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Abstract: We study theoretically and empirically the impact of cheating in leadership elections. Our framework predicts cheaters should be more likely to win elections, and yet be less likely to be followed due to low psychic costs of disobeying dishonest leaders. Our model implies that dishonest leaders create both social inefficiency and inequity. We use controlled laboratory experiments to test these predictions. We compare leadership elections where cheating is and is not possible. Because honest and dishonest leaders are randomly assigned to groups, we obtain causal evidence that cheating to win leadership positions harms social welfare and increases earnings inequality. In addition, we obtain causal evidence that honest leaders generate higher social welfare and less inequality in relation to the control condition where honesty cannot be chosen. Our results highlight that cheating to win can benefit the resulting leader, but their inability to lead effectively increases inequity and creates lower social welfare.

Keywords: Honesty, Election, Leadership, Cheating, Signaling, Cooperation

JEL Classification: D91, C91

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1. INTRODUCTION

Leadership elections are crucial to forming effective groups that promote social welfare and equity (Levy et al., 2011; Acemoglu et al., 2015; Brandts et al., 2015). Within this context electoral integrity is recognized as important¹, but few leadership studies consider the impact of the possibility of cheating in the election process on leadership. Elections can reveal honesty in both leaders and groups². Candidates for leadership positions can use elections to showcase their attributes, such as integrity (Houser et al., 2016; Born et al., 2018; Cooper et al., 2020). However, their honesty can sometimes be a facade (Markussen & Tyran, 2017). Particularly during elections, selfish and dishonest candidates might cheat to gain winning advantages (Woon & Kanthak, 2019). If a leader is suspected of cheating to win, they may be viewed as illegitimate, detrimentally impacting their ability to lead (Biggerstaff et al., 2015). At the same time, the honesty of a group can also be indicated during an election process. If a group includes many cheaters, people may act in a more selfish way (Keizer et al., 2008). The way a leader leads, and the way a group follows, can be influenced by both a leader's and group's honesty, and these in turn can be informed by the decisions they make within an electoral competition.

We develop a model to study how honesty in leadership elections impacts group effectiveness. Building on a number of leadership studies, elected leaders send a cheap-talk signal specifying the amount they would like each person in the group to contribute, including themselves (Levy et al., 2011; Houser et al., 2014). Following the social norm literature (Bicchieri & Xiao, 2009; Kessler & Leider, 2012; Krupka &

¹ Substantial evidence supports the critical impact of a candidate's honesty on voting decisions (Houser et al., 2016; Born et al., 2018; Galeotti & Zizzo, 2018).

² In election process, each candidate can use the decisions they make within an electoral competition to signal their integrity (Houser et al., 2016; Born et al., 2018), meaning both the leader's and group's honesty can be revealed during the election process.

Weber, 2013), we assume that a leader or group member who does not follow that signal incurs a psychic cost that increases when the leader is perceived to be honest. In addition, following the conditional cooperation literature (Rabin, 1993; Fischbacher & Gächter, 2010), we assume a preference to conditionally cooperate with the group's average contribution. We further assume that contributing less than the average contribution produces a psychic cost that increases when the group is perceived to be honest. The model implies that group members are more likely to follow suggestions from leaders perceived to be honest, and that honest groups are more likely to follow each other's contributions. It follows that honest groups with honest leaders are most likely to cooperate effectively, while dishonest groups with dishonest leaders are least likely to be effective.

Our model points to the importance of perceptions of honesty, and therefore the importance of signaling honesty, in leadership and group effectiveness. When a group cannot signal its honesty, we assume the psychic cost of deviating from the average contribution is lower than when the leader and group are perceived to be honest, but still higher than when the leader and group are perceived to be dishonest. Consequently, our model predicts that groups that cannot send honesty signals (or groups where the leaders and followers send different honesty signals) will cooperate at a level that falls between the cooperativeness of honest groups with honest leaders and the cooperativeness of dishonest groups with dishonest leaders.

We test our model's predictions using an incentivized laboratory experiment, in which subjects are randomly assigned into four-person groups. Each group first elects a leader by simultaneously casting ballots. The group member receiving the greatest number of votes becomes the leader. In the case of a tie, the computer randomly decides which of the tied members will be the leader. Each person rolls a die privately and is awarded a number of ballots according to the die roll outcome. Each individual's votes are

publicly observable. In some treatments, it is common knowledge that one can cheat by casting more ballots than one should. Cheating is not possible in the control treatment. After the election, each group plays a ten-round public goods game, with the leader making a contribution suggestion at the beginning of each round.

Our design randomizes whether it is possible to cheat. Groups are formed randomly, thereby randomizing whether an honest group will have an honest or dishonest leader. Similarly, dishonest leaders randomly occur in both honest and dishonest groups. Thus, our randomization strategy provides causal evidence on the impact of honesty in leadership in honest groups, as well as the causal impact of honesty in groups on the effectiveness of groups with dishonest leaders.

We find that groups are most effective when they are perceived to be honest and led by leaders who are perceived to be honest. We also find, consistent with our hypotheses, that honest groups can attenuate the detrimental impact of dishonest leadership: behavior in honest groups with dishonest leaders resembles behavior when neither leaders nor groups can signal their honesty.

We also find substantial evidence of dishonesty when people are able to cheat, and when cheating is possible dishonest people are more likely to be elected as leaders. We find seemingly dishonest leaders are least likely to lead groups effectively. This implies that suspecting a leader is dishonest is enough to harm their ability to lead. Importantly, and consistent with our theory, we find honest leaders promote social welfare and significantly decrease inequity in relation to the control condition where people cannot cheat.

The next section presents the literature review, which is followed by sections on experimental design, theory predictions, results, discussion and conclusion.

2. LITERATURE REVIEW

2.1 HONESTY IN LEADERS AND GROUP EFFECTIVENESS

Many leadership and cooperation studies emphasize the importance of honesty (Mayer et al., 2012; Simons et al., 2015; Eisenkopf, 2020; Blake et al., 2022), a leader's words and actions have a great impact on a group's effectiveness in general and cooperation in particular (Houser et al., 2014; Jack & Recalde, 2015; Cooper et al., 2020). Survey analyses have found that integrity in leadership positively affects cooperation within groups (Brown & Treviño, 2006; Mayer et al., 2012; Bedi et al., 2016); however, other studies have found that honesty among leaders does not always impact followers' behavior (Ciulla, 2004; Wang et al., 2021). Ethical leadership research has called for more causal insights on the relationship between integrity in leadership and group's effectiveness (Banks et al., 2021). Our theory and experiment add new and rigorous evidence to the debate on how the honesty of the leader impacts a group's effectiveness.

One advantage of our study is that it mimics natural environments, in that voters form beliefs about the integrity of the leader without knowing for certain whether the leader is. In contrast, previous experimental studies exploring the effects of a leader's honesty have assumed it is common knowledge whether a leader is dishonest (Beekman et al., 2014; Campos-Vazquez & Mejia, 2016). Further, in our study, dishonesty is signaled through behavior in an election (Markussen & Tyran, 2017). This tracks natural environments, where concerns are often raised about the integrity of government and corporate elections (Woon & Kanthak, 2019). Our study contributes by advancing our understanding of how honesty in a group's election process ultimately impacts group outcomes.

2.2 HONESTY IN GROUPS AND GROUP EFFECTIVENESS

Group-level honesty is also emphasized in leadership literature (Palanski & Yammarino, 2009), where many studies demonstrate the positive impact of group honesty on group effectiveness (Pierce & Snyder, 2008; Newman et al., 2017). This literature argues that honest environments motivate employees to act in a cooperative manner. However, many studies use a leader's honesty to identify the honesty of their group (e.g., Pierce & Snyder, 2008), confounding group (dis)honesty with a leader's (dis)honesty. Recently, studies have recognized the importance of distinguishing leader behavior from group behavior (d'Adda et al., 2017; Banks et al., 2021). Our study contributes to this literature by separating a leader's honesty from their group's honesty, and further exploring how the honesty of leaders and their groups jointly determine a group's effectiveness.

In addition, previous studies have found that when there is low regulation on unethical conduct, some people will choose to cheat even when there is no obvious benefit from cheating (Campos-Vazquez & Mejia, 2016; Markussen & Tyran, 2017). This implies that when cheating is possible, people are more likely to have a dishonest group environment. Further evidence shows that personality is highly associated with norm obedience behavior (Kish-Gephart et al., 2010; Bendahan et al., 2015). Some people will choose to be honest even without any regulation (Gibson et al., 2013). The choice of honesty may be associated with prosocial attitudes, while selfishness is positively associated with cheating in a social dilemma context (De Vries & Van Gelder, 2015). This indicates that selfish people are more likely to cheat when cheating is possible. The implication is that when cheating is possible during an election, as in some of our treatments, selfish cheaters are more likely to become leaders.

3. MODEL AND HYPOTHESES

3.1 A SOCIAL DILEMMA WITHOUT PSYCHIC COSTS

Consider the following repeated public goods game. Each subject i in each round is given E ; the player in the role of a leader suggests a contribution amount g_0 to their group members; then group members (including the leader) decide their contribution g_i simultaneously, $g_i \in [0, E]$, $i \in \{1, 2, \dots, n\}$. In each round, the player i chooses the contribution g_i to maximize the expected payoff π_i :

$$\pi_i = E - g_i + m \sum_{i=1}^n g_i, \quad 1/n < m < 1 \quad (1)$$

where m denotes the constant marginal return from the group account, $m < 1$, so $\partial \pi_i / \partial g_i = -1 + m < 0$. Standard theory predicts that a marginal investment into the group account causes a monetary loss. Given that the leader's suggested amount is a common signal, group members may choose to cooperate with $g_i = g_0 \geq 0$; however, in the absence of psychic cost, the dominant strategy is still to choose $g_i = 0$, $\forall i$.

3.2 A SOCIAL DILEMMA WITH PSYCHIC COSTS

3.2.1 FOLLOWING DECISION

Building on previous work (Bicchieri & Xiao, 2009; Kessler & Leider, 2012), we construct a model to predict the effectiveness of groups. Our intuition is that preferences are modified by psychic costs produced from deviations from the leader's suggested amount or group's average contributions.

$$U_i = \pi_i - C_i \quad (2)$$

Here, U_i denotes the utility of follower i (this includes the leader as a follower to follow his own suggestion in the public goods game) in each round, and C_i denotes a player's psychic cost of deviation. It follows that a group member's payoff is determined as follows:

$$U_i = E - g_i + m \sum_{i=1}^n g_i - C_i, 1/n < m < 1 \quad (3)$$

The psychic cost of follower i is given by

$$C_i = \alpha_i \max(g_0 - g_i, 0) + \beta_i \max\left(\frac{\sum_{i=1}^{n-1} g_{-i}}{n-1} - g_i, 0\right) \quad (4)$$

The psychic cost decreases a group member's utility if g_i is less than the leader's suggested amount g_0 or less than other members' mean contribution $\frac{\sum_{i=1}^{n-1} g_{-i}}{n-1}$.

α_i, β_i represents the player's sensitivity to deviating from the leader's suggested amount and the group's average contribution, respectively. We assume $\alpha_i \geq 0, \beta_i \geq 0$.

The utility function can now be written as follows:

$$U_i = E - g_i + m(g_i + \sum_{i=1}^{n-1} g_{-i}) - \alpha_i \max\{g_0 - g_i, 0\} - \beta_i \max\left\{\frac{\sum_{i=1}^{n-1} g_{-i}}{n-1} - g_i, 0\right\} \quad (5)$$

It is apparent that one will never set $g_i > \max\{g_0, \frac{\sum_{i=1}^{n-1} g_{-i}}{n-1}\}$ because after this point, the increase of g_i will not decrease the psychic cost (constant at zero) but will suffer a loss of $(-1 + m)g_i$ monetary payoff as $m < 1$. Now let's suppose $g_i \leq \min\{g_0, \frac{\sum_{i=1}^{n-1} g_{-i}}{n-1}\}$ (we will show there is the consistency that in equilibrium g_i satisfies this condition), then the utility function can be written as:

$$U_i = E - g_i + m(g_i + \sum_{i=1}^{n-1} g_{-i}) - \alpha_i(g_0 - g_i) - \beta_i\left(\frac{\sum_{i=1}^{n-1} g_{-i}}{n-1} - g_i\right) \quad (6)$$

and reorganize to:

$$U_i = E + (m + \alpha_i + \beta_i - 1)g_i + m \sum_{i=1}^{n-1} g_{-i} + \alpha_i g_0 + \beta_i \frac{\sum_{i=1}^{n-1} g_{-i}}{n-1} \quad (7)$$

Given g_0 and g_{-i} , one's utility is a linear function of g_i , the best response will be a corner solution.

If $m + \alpha_i + \beta_i - 1 < 0$, then $g_i^* = 0$.

If $m + \alpha_i + \beta_i - 1 > 0$, then $g_i^* = g_0$.³

³ This is a symmetric contribution game, in equilibrium, $g_i^* = g_0 \forall i$ and therefore $\frac{\sum_{i=1}^{n-1} g_{-i}}{n-1} = g_0$. The assumption $g_i \leq \min\{g_0, \frac{\sum_{i=1}^{n-1} g_{-i}}{n-1}\}$ is satisfied.

3.2.2 LEADER'S SUGGESTION

When $m + \alpha_i + \beta_i - 1 < 0$, we know $g_i^* = 0 \forall i$. In this case, leader's utility function is (here we use j to distinguish the leader from the follower):

$$U_j = E - \alpha_j g_0 \quad (8)$$

If the leader's suggestion $g_0 > 0$, she will only suffer the psychic cost by deviating from her own suggestion. Therefore, the best response is: $g_0^* = 0$.

When $m + \alpha_i + \beta_i - 1 > 0$, we know $g_i^* = g_0 \forall i$, including the leader's following decision. Taking the contribution decision back into the leader's utility function, we have:

$$U_j = E - g_0 + m(g_0 + (n-1)g_0) - \alpha_j(g_0 - g_0) - \beta_i(g_0 - g_0) \quad (9)$$

which is:

$$U_j = E + (mn - 1)g_0 \quad (10)$$

Since $m > 1/n$, we must have $mn - 1 > 0$. Therefore, the leader's best response is $g_0^* = E$.

Now we solve the equilibrium: If $m + \alpha_i + \beta_i - 1 > 0$, the equilibrium is $g_i^* = g_0^* = E$. Otherwise, the equilibrium is $g_i^* = g_0^* = 0$.

3.2.3 BEHAVIOR PREDICTIONS

Whether the leader will suggest the maximum and the followers will follow the leader's suggestion depends on the probability of $m + \alpha_i + \beta_i - 1 > 0$.

Following the literature (Rabin, 1993; Levine, 1998; Fischbacher & Gächter, 2010), we assume α_i will be affected by the leader's honesty type L , $L \in (HL, DL)$, where HL is an honest leader and DL is a dishonest leader. The parameter α_i is in ordered by

$$0 \leq \alpha_{i,DL} < \alpha_{i,Control} < \alpha_{i,HL} \quad (11)$$

where $\alpha_{i,Control}$ is the value in the control condition, where honesty signals are not possible.

Similarly, we assume β_i will be affected by a group's honesty type G , $G \in (HG, DG)$, where HG is an honest group and DG is a dishonest group. The parameter β_i is ordered by

$$0 \leq \beta_{i,DG} < \beta_{i,Control} < \beta_{i,HG} \quad (12)$$

Similar to the above, $\beta_{i,Control}$ is the parameter in the control condition where cheating is not possible.

From above, we know $m + \alpha_i + \beta_i - 1 > 0$ is more likely to hold in honest leader honest group (HH) than in dishonest leader honest group (DH) than in dishonest leader dishonest group (DD) condition.

Therefore, leaders are more likely to suggest the maximum and the followers are more likely to follow the leader's suggestion in HH, while both are less likely to happen in DD, and DH and Control fall in between.

3.3 HYPOTHESES

3.3.1. Hypotheses regarding cheating in elections

In view of our experiment design, the literature in Section 2 suggests the following hypotheses.

Hypothesis 1: Cheating in elections sometimes but not always occurs when people are able to cheat.

Some groups will have honest leaders, some will have dishonest leaders, some groups will be honest, and some groups will be dishonest.

This hypothesis is a direct consequence of the repeated finding that some but not all people cheat when able to do so (see Section 2).

Hypothesis 2a: As compared to when cheating is not possible, the frequency with which people cast five votes for themselves (the maximum possible votes for self) is greater when people can cheat.

This hypothesis follows from findings that some people cheat to benefit themselves (see Section 2), and winning an election carries benefits in our design.

Hypothesis 2b: As compared to when cheating is not possible, more votes are required to win an election when cheating is possible.

This is a corollary to Hypothesis 2a. Cheating adds to the number of total votes cast during an election and adds to the number of votes that winning candidates receive.

Hypothesis 3: When cheating is possible cheaters are more likely to become leaders than non-cheaters.

Clearly, voting five times for oneself increases the chance, all else equal, that one will win an election, and cheaters are more likely than non-cheaters to cast five votes for themselves.

Hypothesis 4: When cheating is possible leaders are more likely to be selfish than non-leaders.

This follows from Hypothesis 3 and the positive relationship between cheating and selfishness reported in the literature (see Section 2).

3.3.2. Hypotheses regarding the effectiveness of groups

From the model above our study directly obtains the following hypotheses.

Hypothesis 5: Mean group contributions are highest when an honest leader leads an honest group and lowest when a dishonest leader leads a dishonest group, whereas average contributions when a dishonest leader leads an honest group and the control conditions will fall between.

Hypothesis 6: The frequency of full cooperation is highest in HH and lowest in DD, while the frequency of free-riding is highest in DD and lowest in HH. The frequencies in DH and Control will fall between.

Hypothesis 7a: The frequency with which leader's suggest the maximum amount is highest in HH and lowest in DD.

Note that this hypothesis follows from the fact that the leader's best response is to suggest the maximum amount if their sensitivity toward the social norms is sufficiently high (see Section 3.2.2).

Hypothesis 7b: The leader's actual contributions are highest in HH, and lowest in DD.

This is a corollary to Hypothesis 7a, as a group member, the leader's best response is also to contribute all if their sensitivity toward the social norms is enough high. Therefore, the honest leaders tend to contribute more compared to dishonest leaders (see Section 3.2).

Hypothesis 8: The frequency of deviations from leaders' suggestions is highest in DD and lowest in HH. The frequencies in DH and Control will fall between.

This hypothesis follows from the model (see Section 3.2.1). When group members believe others are honest, the group members will lose utility if they deviate from the honest leader's suggestion. This provides an incentive for group members to follow the group and the leader. When group members believe others are dishonest, deviating will not increase psychic cost; contribute 0 is the dominant strategy as well. In the absence of information about honesty, the costs of deviation lie between these two cases.

Hypothesis 9: Social welfare is lowest in DD and highest in HH. Social welfare in DH and Control will fall between.

This hypothesis follows from the literature and model. The previous literature suggests that honest people are more likely to allocate to others. The model also shows that honesty can increase cooperation in groups. It follows that social welfare should be highest in HH and lowest in DD.

4. EXPERIMENT DESIGN

Our goal is to test the impact of honesty (both the leader's and the group's) on a group's effectiveness. Our design includes three primary stages. At the beginning of each session, participants were provided full information about all three stages of the experiment. Instructions were read aloud by the experimenter. Subjects answered several short quizzes to guarantee that they understood the instructions for each part of the experiment. Answers were checked by the experimenter, and the experiment did not begin until all subjects answered the questions correctly.

Prior to beginning in Stage 1, subjects are randomly assigned to four-person groups. Group composition does not change during the experiment. Stage 1 is a leader election process. Subjects are randomly assigned into two treatments that differ according to whether it is possible to cheat. In the cheating treatment, we introduce the possibility of cheating in an election process. The numbers of votes cast serve as a public signal of whether group members or the elected leader cheated. This signals the leader's honesty type and the group's honesty type, the combinations of which form the four conditions we study. We also include a control treatment where there is no possibility to cheat during the election.

In Stage 2, subjects make decisions in a dictator game. Each person is told to assume they have been elected leader when making decisions. Actual payments are determined by the elected leader's decision, but the leaders' distributions to the group members are not revealed until the end of the experiment. The leader's role is to decide how to allocate 300 experimental currency units (ECs) among the group, which will be converted to RMBs. The purpose of this stage is both to provide an incentive to become the leader, as well as to obtain data on each participant's prosociality. We use the latter to test Hypothesis 4 regarding

the selfishness of elected leaders when it is and is not possible to cheat during elections.

In Stage 3, participants make decisions in a public goods game with leader suggestions. This stage provides information regarding effectiveness of different types of honest groups under different types of honest leaders.

Table 1 summarizes the structure of the experiment and provides detailed descriptions of each stage of our experiment.

Table 1. Experiment design structure

Stage 1	Leader election: Die rolling game				
	Cheating Treatment		Control Treatment		
	HH	HD	DH	DD	No information about honesty
Stage 2	Money allocation: Dictator game				
	Each group member makes a distribution decision assuming they are the leader				
Stage 3	Group cooperation: Public goods game				
	Leader sends a message to group members. Each group member decides how to invest the endowment in a group public project.				

4.1 LEADER ELECTION STAGE

In this stage, the four members of each group vote to elect a leader for the group. Participants first play a die-rolling game to determine the number of voting rights. Each member can have 0-5 votes. The number of voting rights for each member is determined by the die points. A 6-sided die and a cup are provided to each participant. Participants roll the die twice. The first roll decides how many voting rights the participant receives. The relationship between die points and voting rights numbers is shown in table 2⁴. The second roll serves only to make sure that the die is working properly. This table shows that rolling 5 is the most profitable outcome to win the election.

⁴ This payoff structure provides a powerful way to detect cheating in the die-rolling game.

Table 2. The relationship between rolled dice number and voting rights

Dice number:	1	2	3	4	5	6
Voting rights:	1 vote	1 vote	1 vote	3 votes	5 votes	0 vote

Participants are randomly assigned into two treatments in this game. In the cheating treatment, people can signal their honesty based on the die points report with the opportunity to cheat. In the control condition, subjects must be honest and cannot signal their honesty. This benchmark allows us to investigate how leadership efficiency varies compared to the no-signaling environments. Details are shown below.

In the cheating treatment, participants play the die-roll game by themselves and self-report their first roll on the computer screen. Participants in the cheating treatment are informed that:

Once you finish rolling, you need to record your first roll on the computer screen, which will determine your voting rights.

In the control treatment, participants roll the die while being monitored by the experimenter. The experimenter records their first roll on the computer screen. Participants in the control treatment are informed that:

Once you finish rolling, the experimenter will record your first roll on the computer screen, which will determine your voting rights.

After each subject's voting right numbers are determined, the four members in each group begin to vote, by assigning the votes they own to members in the group. Subjects are allowed to divide votes among multiple members of the group, including themselves. The subject who receives the most votes become the leader. In the case of a tie, the computer randomly decides which of the tied members will be the leader. It is worth noting that the voting result are not revealed to each group member until everyone has completed

the dictator task. However, subjects are informed of the voting right number that each subject received through the die rolling game.

4.2 ALLOCATION STAGE

Before the group members learn the outcome of the election, each member decides how much they will distribute, conditional on winning the election. Specifically, each of the group members has a chance to decide how to allocate 300 ECs among the group members. Subjects can distribute any amount from the 300 ECs to each of the other three group members. However, the payoff of this stage is determined only by the actual leader's distribute decision, and the leader keeps the remainder that is not distributed. Once everyone finishes this distribution decision, the leader of the group is revealed. Subjects are informed of the total votes each subject received in the leader election process. This information allows the subject to make a judgment regarding whether their leader and group members are honest. Note that the leaders' distributions to the group members are not revealed until the end of the experiment.

4.3 GROUP COOPERATION STAGE

In this stage, groups play a ten-round public goods game. Like the classical public goods game, each group member receives 20 ECs as their endowment at the beginning of each round and makes simultaneous contribute decisions via the software's user interface. The difference here is that leaders suggest a contribution amount to all followers before any contribution decisions are made. A constant marginal return rate is informed at the beginning of Stage 3. The marginal return rate determines the marginal return each subject receives from the group contribution account. In our setting, each participant's return from the group

account was 0.5 times the group's total contribution in the public goods. The final profit from this stage depends on how many ECs participants have accumulated over 10 rounds.

To begin, the leader sends an identical suggestion to each follower, as follows: "Let's contribute X EC to the group account." The leader can only communicate by entering a number X, where X is an integer between 0 and 20. Then, group members, including the leader, make contribution decisions simultaneously. It is common information to the subjects that: (1) each follower receives the same message from the leader; (2) everyone makes their decisions after observing the leader's message; and (3) the message is an unenforceable suggestion. At the end of each round, subjects are only informed about the total investment amount in the group account for this round and their own earnings for this round. After subjects complete Stage 3, the demographics information was collected.

4.4 PARTICIPANTS AND PROCEDURES

The experiment was computerized using oTree (Chen, Schonger & Wickens, 2016) and conducted in the laboratory of the Business School in Central South University in China. In total, 472 subjects participated in the experiment⁵. The detail of the participants is shown in Table 3. The final payoff of each subject depends on how many ECs subjects accumulated in the experimental tasks. At the end of the session, ECs were exchanged at the rate of 10 ECs = 1RMB, and each subject was paid individually and privately. On average, subjects were in the lab for about 60 mins and earned 45.34 RMB, including a show-up fee of 5 RMB. Our specific procedures are detailed in the experiment's instructions (see Appendix).

⁵ The power of our design was discussed in the results section below.

Table 3. Summary statistics of the subjects within each treatment

Variables	Cheating treatment	Control treatment
Number	372	100
Sessions	22 sessions (93 groups)	6 sessions (25 groups)
Age	20.99 \pm 2.03(Min = 18, Max = 31)	21.10 \pm 1.89(Min = 18, Max = 27)
Gender	195 males; 177 females (47.58%)	53 males; 47 females (47.00%)
Education	84.41% undergraduate	88.00% undergraduate

5. RESULTS

5.1 TREATMENT DIFFERENCES IN CHEATING AND DICTATOR GAMES

Figure 1 shows the distributions of subjects' die rolling outcomes, by treatments. The control condition shows what happens if no one can cheat in the leader election process. The cheating treatment observes what happens when people can choose to behave unethically without detection. Figure 1 presents the difference of individual behavior in the die rolling game between two treatments, to help readers get a sense of the prevalence of misreporting (Fischbacher & Föllmi-Heusi, 2013). Overall, the distributions of reported outcomes are significantly different in the two treatments ($p < 0.001$, two-sided Kolmogorov-Smirnov test).

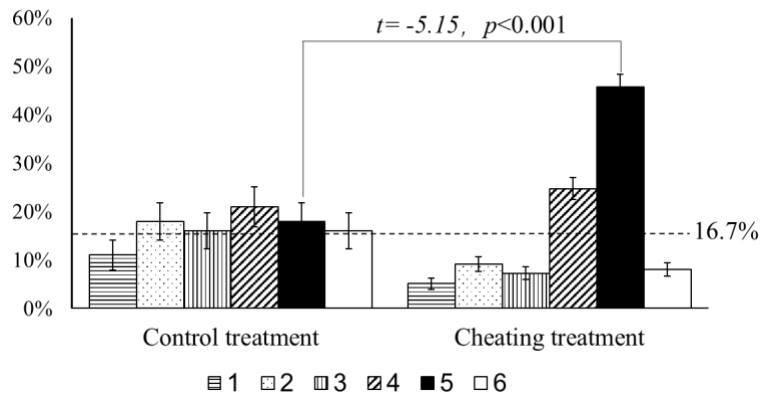


Figure 1. Distributions of reported outcomes in die rolling game by treatment

Note: N (Control treatment) = 100, N (Cheating treatment) = 372

In the cheating treatment, 45.70% of subjects reported 5, which is significantly higher than the expected frequency of 1/6 (16.67%, $p < 0.001$, two-sided Mann-Whitney U-test), and significantly higher than the frequency of reporting 5 (18.00%) in the control condition ($p < 0.001$, two-sided Mann-Whitney U-test). Consistent with previous findings (Houser et al., 2012; d'Adda et al., 2017; Woon & Kanthak, 2019), when there is an opportunity to cheat, misreporting is the dominant superiority strategy to obtain the most profitable outcome. Considering the frequency of misreporting outcomes, we observe a significant difference in cheating behaviors between treatments.

Result 1. *Consistent with Hypothesis 1, cheating occurs when people are able to cheat.*

Turning to Hypothesis 2a, we obtain clear evidence that people are more likely to cast five votes for themselves when cheating is possible. Specifically, results reveal that the frequency with people cast five votes for themselves is significantly greater in cheating treatment (37.90%) compared to the control treatment (15.00%, $p < 0.001$, two-sided Mann-Whitney U-test).

Result 2a. *Consistent with Hypothesis 2a, the frequency with people cast five votes for themselves is greater when people are able to cheat.*

Further, evidence shows that people need more votes to win the election when cheating is possible. On average, the total votes people need to become leaders are significantly higher in cheating treatment (5.24) compared to the control treatment (3.82, $p < 0.001$, two-sided Mann-Whitney U-test).

Result 2b. *Consistent with Hypothesis 2b, more votes are required to win an election when people are able to cheat.*

Turning to Hypothesis 3, additional evidence reveals that cheaters are more likely to become leaders when cheating is possible. We conduct a dummy variable “cast five ballots” to identify subject’s cheating

behavior and “potential leader⁶” to identify whether one becomes a leader. If subject cast five ballots, “cast five ballots” were coded as 1. Otherwise, “cast five ballots” were coded as 0. We predict that the probability of becoming the leaders varies by this “cast five ballots” variable and conduct a logistic regression with “potential leader” as the dependent variable in Table 4. The result show that the people who cast five ballots are more likely to become leaders than people who don’t cast five ballots, and this “cast five ballots” effect exist in both treatments. Combining the frequency of “cast five ballots” behavior (as shown in Figure 1) with the regression results in Table 4, we find that cheaters are more likely to become leaders when cheating is possible. Conditional on cheating, the probability of becoming a leader is 45.88%, if one is honest, the probability of becoming a leader is only 7.43%.

Table 4. Regression of casting five ballots effect on potential leaders by treatment

VARIABLES	Cheating treatment	Control treatment
Cast five ballots	3.029*** (0.29)	3.42*** (0.80)
Constant	-2.15*** (0.23)	-1.34*** (0.27)
<i>Pseudo/Adjusted R²</i>	0.31	0.24
Observations	372	100

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Result 3. *Consistent with Hypothesis 3, cheaters are more likely to become leaders than non-cheaters when people are able to cheat.*

⁶ The computer randomly determines the leader when there is a tie. Consequently, some subjects are potential but not realized leaders.

Figure 2 describes how likely potential leaders and non-potential leaders are to send nothing in the dictator game. In the cheating treatment, where people can cheat to be leaders, the percentage of potential leaders who allocate zero for others is significantly higher than for non-leaders ($p < 0.001$, two-sided Mann-Whitney U-test). In the control treatment, where people have no chance to cheat to be leaders, the percentage allocating zero to others is not significantly different between potential leaders and non-leaders ($p = 0.837$, two-sided Mann-Whitney U-test). Logit regressions reveal that the interaction between treatment and potential leader significantly increases the likelihood of allocating zero to others ($p = 0.037$, z-test).

Result 4. *Consistent with Hypothesis 4, potential leaders are more selfish than non-leaders when people are able to cheat.*

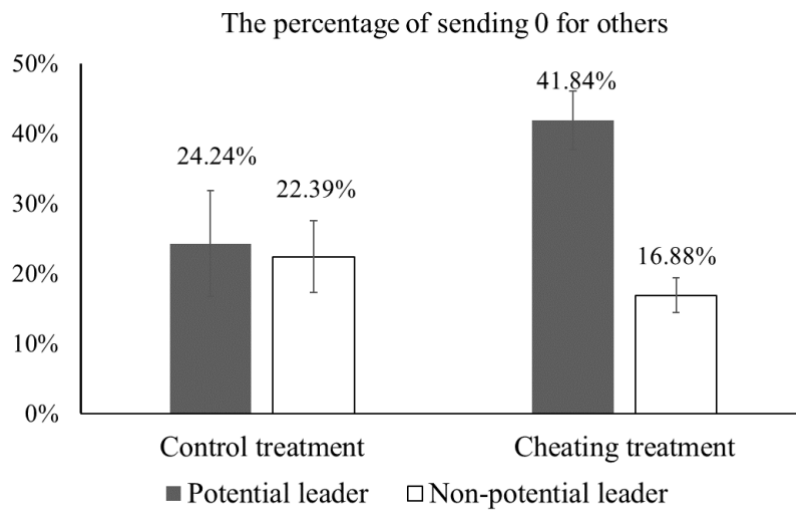


Figure 2. The allocation outcome in the dictator game by treatment

Note: N (Potential leader/Control treatment) = 33, N (Potential leader/Cheating treatment) = 141

5.2 HONESTY EFFECTS

5.2.1 IDENTIFICATION OF HONESTY

Following the previous die-rolling literature (Fischbacher & Föllmi-Heusi, 2013; d'Adda et al., 2017) and using Bayesian inference⁷, binary variables were constructed to identify honest leaders and honest groups. Reporting 5 is assumed as a dishonest signal, while not reporting 5 is an honest signal. Leaders who did not report “5” were identified as honest. Leaders who reported “5” were classified as dishonest. Similarly, groups were classified as honest when, at most, one person reported “5.” Otherwise, the group was classified as dishonest⁸.

These classifications result in four realized conditions, the number of observations of which are shown in Table 5⁹. Note that it is very hard for honest leaders to emerge from dishonest groups¹⁰, so this condition does not appear in our analysis.

⁷ DePaulo et al. (1996) asked people how often they lied and found that lying accounts for 20-31% of their social interactions. Assuming the prior probability that others are honest is 75%, when a leader reports 5 the posterior probability the leader is honest decreases to 33.33%. Similarly, if only one group member reports 5, the posterior probability the group is entirely honest is 53.70%.

⁸ Our classification approaches, like all classification approaches, are unavoidably arbitrary. That said, the connection between selfishness and dishonest leaders we report below resonates with previous studies that link dishonesty and selfishness (e.g., De Vries & Van Gelder, 2015). Note further that the consequences of misclassifications are only to our interpretations of a leader's behavior. For the followers, their perception of leader's honesty is lower when the leader reports 5.

⁹ The realized power of our design to detect aggregate differences between types of groups is limited due to the number of groups, but we have significant power to detect differences between leader and follower behavior. A post hoc analysis indicates 58% power to detect a difference in group mean contributions between HH and DD, and 35% power to detect differences between HH and DH. Regarding the absolute deviation between followers' contributions and leaders' suggestions, we obtain over 96% power to detect a difference between HH and DD, and 85% power to detect a difference between HH and DH.

¹⁰ Only two honest leaders emerge from dishonest groups.

Table 5. Sample distribution

	Cheating Possible			Cheating not Possible
Treatment	HH	DH	DD	Control
Observations	52	96	216	100
Groups	13	24	54	25

5.2.2 GROUP EFFECTIVENESS

Figure 3 presents the average group contribution over ten rounds for the four different conditions. It reveals a significant decline in group contribution over time; however, group contributions are always higher in HH relative to other conditions. Group contributions are uniformly lower in DD relative to both DH and Control. The results also reveal that the group contributions in the control condition are slightly below the average group contribution in DH in all rounds.

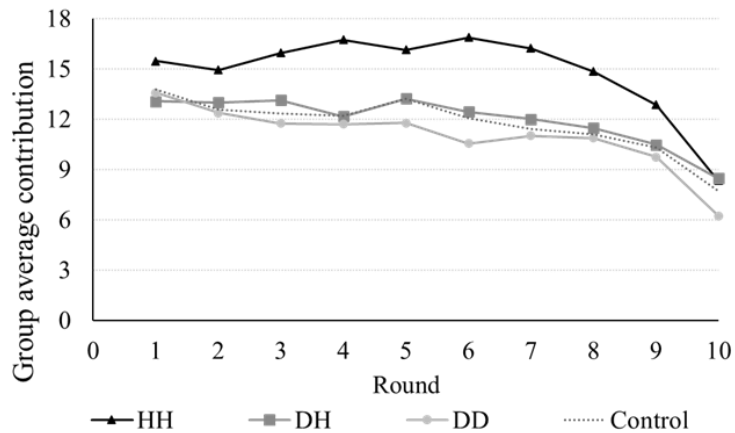


Figure 3. Group average contribution over ten rounds

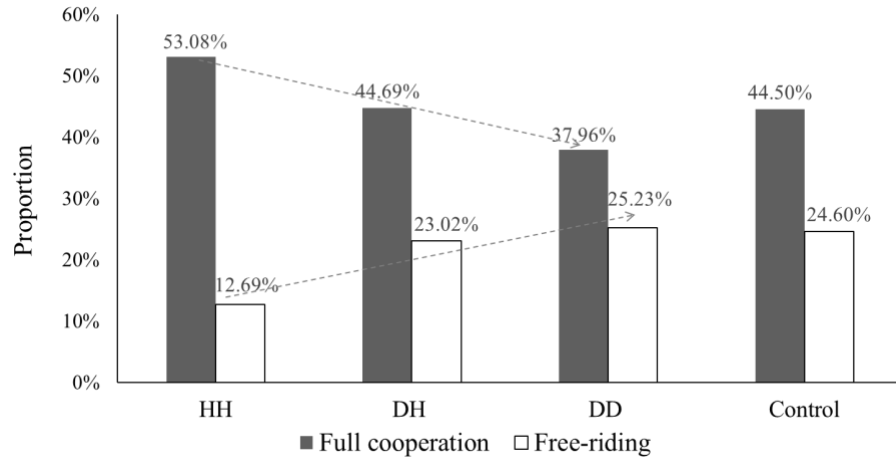


Figure 4. Full cooperation and free-riding proportion

Figure 4 provides proportions of full cooperation and free-riding by condition. Results show that full cooperation is highest in HH; 53.08% of people contribute everything to the group account, while only 37.96% of people contribute all in DD. Additionally, the proportion of full cooperation under Control is higher than in DD. Free-riding is highest in DD and lowest in HH.

We test the null hypotheses that group contributions, full cooperation, and free-riding do not differ among honesty contexts. The results show significant downward trends in group contribution ($p = 0.025$) and full cooperation ($p = 0.001$), while showing an increasing trend for free riding ($p = 0.002$; all p-values based on Jonckheere-Terpstra tests). These results support the following result.

Result 5. *Consistent with Hypothesis 5, group contributions are highest in HH and lowest in DD. Group contributions in DH and Control fall between HH and DD.*

Result 6. *Consistent with Hypothesis 6, the frequency of full cooperation is highest in HH and lowest in DD, while free-riding is highest in DD and lowest in HH. For both full cooperation and free-riding, DH and Control fall between HH and DD.*

5.2.3 LEADER'S BEHAVIOR

The actual suggestions of leaders show no significant difference between the control and cheating treatments using ten-round average observations, which is 16.63 versus 15.80 respectively ($p = 0.434$, two-sided Mann-Whitney U-test). However, the difference in the variances of leaders' average deviation from their own suggestions between the two treatments is marginally significant, ($p = 0.080$, Chi-square test).

Figure 5 shows the proportion of suggesting the maximum amount in four conditions. Results show that the frequency of suggesting the maximum amount is highest in HH; 75.38% of leaders suggest followers contribute all to the group account, while only 60.74% of leaders suggest 20 in DD. Additionally, the frequency of suggesting the maximum amount under DH is higher than in DD. The Jonckheere-Terpstra tests show a marginal significant downward trend in leader's suggesting maximum behaviors ($p = 0.074$).

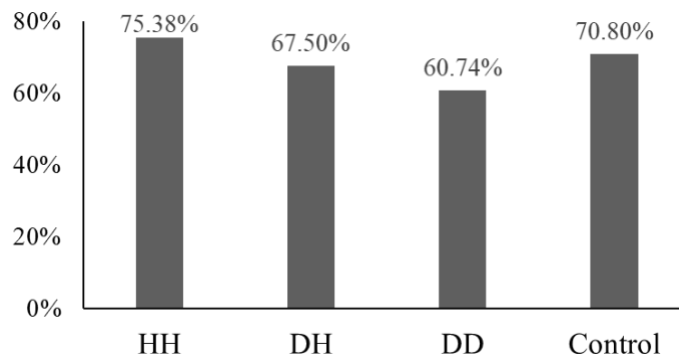


Figure 5. The proportion of suggesting the maximum amount

Result 7a. *Consistent with Hypothesis 7a, leaders are more likely to suggest the maximum in HH and least likely to do so in DD.*

To shed further light on the leader's leading behaviors, Figure 6 presents the leaders' suggestions and contributions. Two-sided Mann-Whitney U-tests show that the average leader suggestions do not differ significantly among HH and DH ($p = 0.278$), HH and DD ($p = 0.156$), HH and Control ($p = 0.509$). Leader contributions in HH are statistically higher than DD ($p = 0.041$, two-sided Mann-Whitney U-test). The

Jonckheere-Terpstra tests show a significant downward trend in leader contribution ($p = 0.026$). We also detail leader contributions by round¹¹. These results support the following result.

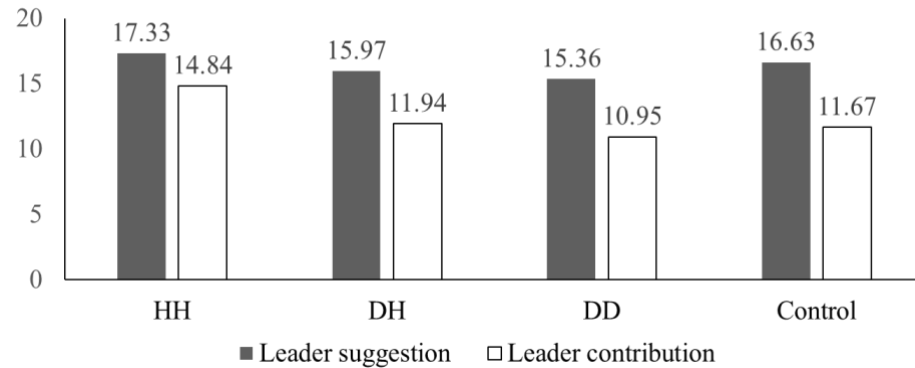


Figure 6. Leader suggestion and contribution by condition

Result 7b. *Consistent with Hypothesis 7b, leader's contributions are highest in HH and lowest in DD.*

5.2.4 FOLLOWER'S BEHAVIOR

We next focus on how group members respond to a leader's suggestion. Figure 7 details how group members deviate from leaders' suggestions across conditions. The absolute deviation percentage from leaders' suggestions is lowest in HH, which is significantly lower than DH ($p = 0.007$, two-sided Mann-Whitney U-test), DD ($p < 0.001$, two-sided Mann-Whitney U-test), and Control ($p = 0.002$, two-sided Mann-Whitney U-test)¹². But there is no difference between DD and Control ($p = 0.882$, two-sided Mann-Whitney U-test). Jonckheere-Terpstra tests provide evidence supporting the fact that deviations are lowest in HH and highest in DD, with DH falling between those two conditions ($p < 0.001$).

¹¹ The leader contribution by round is presented in Figure A1 in the appendix. Over the 10 rounds, leader contributions are always higher in HH than in other conditions.

¹² When conducting this analysis, we removed two outliers from Control. In both cases, the leaders suggested a very small amount, and yet a group member contributed a substantial amount, creating a very large percentage deviation.

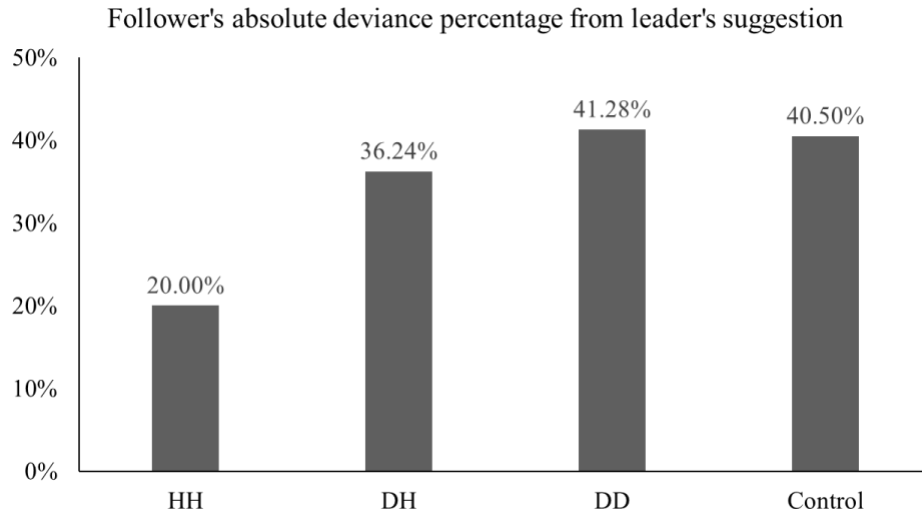


Figure 7. Follower's deviance behaviors

Figure 8 further focuses on contributing less conditions and explore the percentage and magnitude of followers' deviations from their leaders' suggestions¹³. We explore how often followers gave less money than the leader suggested. The results show that followers were most likely to give less than the leader suggested in DD and least likely in HH, while DH and Control lie between those two conditions ($p = 0.019$, Jonckheere-Terpstra test). We do not find any statistically significant difference between Control and DD ($p = 0.776$, two-sided Mann-Whitney U-test). Where followers decided to give less than a suggestion, the percentage deviation by followers is highest in DD and lowest in HH, while DH and Control fall between ($p = 0.003$, Jonckheere-Terpstra test). Both the percentage of followers deviating from the leader's suggestion and the magnitude of followers' deviations varies by condition.

¹³ We further explore the relationship between leaders' suggestions and followers' contributions. The scatter plot of leader suggestion and follower contributions is provided in Figure A2 in the Appendix. Results indicate that many participants contribute less than the leader's suggestion, but this differs by condition.

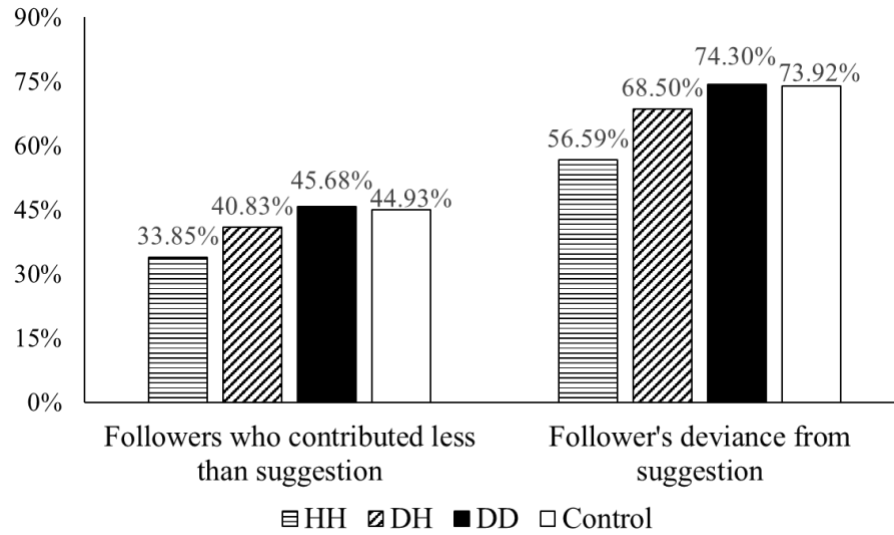


Figure 8. Follower deviance behavior conditional on giving less

These findings support the following result.

Result 8. *Consistent with Hypothesis 8, followers are most likely to deviate from their leaders' suggestions in DD and least likely in HH, with DH and Control falling between.*

5.2.5 SOCIAL WELFARE

Aggregating subjects' earnings in the dictator game and public goods game, our results show a hidden social benefit of honesty. Overall social welfare is higher in cases that include only honest people as compared to cases that include one or more dishonest people ($p < 0.001$, two-sided Mann-Whitney U-test), and also higher than found in the control condition ($p = 0.004$, two-sided Mann-Whitney U-test). Figure 9 shows social welfare in the four conditions. A Jonckheere-Terpstra test shows a significant downward trend in social welfare as dishonesty increases ($p = 0.003$). Social welfare is highest in HH and lowest in DD, with DH and Control falling between. This is driven by the fact that the average public goods game payoffs in HH are significantly higher than DH ($p = 0.005$, two-sided Mann-Whitney U-test), DD ($p < 0.001$, two-sided Mann-Whitney U-test) and Control ($p = 0.005$, two-sided Mann-Whitney U-test).

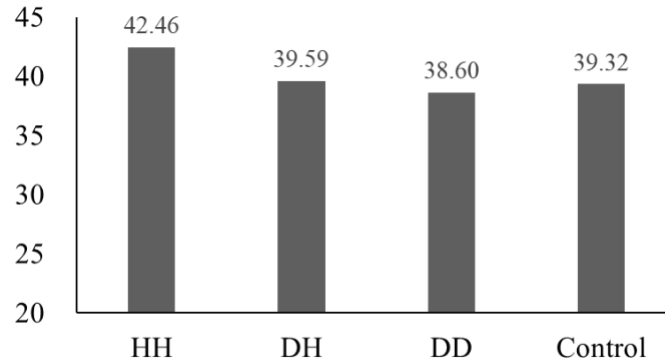


Figure 9. Social welfare

Honesty also promotes earnings equality. One reason is that honest leaders allocate about 50% to followers in the dictator game, while dishonest leaders only allocate 23.95% to others ($p = 0.008$, two-sided Mann-Whitney U-test)¹⁴. At the same time, the variance of earnings in HH is statistically significantly lower than in DH ($p = 0.002$, F-test), DD ($p = 0.002$, F-test) and Control ($p = 0.031$, F-test).

These findings support the following result.

Result 9. *Consistent with Hypothesis 9, social welfare is lowest in DD and highest in HH, with DH and Control falling between.*

6. DISCUSSION

Our work contributes to the election and leadership literature. Many studies support the idea that elections enhance the effectiveness of leaders (Hamman, Weber & Woon, 2011; Levy et al., 2011; Brandts et al., 2015) and some have investigated the negative impact of cheating to win (Markussen & Tyran, 2017; Woon & Kanthak, 2019). We find substantial cheating in elections, and that when people are able to cheat during an election process, selfish cheaters are more likely to become leaders. We also find that not

¹⁴ The honest people and dishonest people's dictator decisions are presented in Figure A3 in the appendix. Honest people are more prosocial in the dictator game compared to their dishonest counterparts.

everyone cheats, so that elections can signal the integrity of both leaders and the groups from which they emerge. Others have suggested that signaling honesty is a key to effective leadership (Banks et al., 2021). Our model points to the reason: people feel little psychic cost to disobeying leaders they perceive as dishonest, and this creates a downward spiral of cooperation which ultimately leads to reduced social welfare and increased inequity.

Our finding that leaders who signal honesty are more effective than those who cannot has important practical implications for management of firms. Honest and ethical environments are surely important (Keizer et al., 2008; Gino, Krupka & Weber, 2013), yet our findings suggest that mandating honesty, for example through heavy monitoring, is not enough. Rather than heavy monitoring, a leader's ethical conducts play a more important role in followers' behaviors (Nagin et al., 2002). It is crucial that leaders and members of their group can signal they are honest.

Our findings matter for the natural environments. There is much evidence that people cheat to win competitions in various contexts¹⁵. Leaders suspected of being dishonest are more likely to be fired and their firms more likely to experience large losses (Biggerstaff et al., 2015). Moreover, both empirical findings and real world examples indicate that deception occurs in the leader selection process (Markussena & Tyran, 2017; Woon & Kanthak, 2019). While one may not be able to determine with certainty whether a winner cheated, our results are the first to show that simply suspecting that a leader is dishonest is enough to harm their ability to lead effectively. Our design mimics the naturally occurring process of electoral competition, and provide important insights on the causal effect of honest leaders on group effectiveness.

¹⁵For example, people may cheat to obtain promotions or to win other types of tournaments (Conrads et al., 2014).

This adds new and rigorous evidence to the call for casual insights on factors impacting leadership (Antonakis, 2017; Podsakoff & Podsakoff, 2019; Kosfeld, 2020).

A limitation of our study is that honest people have almost no chance of being elected when they are part of a dishonest group. This may have ecological validity, but it nevertheless means we are not able to study the impact of honest leadership on a dishonest group. Another limitation is that our study focuses exclusively on the impact of honesty in groups and leaders on group effectiveness. Previous studies point to other effective channels to increase leadership effectiveness, including the role of material incentives (Brandts & Cooper, 2006; 2007; Cappelen et al., 2016; Antonakis, 2022), communication (Levy et al., 2011), or intergroup competition (Eisenkopf, 2020). It would be profitable for future studies to investigate the interplay of these factors with honesty in driving effective ethical leadership.

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ONLINE APPENDIX: SUPPLEMENTARY ANALYSES AND INSTRUCTIONS

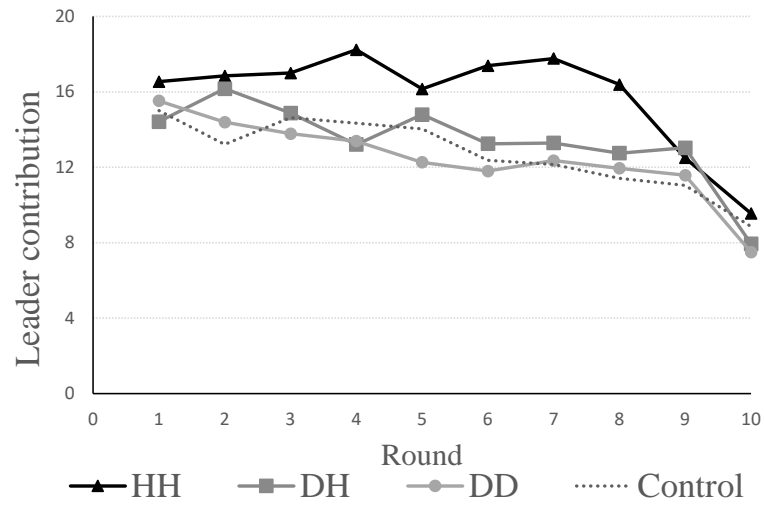


Figure A1 Leader contribution over ten rounds

Note: The figure shows that leader contribution is uniformly higher in the honest leader honest group condition compared to other conditions.

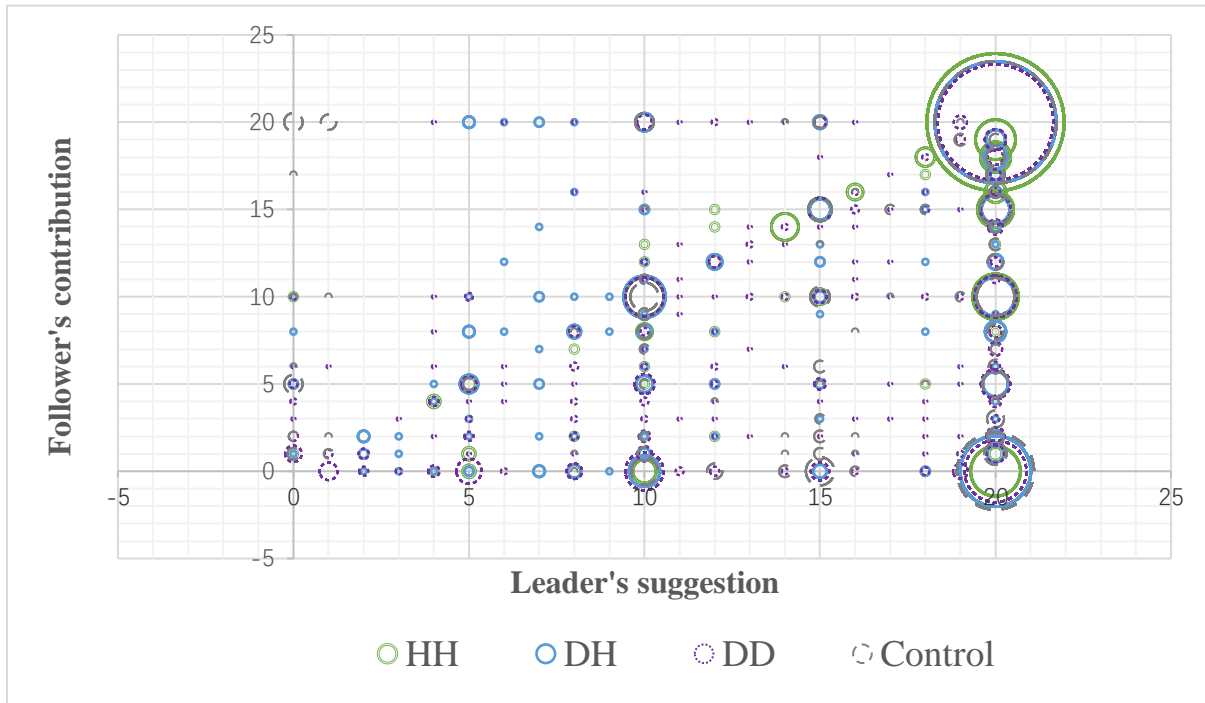


Figure A2 Scatter plot of leader suggestion and follower contribution

Note: The figure describes the percentage of each plot in the bubble diagram. As we can see from the figure, the largest bubble showed up in the upper right corner, which means leaders most often recommend contributing 20, and followers often contribute exactly the same as leader's suggestion; however, this varied across the four conditions. Specifically, the bubble sizes indicate that there are fewer people choosing to contribute 20 in the dishonest leader dishonest group condition compared to other conditions.

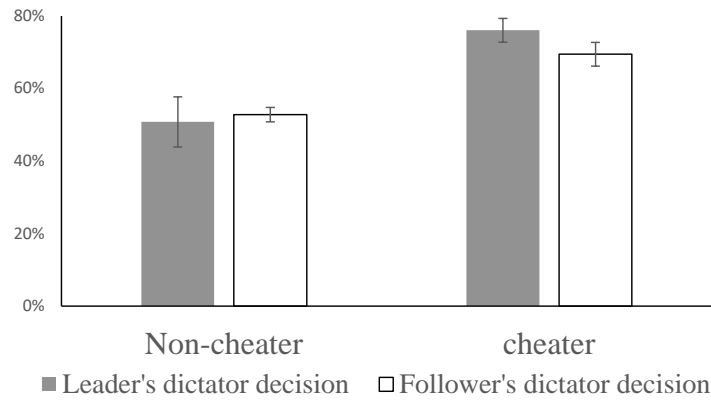


Figure A3 Subject's kept percentage in dictator game

Note: The figure shows how much subjects kept in the dictator game. As we can see from the figure, honest leaders kept much less compared to cheating leaders ($p = 0.008$, two-sided Mann-Whitney U-test). Honest followers also kept much less compared to cheating followers ($p < 0.001$, two-sided Mann-Whitney U-test). But there is no significant difference between cheating leaders and followers ($p = 0.137$, two-sided Mann-Whitney U-test).

INSTRUCTIONS

Welcome page

Welcome to today's experiment! You've earned 5 Yuan for showing up on time, and you can earn more money for the experiment. At the end of the experiment, you will be paid privately in cash.

The instructions explain how you can make decisions to earn more money. So please read these instructions carefully!

Before the experiment is officially started, we will ask you to answer some test questions to ensure your understanding of the experiment rules. The experiment can only be started after all the subjects have answered correctly.

There is no talking at any time during this experiment. If you have a question, please raise your hand, and an experimenter will assist you. Please remain in your seat throughout the experiment. Those who violate the rules will be ejected.

Overall description

The experiment includes three stages. You will be randomly assigned to a group with 3 other participants. The composition of each group will NOT change during the entire experiment. You won't know the identities of your group members. Momentarily, you will be interacting with some of them over the computer in a series of simple group tasks that determines your earnings from this experiment.

The Experimental Currency (EC) will be used in the experiment. The exchange rate between EC and RMB is: 10 ECs= 1RMB. All EC you earn in the experiment will be exchange to RMB and paid to you at the end the experiment.

Stage 1:

In this stage, the four members of each group will vote to elect a leader for the group. The elected one will be the leader of the group through out of the experiment.

Determine the number of voting right

Each member can have 0-5 votes. The number of voting right for each member is determined by rolling a die. The procedure is as follows:

A 6-sided die and a cup will be provided to each of you. You will roll your die twice. Your first roll decides on how many voting right you get, according to the table below. Specifically, if you roll 1, 2, or 3 dice for the first time, the number of voting right you get is 1; if you roll 4 dice for the first time, the number of voting right you get is 3; if you roll 5 dice for the first time, the number of voting right you get is 5; if you roll 6 dice for the first time, the number of voting right you get is 0.

The second roll only serves to make sure that the die is working properly. You may of course roll the die more than twice. However, only the first roll counts.

Dice number:	1	2	3	4	5	6
Voting rights:	1 vote	1 vote	1 vote	3 votes	5 votes	0 vote

Please wait until the experimenter tells you to roll the dice, please click the button below “start rolling the die” to roll the die when the experimenter asks you to roll the dice. Please do not to roll the dice out of the cup.

[Have the possibility to cheat to be a leader Condition]

Once you finish rolling, you need to record your first roll on the computer screen (the interface is shown in the figure below), which will determine your votes according to the table above.

[Not possible to cheat to be a leader Condition] (Control treatment)

Once you finish rolling, the experimenter will record your first roll on the computer screen (the interface is shown in the figure below), which will determine your votes according to the table above.

Now, please enter the number:

Number rolled:	1	2	3	4	5	6
Voting right number:	1	1	1	3	5	0

[Next](#)

Presenting the die rolling outcomes

The die rolling outcomes will be revealed to each group member after everyone has completed the task (the interface is shown in the figure below).

The die rolling outcomes

Group ID	Number rolled	Voting right number
D (You)	1	1
A	4	3
B	6	0
C	5	5

Your group ID is D, your first dice number is 1, the number of voting right you receive is 1

If you have finished reading, please click on the "next" button to enter the voting task.

[Next](#)

Election

After each of the group member's voting right number are determined, the four members in each group will start to vote, by assigning the votes she own to members in the group. You are allowed to divide votes to multiple members in the group, including yourself. The one who receive the most votes will be elected to be the leader. Please enter the number of votes you have decided to vote for each member, which can be from 0 to the number of votes you have obtained (the interface is shown in the figure

below). The total number of votes cast for four members is the number of votes you have obtained. In case of a tie, the computer will randomly decide which of the tied members to be the leader.

Stage One——Election

You are allowed to divide votes to multiple members in the group, including yourself.

Please enter the number of votes you have decided to vote for each member, which can be from 0 to the number of votes you have obtained.

The total number of votes cast for four members is the number of votes you have obtained.

The one who receive the most votes will be elected to be the leader. In case of a tie, the computer will randomly decide which of the tied members to be the leader.

Your group ID is A, the number of voting right you receive is **3**.

How much will you vote to A? (If not, enter 0):

How much will you vote to B?(If not, enter 0):

How much will you vote to C?(If not, enter 0):

How much will you vote to D?(If not, enter 0):

If you have voted, please click the "submit" button

The election result

The voting result will be revealed to each group member at the end of stage 2 (the interface is shown in the figure below).

The election result

A (You)	Number rolled: 4	Voting right number: 3	Voting results: 3votes
B	Number rolled: 6	Voting right number: 0	Voting results: 0votes
C	Number rolled: 5	Voting right number: 5	Voting results: 5votes
D	Number rolled: 1	Voting right number: 1	Voting results: 1votes

Your group ID is A, you lost in this election task.

Your role is the group member in the following experiment.

If you have any question, please raise your hand, the experimenter will come to help you.
As long as everyone has understood this task, we will start introduce the next stage.

Stage 2:

The leader of the group will decide how to allocate 300EC among the group members. The leader can distribute any amount from the 300EC to each of the other three group members. The leader keeps the remainder that is not distributed.

Before the group members know the outcome of the election, each member decides how much he or she would actually distribute, conditional on winning the election. Once everyone finishes the decision, the leader of the group will be revealed. The payoff of this stage will be determined by the actual leader's distribute decision and will be revealed to each group member at the end of the experiment.

Example

Now, we will provide an example to make sure that it is clear to everyone how payoffs are determined in this stage.

Group Id	Distribution decision	Kept amount
A	Offer 0 ECs to each of other three members (in total 0 ECs)	$300-0=300$ ECs
B	Offer 20 ECs to each of other three members (in total 60 ECs)	$300-60=240$ ECs
C	Offer 60 ECs to each of other three members (in total 180 ECs)	$300-180=120$ ECs
D	Offer 100 ECs to each of other three members (in total 300 ECs)	$300-300=0$ ECs

Suppose that your Group ID is A, and C is finally elected as the leader.

Then you, B and D will receive 60 ECs in this stage and C will get 120 ECs.

Suppose that your Group ID is A, and eventually you are elected as the leader.

Then you will receive 300 ECs, and B, C, D will receive 0 ECs.

Quiz

Before we begin with this stage, we will first ask you to answer a quiz about payoffs. This is done to make sure that everybody understands how payoffs are calculated.

Now, please answer some practice questions according to the given conditions of the following condition.

Group Id	Distribution decision	Kept amount
A	Offer 50 ECs to each of other three members (in total 150 ECs)	150 ECs
B	Offer 90 ECs to each of other three members (in total 270 ECs)	30 ECs
C	Offer 15 ECs to each of other three members (in total 45 ECs)	255 ECs
D	Offer 5 ECs to each of other three members (in total 15 ECs)	285 ECs

If your group Id is A, and the decision results of you, B, C and D are as shown in the table above, it is you who is actually elected as the leader.

Then, in this stage, your income is _____ ECs (*Correct answer=150 ECs*)

B's income is _____ ECs (*Correct answer=50 ECs*)

C's income is _____ ECs (*Correct answer=50 ECs*)

D's income is _____ ECs (*Correct answer=50 ECs*)

Please keep in mind that the Numbers above are examples, how do you make decisions in a task is entirely up to you.

When you make a formal decision in the experiment, your decision screen looks like this:

Your Decision

Please decide how much of the 300 ECs you will allocate for other three members conditionally when you win the leader election.

If I win the leader election, **for each of the other three members**, I will allocate :

Please note: if you are actually the elected leader, your gain will be 300 minus **3 times** the amount you decide to allocate

If you have completed and confirmed your decision, please click the "Confirm" button below to continue. Next we will show the election result of Stage one

Confirm

If you have questions or are confused, please raise your hand and wait for the experimenter to help you. As long as everyone has answered the quiz correctly, we will start introduce the next stage.

Stage 3:

In this stage, you need to make 10 rounds of repeated decisions. Please note that the final profit of this experiment depends on the ECs you have accumulated in 10 rounds.

In this experiment your endowment is 20ECs in each round. Everybody in each group will allocate a given endowment between two different accounts. One account will be an individual account and the other will be a group account. The rates of return will differ between the two accounts. You have to decide on the number of EC to place in the Group accounts, the amount of EC that are not put in the group account will automatically be added to your individual account

Decide the investment amount in a group public project.

At the beginning, you decide how many of your 20 ECs to invest in the **Group Account (G)** and how many to invest in your **Individual Account (I)**. Each point you do not invest into the group account is automatically placed into your individual account. These two accounts are explained below.

Individual Account (I)

Every EC you assign to the Individual account will return one EC at the end of the round. For example, if you invested 10ECs in your Individual account, you would earn 10ECs from the individual account at the end of the round. If you invested 5ECs in your Individual account, you would earn 5ECs from the individual account at the end of the round. No one except you earns something from your individual account.

Group Account (G)

Your earnings from the Group Account depend on the number of EC that **you and your other group members** invest in the Group Account. All ECs that you and your group members invest in the Group account are added together and form the group investment. The group investment generates a return of **2** ECs for every one EC invested. These earnings are then divided **equally** among all group members. Your group has **4** members (including yourself). So, every EC invested in the Group account will return **.5 EC** to each group member at the end of the round.

Some examples of returns to group investment are illustrated in the table below. The left column lists various amounts of group investment; the right column contains the corresponding personal earnings for

each group member:

Total Group investment amount by your group (TG)	Return to each group member (From Group investment)
0	0
8	4
20	10
28	14
41	21(round-off)
80	40

As you can see, it does not matter who invests ECs in the Group account. Everyone will get the same return from every EC invested there-whether they invested EC in the Group account or not.

Your earnings in this task

The total payoff you earn is the sum of your earnings from each of the two accounts:

- 1) ECs earned from your Individual account = amount of ECs you invest in the Individual account. (**I**)
- 2) ECs earned from the Group account = $0.5 \times$ the total invested ECs of all 4 Group members to this account. (**TG**)

So your earnings at the end of each round = $I + 0.5 \times TG$

Example

Some examples of payoffs are illustrated in the table below. The first column lists various investment amounts in individual account, the second column lists various investment amounts in group investment; the third column contains the corresponding personal earnings for each group member:

ID	Individual account	Group account	Total Group invest amount	Payoffs
A	0 ECs	20 ECs	20+14+10+0=44 ECs	$0+0.5 \times 44=22$ ECs
B	6 ECs	14 ECs		$6+0.5 \times 44=28$ ECs
C	10 ECs	10 ECs		$10+0.5 \times 44=32$ ECs
D	20 ECs	0 ECs		$20+0.5 \times 44=42$ ECs

Reveal your results

Once each group member finishes her decision, the other information box is labeled "**Outcome of This Round**" and will show you:

- (1) the total invest amount in the Group account;
- (2) your earnings for this round.

Quiz

Please answer the following control questions. They will help you to gain an understanding of the calculation of your income, which varies with your decision about how you distribute your 20 points. Please write down your calculations.

1. Each group member has 20 points. Assume that none of the four group members (including you)

contributes anything to the project.

What will your total income be? _____ (20)

What will the total income of the other group members be? _____ (20)

2. Each group member has 20 points. You invest 20 points in the project. Each of the other three members of the group also contributes 20 points to the project.

What will your total income be? _____ (40)

What will the total income of the other group members be? _____ (40)

3. Each group member has 20 points, and invested them into two accounts as the following decision table.

Group ID	Individual account	Group account
A	14 ECs	6 ECs
B	20 ECs	0 ECs
C	10 ECs	10 ECs
D	2 ECs	18 ECs

Assume that your Group Id is A, you invested 6 ECs in the Group account, each of the other three group members invested 0 ECs, 10 ECs, 18 ECs in the group account.

- a) What is the total group investment amount? (Correct answer: 34)
- b) How much would you and **each of other subjects earn from the group account**? (Correct answer: 17)
- c) How much would **your total payoff** be in this condition? (Correct answer: 31)

B's payoff _____ (Correct answer: 37)

C's payoff _____ (Correct answer: 27)

D's payoff _____ (Correct answer: 19)

The role of leader

In this stage, leader will write a message at the beginning of each round, and send it to other group members.

All messages will have this form:

"Let's contribute X EC to the group account."

Then decide how to invest the endowment in a group account.

The role of group member

In this stage, group members will receive a message from leader at the beginning of each round, and then decide how to invest the endowment in a group public project.

The screen will show you both the current round, and how many rounds there are in this experiment in total.

If you have questions or are confused, please raise your hand and wait for the experimenter to help you. As long as everyone has answered the quiz correctly, we will continue introduce the instructions.

Experiment Summary

Stage 1: Elect a leader

Stage 2: Each group member makes a distribution decision assuming she is the leader.

Stage 3: Leader sends a message to group members. Each group member decides how to invest the endowment in a group public project.

Your total payoff will be the payoff you earned from each stage, and plus your 5 Yuan show-up fee.

The election results will be presented at the end of stage 2.

The leader's decisions in Stage 2 will be revealed at the end of this experiment.

Demographic survey

1. Sex
☐Male ☐Female
2. Year of Birth_____
3. Ethnic Group
☐Han ☐Minority
4. Grade
☐First ☐Second ☐Third ☐Forth ☐Fifth
5. Institute_____