is LOW, then the second mover's total earnings are equal to his or her endowment ($9.00) plus the actual investment return that was not paid to the first mover ($10.00 − $5.00 = $5.00), which equals $14.00. When the first mover does not invest, the second mover's total earnings are equal to his or her initial endowment.

When announcing the return on the investment the second mover knows the size of the investment and the share of the actual investment return that the first mover receives. For example, if the endowment invested by the first mover is $10.00 and the actual investment return is low, then the second mover sees the following decision screen.



[INFORMATION TREATMENTS –

At the beginning of phase 2 you will see the sequence of returns announced by four second movers in one phase of a previous session of the experiment. Announcements of high returns are denoted by H and announcements of low returns are denoted by L.]

Now I ask that you answer some questions to check your understanding. We will go over the correct responses before phase 2 begins.

CHECKING YOUR UNDERSTANDING
[PHASES 2 AND 3 - EXPERIMENT 1]

In any given round, what is the probability that the return observed by the second mover is HIGH?

3/4

In any given round, what is your endowment if you solved 6 problems correctly in phase 1?

\$2.00 + \$0.50 × 6 = \$5.00

Suppose you are the FIRST MOVER and your endowment equals \$5.00.

What are your total earnings if you decide NOT to invest?

\$5.00

What are your total earnings if you invest and the return announced by the second mover is HIGH?

2 × \$5.00 = \$10.00	*because*	*First mover's invested endowment*	*\$5.00*
		Announced investment return	*200% × \$5.00 = \$10.00*
		First mover's share of the return (half of the announced investment return)	*50% × \$10.00 = \$5.00*
		First mover's total earnings	*\$5.00 + \$5.00 = \$10.00*

What are your total earnings if you invest and the return announced by the second mover is LOW?

1.5 × \$5.00 = \$7.50	*because*	*First mover's invested endowment*	*\$5.00*
		Announced investment return	*100% × \$5.00 = \$5.00*
		First mover's share of the return (half of the announced investment return)	*50% × \$5.00 = \$2.50*
		First mover's total earnings	*\$5.00 + \$2.50 = \$7.50*

Suppose you are the SECOND MOVER matched with the first mover described above. Your endowment equals \$4.00.

What are your total earnings if the first mover decides NOT to invest?

\$4.00

What are your total earnings if the return you observe and announce to the first mover is HIGH?

\$4.00 + \$5.00 = \$9.00	*because*	*First mover's invested endowment*	*\$5.00*
		Actual investment return	*200% × \$5.00 = \$10.00*
		Announced investment return	*200% × \$5.00 = \$10.00*
		Return paid to the first mover (half of the announced investment return)	*50% × \$10.00 = \$5.00*
		Remaining actual investment return	*\$10.00 − \$5.00 = \$5.00*
		Second mover's total earnings	*\$4.00 + \$5.00 = \$9.00*

What are your total earnings if the return you observe and announce to the first mover is LOW?

\$4.00 + \$2.50 = \$6.50	*because*	*First mover's invested endowment*	*\$5.00*
		Actual investment return	*100% × \$5.00 = \$5.00*
		Announced investment return	*100% × \$5.00 = \$5.00*
		Return paid to the first mover (half of the announced investment return)	*50% × \$5.00 = \$2.50*
		Remaining actual investment return	*\$5.00 − \$2.50 = \$2.50*
		Second mover's total earnings	*\$4.00 + \$2.50 = \$6.50*

INSTRUCTIONS
[PHASES 2 AND 3 – EXPERIMENT 2]
[DISTRIBUTED AFTER PHASE 1 IS COMPLETED]

PHASES 2 & 3

Phases 2 and 3 will each consist of 10 rounds. Your endowment in each round equals $2.00 plus $0.50 times your performance in phase 1. For example, if you solved 8 problems correctly in phase 1 you will have a $2.00 + $0.50 × 8 = $6.00 endowment.

[INFORMATION TREATMENTS –

At the beginning of phase 2 you will be randomly assigned the role of first mover or second mover. Your role will be the same in phases 2 and 3 of the experiment. Half of the people in this room will be assigned the role of first mover and half will be assigned the role of second mover.

In both phases you will be randomly matched with a person of the opposite role. For the ten rounds of phase 2 you will be matched with one person and for the ten rounds of phase 3 you will be matched with another person. You will not know the identity of the person you are matched with and he or she will not know who you are. At the beginning of phase 2 everyone in this room will be randomly assigned an identification number. The identification number of the person you are matched with will be displayed on your screen every round.]

[COMPUTER TREATMENT –

In every round you will have to make a decision. Your decision will determine the earnings that you secure for the round.]

Phases 2 and 3 consist of a total of 20 rounds. At the end of the experiment we will have one participant randomly select one of the 20 rounds to count for payment. Your payment will equal your earnings from the selected round.

Investment decision

[INFORMATION TREATMENTS –

In every round you will be matched with one person and the two of you will participate in an investment decision.]

[COMPUTER TREATMENT –

In every round a first and a second mover will participate in an investment decision.]

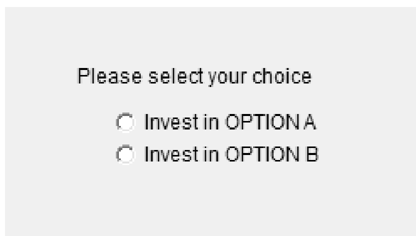
The round proceeds as follows. The first mover first decides whether to invest his or her endowment in Option A or B.

Investment in Option A generates a 40% return. This return is kept entirely by the first mover. For example, if a first mover with a $6.00 endowment invests in Option A his or her earnings for the round equal $8.40; the invested endowment ($6.00) plus the entire investment return (40% × $6.00 = $2.40). The second mover gets nothing from the first mover’s investment in Option A. The second mover’s earnings for the round equal his or her initial endowment.

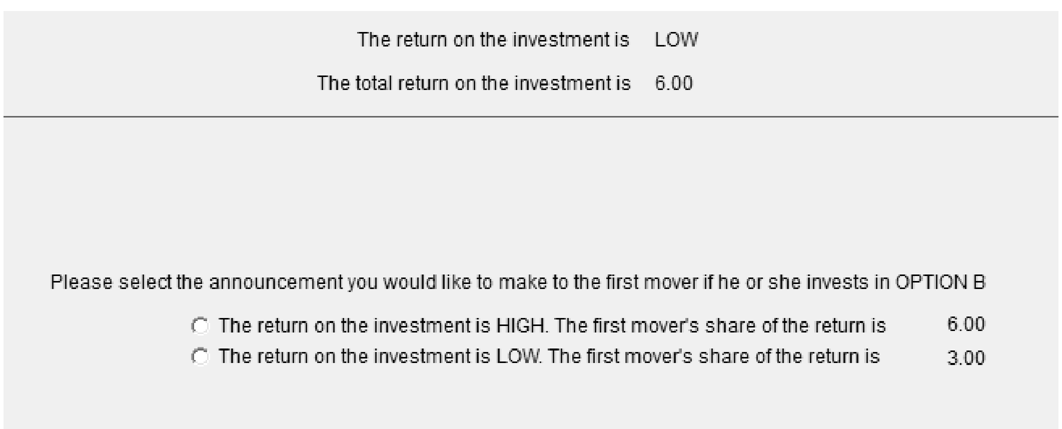
Investment in Option B can generate either a LOW or a HIGH return. This return is shared between the first and second mover. When the first mover invests in Option B, the second mover observes the actual return on the investment and announces a return to the first mover. The first mover learns the investment return announced by the second mover, but does not observe the actual return on the investment. The first mover receives half of the investment return announced by the second mover. The second mover keeps the investment return that is not paid to the first mover. The total earnings that each mover receives equal their initial endowment plus a share of the investment return.

The return from Option B, to be shared between the first and second mover, is 100% when the return is LOW and 200% when the return is HIGH. For example if a first mover with a \$6.00 endowment invests in Option B, the total return on the investment is 100% × \$6.00 = \$6.00 when the return is LOW and 200% × \$6.00 = \$12.00 when the return is HIGH. The chance that the return is LOW is 1/4 and the chance that the return is HIGH is 3/4. The computer randomly determines whether the return is LOW or HIGH. The return selected by the computer is what we refer to as the actual investment return.

The first mover sees the following screen and makes an investment decision.



When the first mover invests in Option B, the second mover learns the actual return on the investment and announces a return to the first mover. Consider the example where a first mover invests a \$6.00 endowment in Option B and the actual investment return is LOW. In this case, the second mover sees the following screen and decides whether to announce a LOW or a HIGH return on the investment.]



The announcement decision determines the share of the actual investment return (in this case \$6.00) that each mover receives. If the second mover announces a LOW return, the first mover's earnings for the round equal \$9.00; the invested endowment (\$6.00) plus half of the announced investment return (1/2 × \$6.00 = \$3.00). If the second mover announces a HIGH return, the first mover's earnings for the round equal \$12.00; the invested endowment (\$6.00) plus half of the announced investment return (1/2 × \$12.00 = \$6.00).

The second mover keeps the investment return not paid to the first mover. In the above example if the second mover has a \$5.00 endowment and he or she announces a LOW return, then the second mover's earnings for the round equal \$8.00; the initial endowment (\$5.00) plus the actual investment return that was not paid to the first mover (\$6.00 − 1/2 × \$6.00 = \$3.00). If instead the second mover announces a HIGH return, then his or her earnings for the round equal \$5.00; the initial endowment (\$5.00) plus the actual investment return that was not paid to the first mover (\$6.00 − 1/2 × \$12.00 = \$0.00).

[INFORMATION TREATMENTS –

Although choices are effectively made in sequence, the second mover will be asked to decide which return to announce before knowing the first mover's investment choice. The second mover's announcement becomes relevant and is learned by the first mover only when the first mover invests in Option B.

In each round the actual investment return is independently and randomly determined for each second mover. The actual investment returns observed by second movers therefore differ across participants and rounds.

At the beginning of phase 2 you will see the sequence of investment returns announced by four second movers in one phase of a previous session of the experiment. Announcements of high returns will be denoted by H and announcements of low returns will be denoted by L.]

[COMPUTER TREATMENT –

IN TODAY'S EXPERIMENT EVERYONE IN THIS ROOM WILL BE ASSIGNED THE ROLE OF SECOND MOVER. THE COMPUTER WILL MAKE FIRST MOVER CHOICES IN EVERY ROUND.

In every round of phases 2 and 3 the computer is programmed to have an \$8.00 endowment and to invest in Option B. The decisions that you make as second mover will therefore have NO impact on the investment option selected by the computer.

The earnings secured by the computer will NOT be paid to a subject. Your decisions will only affect YOUR payoff. They will NOT affect the payment that any other participant receives today.]

Before proceeding I ask that you answer some questions to check your understanding. We will go over the correct responses before phase 2 begins.

CHECKING YOUR UNDERSTANDING
[INFORMATION TREATMENTS - EXPERMENT 2]

In any given round, what is the probability that the return observed by the second mover is HIGH?

3/4

Suppose you are the FIRST MOVER and your endowment equals $5.00.

What are your total earnings if you invest in Option A?

1.4 × $5.00 = $7.00	*because*	*First mover's invested endowment*	*$5.00*
		Investment return	*40% × $5.00 = $2.00*
		First mover's total earnings	*$5.00 + $2.00 = $7.00*

What are your total earnings if you invest in Option B and the return announced by the second mover is LOW?

1.5 × $5.00 = $7.50	*because*	*First mover's invested endowment*	*$5.00*
		Announced investment return	*100% × $5.00 = $5.00*
		First mover's share of the return	*1/2 × $5.00 = $2.50*
		First mover's total earnings	*$5.00 + $2.50 = $7.50*

What are your total earnings if you invest in Option B and the return announced by the second mover is HIGH?

2 × $5.00 = $10.00	*because*	*First mover's invested endowment*	*$5.00*
		Announced investment return	*200% × $5.00 = $10.00*
		First mover's share of the return	*1/2 × $10.00 = $5.00*
		First mover's total earnings	*$5.00 + $5.00 = $10.00*

Suppose you are the SECOND MOVER matched with the first mover described above. Your endowment equals $4.00.

What are your total earnings if the first mover invests in Option A? *$4.00*

What are your total earnings if the first mover invests in Option B, the return you observe is LOW, and you announce a LOW return to the first mover?

$4.00 + $2.50 = $6.50	*because*	*First mover's invested endowment*	*$5.00*
		Actual investment return	*100% × $5.00 = $5.00*
		Announced investment return	*100% × $5.00 = $5.00*
		Return paid to the first mover	*1/2 × $5.00 = $2.50*
		Remaining actual investment return	*$5.00 − $2.50 = $2.50*
		Second mover0s total earnings	*$4.00 + $2.50 = $6.50*

What are your total earnings if the first mover invests in Option B, the return you observe is LOW, and you announce a HIGH return to the first mover?

$4.00 + $0.00 = $4.00	*because*	*First mover's invested endowment*	*$5.00*
		Actual investment return	*100% × $5.00 = $5.00*
		Announced investment return	*200% × $5.00 = $10.00*
		Return paid to the first mover	*1/2 × $10.00 = $5.00*
		Remaining actual investment return	*$5.00 − $5.00 = $0.00*
		Second move'0s total earnings	*$4.00 + $0.00 = $4.00*

What are your total earnings if the first mover invests in Option B, the return you observe is HIGH, and you announce a HIGH return to the first mover?

\$4.00 + \$5.00 = \$9.00	*because*	*First mover's invested endowment*	*\$5.00*
		Actual investment return	*200% × \$5.00 = \$10.00*
		Announced investment return	*200% × \$5.00 = \$10.00*
		Return paid to the first mover	*1/2 × \$10.00 = \$5.00*
		Remaining actual investment return	*\$10.00 − \$5.00 = \$5.00*
		Second mover's total earnings	*\$4.00 + \$5.00 = \$9.00*

What are your total earnings if the first mover invests in Option B, the return you observe is HIGH, and you announce a LOW return to the first mover?

\$4.00 + \$7.50 = \$11.50	*because*	*First mover's invested endowment*	*\$5.00*
		Actual investment return	*200% × \$5.00 = \$10.00*
		Announced investment return	*100% × \$5.00 = \$5.00*
		Return paid to the first mover	*1/2 × \$5.00 = \$2.50*
		Remaining actual investment return	*\$10.00 − \$2.50 = \$7.50*
		Second mover's total earnings	*\$4.00 + \$7.50 = \$11.50*

CHECKING YOUR UNDERSTANDING

[COMPUTER TREATMENT – EXPERIMENT 2]

What role will you be assigned at the beginning of phase 2?

Everyone in this room will be assigned the role of second mover. The computer will make first mover choices in every round.

What is the endowment that the first mover will have in every round?

The computer is programmed to have an endowment of \$8.00 in every round.

Will the decisions that you make affect the behavior of the mover you are matched with?

NO, the computer is programmed to ALWAY S invest in Option B.

Will the decisions that you make today affect the payoff of another participant?

No, the payment secured by the computer will NOT be paid to another subject. Your decisions will only affect the payment that YOU receive today.

Suppose you are the SECOND MOVER, your endowment equals \$4.00, and the first mover invests in Option B.

What are your total earnings if the return you observe is LOW and you announce a LOW return to the first mover?

\$4.00 + \$4.00 = \$8.00	*because*	*First mover's invested endowment*	*\$8.00*
		Actual investment return	*100% × \$8.00 = \$8.00*
		Announced investment return	*100% × \$8.00 = \$8.00*
		Return paid to the first mover	*1/2 × \$8.00 = \$4.00*
		Remaining actual investment return	*\$8.00 − \$4.00 = \$4.00*
		Second mover's total earnings	*\$4.00 + \$4.00 = \$8.00*

What are your total earnings if the return you observe is LOW and you announce a HIGH return to the first mover?

$4.00 + $0.00 = $4.00	*because*	*First mover's invested endowment*	*$8.00*
		Actual investment return	*100% × $8.00 = $8.00*
		Announced investment return	*200% × $8.00 = $16.00*
		Return paid to the first mover	*1/2 × $16.00 = $8.00*
		Remaining actual investment return	*$8.00 − $8.00 = $0.00*
		Second mover's total earnings	*$5.00 + $0.00 = $5.00*

What are your total earnings if the return you observe is HIGH and you announce a HIGH return to the first mover?

$4.00 + $8.00 = $12.00	*because*	*First mover's invested endowment*	*$8.00*
		Actual investment return	*200% × $8.00 = $16.00*
		Announced investment return	*200% × $8.00 = $16.00*
		Return paid to the first mover	*1/2 × $16.00 = $8.00*
		Remaining actual investment return	*$16.00 − $8.00 = $8.00*
		Second mover's total earnings	*$4.00 + $8.00 = $12.00*

What are your total earnings if the return you observe is HIGH and you announce a LOW return to the first mover?

$4.00 + $12.00 = $16.00	*because*	*First mover's invested endowment*	*$8.00*
		Actual investment return	*200% × $8.00 = $16.00*
		Announced investment return	*100% × $8.00 = $8.00*
		Return paid to the first mover	*1/2 × $8.00 = $4.00*
		Remaining actual investment return	*$16.00 − $4.00 = $12.00*
		Second mover's total earnings	*$4.00 + $12.00 = $16.00*