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ABSTRACT

The performance of government activities, including law enforcement and regulation, depends on whether citizens perceive them as legitimate. Although substantial studies have explored the institutional sources of legitimacy, how non-institutional factors affect perceived legitimacy remains unclear. Human societies have a long history of employing symbolic icons to enhance the legitimacy of a given authority. This study reports a laboratory experiment of public goods that investigates whether (and to what extent) symbolic factors enhance perceived legitimacy. In the contexts of various incentive schemes and transparency levels, an “authority” in each group decides whether to target a “citizen” for punishment after observing the contributions of “citizens,” and untargeted citizens then choose to support or hinder the authority. A symbolic scepter is issued to the authority in the treated group, whereas this symbol is absent in the control group. The experimental results suggest that the political symbol significantly enhances the authority’s legitimacy regardless of the payment scheme and information transparency. A further analysis shows that the political symbol is not associated with the authority’s choices regarding enforcement. Rather, the symbol’s effect on perceived legitimacy is primarily driven by the citizens’ side—that is, the increasing intrinsic tendency to support authority.

1. Introduction

Legitimacy plays a fundamental role in political economy because the performance of governance is strongly associated with the extent to which citizens perceive authorities and institutions as legitimate. Lower levels of compliance and support resulting from a lack of perceived legitimacy of the regimes and government officials increases the difficulty for authorities to enforce laws and public policies.

An extensive body of literature provides empirical and experimental evidence on the legitimacy of institutions and authority (discussed later).¹ Seymore Lipset (1959) posits that “legitimacy involves the capacity of a political system to engender and maintain the *belief* that the existing political institutions are the most appropriate ones for the society” (p.86). Therefore, legitimacy is a somewhat belief-based concept, highly conditional on individuals’ subjective perceptions.² Therefore, a natural question left

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¹ In the context of collective actions, this study defines authority as the right to punish others.

² Legitimacy has other concepts grounded on the positivity of performance, morality, rule of law, and others. Due to limited space, this paper focuses on the subjective dimension of legitimacy.

unanswered is whether authorities can successfully use metaphysical matter to manipulate their legitimacy as perceived by their citizens.

Visual symbols, such as banners, insignia, and scepters, play a central role in political arenas.³ On the one hand, political symbols have been associated with totalitarianism; political scientists are aware that malevolent elites strategically use symbols to evoke fascination and obedience.⁴ Elder and Cobb (1983) postulate that political symbols “serve to constrain people’s vision and make them vulnerable to manipulation” (p.30). Such political symbols have been pervasive across different regimes and regions. Scepters and coronation crowns were often used to present the imperial sovereignty of such rulers as Persian Kings, Egyptian Pharaohs, and Roman Emperors. The Soviet Union and Nazi Germany used visual emblems (the hammer and sickle and the swastika, respectively) for propaganda and mobilization. Alternatively, modern democratic societies have also been permeated by political insignia, such as rank badges in police forces and armies and the sword, blindfold, and scales in the hands of Justitia. Despite the significance and intensity of political emblems, research into their impacts on legitimacy is surprisingly scarce in economics.⁵

This article reports a public goods laboratory experiment that explores the role of symbolic factors in shaping legitimate authority. This experiment extends the original protocol in Dickson et al. (2015) (henceforth DGH). Each group in the experiment consists of four “citizens” who trade off between contributing to the public pool and free riding in each period, as well as one “authority” who can propose to punish a citizen for sustaining group cooperation after observing citizens’ decisions. In the absence of citizen intervention, the probability of successful punishment is 1/2. The three untargeted subjects can change this probability by supporting or hindering the authority’s proposal at their own cost. Through this design, perceived legitimacy can be measured directly. Treatment assignments were manipulated in three dimensions. The first two treatment dimensions are institutional arrangements—namely, the transparency level of contributions and the neutrality of the incentive scheme for the authority’s punishment. While the experiment’s institutional environment has the same variations as DGH, this experiment departs from DGH mainly in focusing on the effects of political symbols by inducing a symbolic scepter issued to the authorities in the treated groups. The experimental environment overcomes the endogenous leader characteristics by random treatment assignment. Moreover, in a controlled experiment, the political symbol does not have any instrumental function but is merely metaphysical. Hence, this design identifies the effects of political symbols rather than other binding powers. The results show that political symbols significantly promote the legitimacy of the authorities—that is, the citizens’ propensity to support the authority’s sanctioning decision. The estimated effects of the political symbol on perceived legitimacy are similar across different payment schemes and levels of information transparency. Further mechanism analysis suggests that the effect of the political symbol on legitimacy is mainly driven by the citizens’ psychological change rather than the authorities’ responsibilities.

The experimental findings provide important implications for political economy. The political symbol is a double-edged sword. Political symbols may produce real effects beyond functional performance, even in an authoritative regime. Therefore, we ought to be cautious and aware that they can be used as powerful tools of misdirection and deception as politicians can control the public subconsciously. In contrast, the use of political symbols under the rule of law and checks and balances may enhance the efficiency of appropriate policy implementation.

This study primarily complements two strands of literature in behavioral and political economics. First, it adds to a large set of experiments on the origins and consequences of leadership and legitimacy. Some experiments of collective action have documented the relationship between the procedure by which rules and leaders are determined (for example, democratic voting systems versus exogenous assignment) and their efficiency and legitimacy (Dal Bó et al., 2010; Baldassarri and Grossman 2011; Grossman and Baldassarri 2012; Markussen et al. 2014; Marcin et al. 2019).⁶ Much like this study, Dickson et al. (2015) investigate the institutional determinants of an authority’s legitimacy in a public goods experiment wherein the authority can choose to punish one group member, and the unpunished subjects can decide whether to support or hinder the authority from implementing further sanction. They find that legitimacy is associated with authorities’ compensation and the transparency of decision-making. An apparent novelty of this experiment is its investigation into the role of metaphysical factors, rather than humane, material, or institutional issues.⁷

Second, this study contributes to recent delegation literature on the intrinsic value of decision rights—that is, one’s preference for

³ This study focuses on the political arenas; however, metaphysical factors may also be important in some other organizations involving hierarchical agencies. For example, crime cartels (i.e., Hong Kong triad and Sicilian mafia) also use well-designed emblems to enhance unified identity and increase the perceived legitimacy of the leaders. However, the scope and aim of symbol usage might be different in other organizations, such as business companies and NGOs, which use symbols for advertising and marketing purposes instead of increasing the leaders’ legitimacy in the organizations.

⁴ Edelman (1971)’s famous books systematically elaborate on how power elites employ symbolic instruments to legitimize their status.

⁵ A reasonable reason is that establishing causality with empirical data is challenging since it is difficult to decouple the manipulation of symbolic authority from the institutional quality and leader characteristics. For instance, political symbols are often embraced in companionship with other juridical and violent instruments. Moreover, personal factors of the political leaders, such as charisma, stratagem, and benevolence, influence their propensity to (over)use political symbols.

⁶ Exceptionally, Castillo, José G. et al., 2021 demonstrated that the experimental results that cooperation in a public good game can be enhanced by the leader’s merits but not influenced by whether the leaders are democratically elected.

⁷ Thus, broadly speaking, this study is also related to literature on non-material incentives (Cassar and Meier 2018). For example, experimental evidence documents that the symbolic awards boost work performance and prosocial contribution (Kosfeld and Neckermann 2011; Gallus 2017). My experiment extends this literature by exploring the role of symbolic icons in legitimacy in a framework of collective actions.

Table 1
An overview of behavioral outcomes across institutions: Average and trends.

Institutional environment	Period 1	Period 20	Average
Panel A: Group Contribution			
<i>Appropriation/Transparency</i>	2.694 (0.130)	1.361 (0.224)	1.908 (0.177)
<i>Appropriation/Non-Transparency</i>	2.622 (0.185)	2.054 (0.180)	2.291 (0.117)
<i>Fixed payment/Transparency</i>	2.527 (0.178)	1.083 (0.221)	1.534 (0.190)
<i>Fixed payment/Non-Transparency</i>	2.389 (0.154)	2.028 (0.203)	2.300 (0.142)
<i>Total Sample</i>	2.559 (0.082)	1.634 (0.109)	2.010 (0.083)
Panel B: Enforcement			
<i>Appropriation/Transparency</i>	0.722 (0.075)	0.833 (0.062)	0.836 (0.023)
<i>Appropriation/Non-Transparency</i>	0.865 (0.056)	0.595 (0.081)	0.738 (0.038)
<i>Fixed payment/Transparency</i>	0.694 (0.077)	0.500 (0.084)	0.513 (0.045)
<i>Fixed payment/Non-Transparency</i>	0.667 (0.079)	0.528 (0.083)	0.615 (0.050)
<i>Total Sample</i>	0.738 (0.037)	0.614 (0.041)	0.676 (0.023)
Panel C: Citizen Intervention: Net Support			
<i>Appropriation/Transparency</i>	-0.038 (0.090)	-0.011 (0.056)	0.115 (0.037)
<i>Appropriation/Non-Transparency</i>	0.042 (0.077)	-0.167 (0.107)	-0.055 (0.059)
<i>Fixed payment/Transparency</i>	0.147 (0.063)	0.111 (0.109)	0.177 (0.043)
<i>Fixed payment/Non-Transparency</i>	0.083 (0.080)	-0.035 (0.119)	0.002 (0.061)
<i>Total Sample</i>	0.056 (0.040)	-0.030 (0.048)	0.054 (0.027)

Note: Robust standard errors clustering at the group level are reported in the parentheses.

the power to determine the outcomes of themselves and others (Bartling et al. 2014; Fatas and Morales 2018; Ferreira et al. 2020; Sloof and von Siemens 2017).⁸ Although this literature sheds light on people's preference for decision rights and self-reliance, it neglects the other side of the delegation in a hierarchical organization—that is, how the masses evaluate the legitimacy of decision power. The current experiment fills this gap by demonstrating that symbolic icons do not affect an authority's responsibilities but do enhance an authority's legitimacy.

The remainder of this article proceeds as follows. Section 2 introduces the experimental design. Section 3 presents the main results. Section 4 discusses the underlying mechanisms. Section 5 provides the concluding remarks. Additional experimental instructions and analytical results can be found in the Appendix.

2. Experimental design and procedures⁹

2.1. Experimental design

This experiment adopts the design of Dickson et al. (2015). At the beginning of each session, participants were randomly assigned into a group of five members, one of which was randomly assigned as an authority (Role A), while others were assigned roles as citizens (Role B).¹⁰ Group and role assignments remained unchanged through the entire session. To avoid the reputation effect, group members in Role B were randomly labeled with an ID number from 1 to 4, which were commonly known to be shuffled every period.

The experiment is a $2 \times 2 \times 2$ design that varies in four dimensions: symbolic leadership, textual salience of the authority, the compensation scheme for the authority, and the information delivered to the citizens. The complete session repeated for 20 periods, each consisting of four stages. In the first stage, each participant received an endowment of 20 tokens (1 token = 0.05 RMB), and each citizen made a binary choice, either to contribute the 20 tokens to a public account or to keep them in their private account. The tokens in the public account would be doubled and divided equally to all members, including the four citizens and the authority. In the second stage, after observing the contributions of each fellow group member, the authority decided whether or not to target one group member (at the cost of 2 tokens), and the target subject would then lose 30 tokens if the targeting was successfully enforced at the end of this stage of the period. In the absence of any member being targeted, the stage ended; contribution information became common knowledge, and the payoffs were realized. The game subsequently proceeded to the third stage, in which the incentive for the authority's targeting behaviors differed in the *appropriation and salary treatments*. In the appropriation treatments, the authority earned 30 tokens from successful targeting enforcement. In contrast, in the salary treatments, the authority earned a fixed payment of 20

⁸ For space limitation, I only discuss the experimental research. Additionally, Edelson et al. (2018) discuss the neurobiological foundations of leadership decisions using fMRI techniques.

⁹ A sample of experimental instructions is provided in Appendix B. Several snapshots associated with some important decisions on the experimental platform are also provided in Appendix C. Compared with DGH's experimental instructions, the instructions in this paper are slightly shorter and rely more on numerical examples than the text. Chinese students pay more attention to numerical examples. If the instructions were too wordy, some of them tend to skip the textual description and go to the examples immediately. Therefore, I slightly briefed the text without losing an accurate description. Notably, DGH explains the probability of punishment using the example of jars. It seems unnecessary for college students. I also delete their summary and conclusion that repeat the experimental protocols.

¹⁰ During the experiment, I avoid using the words "authority" and "citizen" to refer to their roles but use neutral words "Role A" and "Role B" instead. In addition, I use "deduction" and "reduce" instead of "punishment" and "punish".

tokens in each period regardless of whether or not the enforcement was successful. In the third stage of the *full information treatments*, untargeted citizens observed the contributions of each citizen, whether targeting was implemented, and the target's associated ID. Untargeted citizens chose to support or hinder the authority (at the cost of 1 token) or do nothing. In the absence of any intervention, the probability of successful enforcement would be 1/2. By supporting or hindering the authority, the likelihood of successful enforcement would increase or decrease by 1/6. As a result, the enforcement would certainly be successful if all three untargeted citizens supported the authority. By comparison, the enforcement would certainly fail if all three untargeted citizens hindered the authority. In the *limited information treatments* at this stage, untargeted citizens observed whether a fellow citizen was targeted but not whether the targeted citizen or any of their fellow group members contributed or shirked. Instead, citizens learned only the total contribution by the group at the end of the period in the limited information treatments. Because the total contribution was common knowledge, the citizens were still able to determine whether the authority targeted a contributor or a free rider in some cases.¹¹ The target subject would lose 30 tokens from successful enforcement. At the final stage, all group members observed supportive/hindering decisions and whether enforcement was successful; the payoff was then realized.

The experimental design described above is so far the same as the 2×2 design in DGH. This experiment adds another dimension: *symbolic leadership treatments*. In the symbolic leadership treatments, a scepter was issued to the authority of each group. The scepter appeared on the screen when the authority was making targeting decisions and when citizens were deciding whether to support or hinder the authority.¹²

Taken together, the three dimensions represent different institutional and non-institutional environments in an experimental public good game investigating cooperation, sanction, and perceived legitimacy. The incentive scheme and transparency appraise the institutional quality. Last, the symbolic scepter tests whether (and to what extent) an abstract symbol without binding power can affect the interaction between the authority and citizens in collective actions and the authority's perceived legitimacy.

2.2. Hypotheses

The game-theoretical framework incorporating the political symbols helps predict and elucidate whether (and why or why not) political symbols can affect the behaviors of citizens and authorities.

Under the assumption of standard game theory, citizens have no incentive to intervene in the authority's choices at their own cost under any circumstance. Hence, all equilibria in every treatment involve no citizen intervention. The authority receiving fixed payment has no incentive to enforce punishment. The fixed payment, in turn, leads citizens to not contribute. Because of backward induction, the unique equilibrium strategy in the salary treatments is (No Contributions, No Enforcement, No Intervention). By contrast, in the appropriation treatments, the authority has a strong incentive to target the citizens, because the expected benefit of sanction ($30 \times 1/2 = 15$ tokens) exceeds the cost. Three equilibria exist in the appropriation treatments. The first equilibrium is (No Contributions, Attempting Enforcement, No Intervention).¹³ The second is (All citizens contribute, Attempting Enforcement, No Intervention).¹⁴ The third is a mixed-strategy equilibrium, in which citizens contribute with a probability, the authority targets one group member, and, again, no intervention occurs. In the absence of the political symbol, the analysis above can be summarized as follows:

Hypothesis 1. : Citizens do not contribute in the salary treatments. Citizens' contributions are strategically complementary in the appropriation treatments.

Hypothesis 2. : Citizens do not support or hinder the authorities' enforcement without the political symbol.

Hypothesis 3. : In the absence of the political symbol, authorities tend to enforce in the appropriate treatments but not in the fixed-payment treatments.

The above hypotheses are based on the assumption of hyper-rationality. The pro-social citizens may contribute and intervene, and the authorities may have an intrinsic motive to enforce even in the salary treatments.

The central hypothesis in this study is that the presence of the political symbol, *ceteris paribus*, increases the willingness of citizens to support, or at least not hinder, the authority's enforcement. However, this does not lead to a certain response from the authority. On the one hand, increasing citizen support may reinforce the authority's willingness to apply punishment in appropriation treatments as a strategic response. On the other hand, predatory enforcement may induce backlash from the citizens. It is therefore more likely that the political symbol has nuanced effects on authorities' enforcement tendencies. However, if the symbol increases the authority's accountability for psychological reasons, the authority may exhibit more frequent targeting behaviors even in the fixed-payment

¹¹ For instance, a citizen realized that the targeted citizen must be a contributor if the total contribution of three other fellows was 60 tokens, and the targeted citizen must be a free rider if the total contribution of three other fellows was 0 tokens.

¹² This study consists of two batches of experiments with a difference. In the first batch, although the instruction does not use the word "authority" to refer to Role A, the instruction in the treatment describes the meaning of the symbolic scepter by saying "the scepter represents his/her authority." Thus, the effect of the symbolic manipulation may be confounded with the extra textual instruction of the power and authority represented by the political symbol. Therefore, I ran the second experiment, in which the control groups are told that the Role A player has the authority to target a Role B player in each period, while the treated groups are exposed to the scepter symbol without mentioning that it stands for the authority. Running the second-batch experiment allows for testing whether the effect of the political symbol is overestimated due to the extra description of the symbolic scepter's meaning. I thank two anonymous referees for their suggestions to run the second experiment.

¹³ Note that if no one contributed, the probability of being punished is only $1/3 \cdot 1/2 = 1/6$. Then free-riding is the best response.

¹⁴ If all other group members choose to contribute, then a free rider will be the prior target. Hence, contribution is the best response in this case.

treatments. Moreover, the contribution is based on the previous peer contribution and the authority's enforcement. The hypotheses are summarized as follows:

Hypothesis 4. : The exhibition of the political symbol increases citizens' willingness to support the authorities.

Hypothesis 5. : The frequency of enforcement will not be changed by the political symbol if the symbol does not increase the authority's accountability.

Hypothesis 6. : Authorities enforce more frequently under the impact of the political symbol if the symbol increases the authority's accountability.

Whether the political symbol increases citizens' contributions depends on whether the authorities enforce more frequently—that is, which one of the competing hypotheses (2-2a or 2-2b) is supported by the data.

Hypothesis 7. : If Hypothesis 2-2a is supported, the political symbol would not change the citizens' contributions.

Hypothesis 8. : If Hypothesis 2-2b is supported, two-way causation between enforcement and contribution is plausible in the repeated interactions, leading to complicated dynamics.

2.3. Procedures

This experiment consisted of 31 sessions, including 23 sessions in the first batch and 8 sessions in the second batch (see footnote 12). Each of the 725 subjects participated in only one session. In the $2 \times 2 \times 2$ design (appropriation payment * limited information * symbol intervention), each treatment in the first batch included only 60 participants with the exception of one treatment with 65 participants, while the second batch included 30 participants in each treatment.¹⁵ The subjects interacted anonymously via networked computers in the Economics Training Lab at the Shenzhen Institute of Information Technology (SIIT). All participants were first- or second-year undergraduate students from various majors at SIIT.¹⁶ The experiment was programmed and conducted using the oTree platform (Chen et al. 2016). Before entering the laboratory, the participants were notified that they would receive a show-up fee of 5 RMB upon completion of the experiment and that they would also earn extra payouts based on their roles and decisions in the experimental game. Nevertheless, the participants were not provided with other details about the experimental design until the instructions were read at the beginning of each session.

3. Results

3.1. An overview of behavioral outcomes across institutions

This experiment is a public goods game with punishment opportunity, and its experimental design is based on DGH. Therefore, it is worth providing an overview of the behavioral outcomes under different institutions and comparing them with DGH.¹⁷ Panel A of Table 1 and Fig. 1 first examine the evolutionary trend of contributions under different treatments. The average group contribution is 2.010 per period, starting from 2.559 and ending at 1.634, rejecting Hypothesis 1–1.¹⁸ Although the average group contribution starts from a similar level in different institutional environments, implying further evidence for insignificant differences in citizen characteristics, the trajectories are quite different across institutions. In the case of transparency treatments, the average group contribution is 1.908 per period, and the declining trend is relatively modest when the authorities are appropriators, whereas a lower average contribution (1.534) and declining trend are observed when authorities receive fixed payments.

In the treatments without transparent information, the average group contribution is 2.300 per period if the authority receives fixed payment, whereas the group contribution is 2.291 with appropriators.¹⁹ In a nutshell, the contributions significantly deviate from zero but show an overall weak declining trend, which is consistent with previous experiments, including DGH. However, this experiment finds declining contributions in the treatments of transparent information and a stable trend in the treatments with limited information, while DGH show the opposite contribution trends regarding information transparency.

Panels B and C in Table 1 repeat the representation with authority enforcement and citizen intervention. Figs. 2 and 3 further provide the dynamic presentations of authority decisions regarding punishment and citizens' choices about whether to support or

¹⁵ Table A1 of the appendix establishes the balance of the sample. Therefore, the random assignment ensures that our estimating results are unlikely to be driven by individual characteristics.

¹⁶ Although most participants had learned some economics principles, they had not received training in game theory or behavioral/experimental economics in their first year. The experimental subjects in this study have less experience in participating in behavioral experiments than DGH. Participants' less experience in behavioral experiments has usually been considered an advantage in experimental economics. Subjects were not recruited from my course to exclude the demand effects.

¹⁷ Since the primary objective of this study is to explore whether the political symbol affects citizens' perception of legitimacy and not, for example, incentive schemes or cooperation, I keep the comparison as concise as possible.

¹⁸ In comparison, the average group contribution in DGH is about 2.25, slightly higher than the counterpart in this experiment.

¹⁹ In the full information treatments of DGH (Fig. 3), the contribution levels are higher and more stationary, i.e., 2.46 contributions per period with a salaried authority and 2.83 with an appropriator official. In the limited information treatments of DGH Figure 7 the contributions are higher in the appropriation treatments than in the salary treatment.

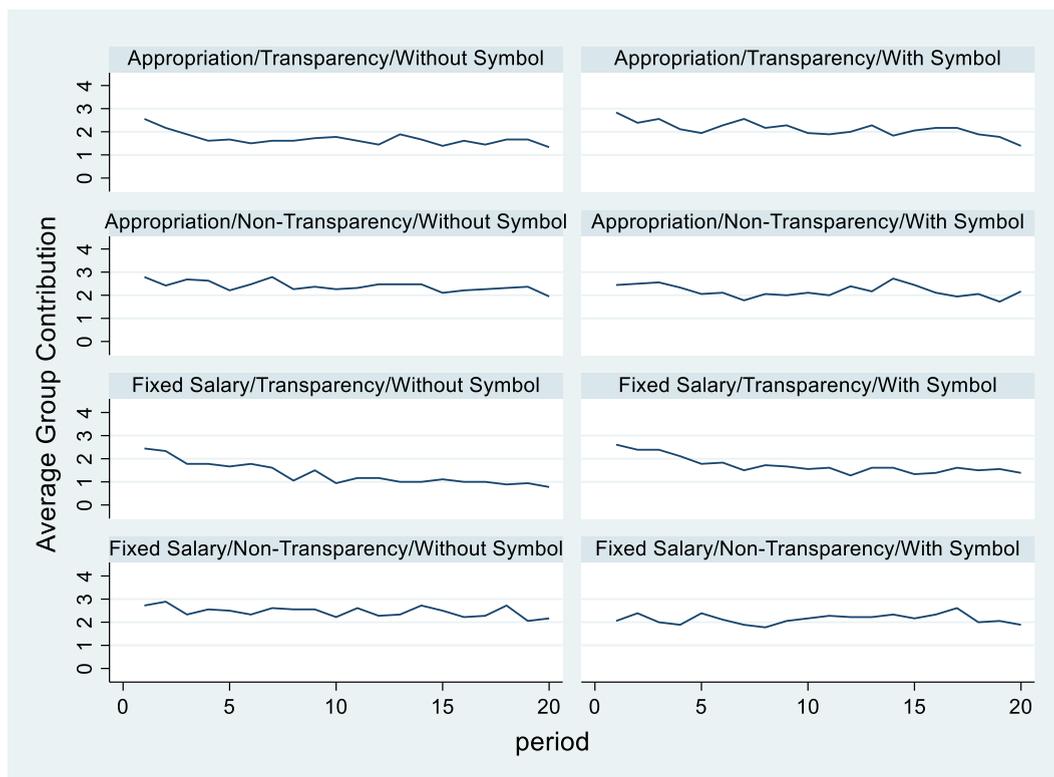


Fig. 1. Dynamics of group contributions.

hinder the authority. Fig. 2 consists of six rows. The first two rows differ in the payment schemes for the authority, whereas the middle two rows differ in the environment of information transparency. Additionally, the last two rows split the sample according to whether the word “authority” is mentioned in the instructions (see footnote 12). In each row, the left and right cells describe the situation without symbol intervention and with symbol intervention, respectively. The circles indicate the proportion of authority approaching punishment in each environment over the periods. Fig. 3 uses the same arrangement as Fig. 2, and the crosses indicate the average level of net assistance to the authority over the periods.²⁰ Table 1 and Figs. 2 and 3 suggest that the enforcement and citizen intervention are consistent with DGH, both showing relatively stable trends at the aggregate level over time, while the stationary aggregate trend is accompanied by considerable individual variation over time.²¹ Moreover, consistently with DGH (p.114 and 120), appropriators tend to implement the punishment more frequently than salaried authorities, irrespective of information transparency. Furthermore, authorities received, on average, greater support under transparent information.²² Therefore, the experimental results reject Hypothesis 1–2 and partially support Hypothesis 1–3. Additionally, the last two rows in Fig. 3 show that mentioning the word “authority” in the instruction does not increase the citizens’ tendency to support the authority.

3.2. The effects of political symbol on citizen intervention

This study primarily compares the support/hinder decisions between the symbol treatment and the control condition. In Fig. 3, citizens seem more willing to support the authorities when exposed to the political symbol (left vs. right). Moreover, Panel A of Fig. 4 displays the overall distribution of support/neutral/hinder decisions. In the absence of political symbols, among all scenarios in which the citizens need to decide whether or not to support the authority, 26% of the sample choose to hinder and 20% choose to support. By contrast, political symbol intervention leads to a significant shift of the distribution to a greater proportion of supportive decisions.

²⁰ I code support as 1, neutral as 0, and hinder as -1. Thus, theoretically, the maximum and minimum net assistance in each group/period are 3 and -3, respectively.

²¹ DGH present the comprehensive graphical presentations in Figs. 1 and 5, and show the almost-constant trend of citizen intervention at the aggregate level in Figs. 4 and 8. Every group has its own trajectory in this experiment. Due to limited space, this paper presents all the group histories as DGH in Figures A2-A9 of the appendix.

²² The reason Chinese subjects attach greater importance to transparency is probably the lack of transparency in the Chinese administration. Although DGH’s columns 3–4 of Table 4 show similar results, the citizens in DGH’s sample are more responsive to payment schemes, instead of transparency in my experiment.

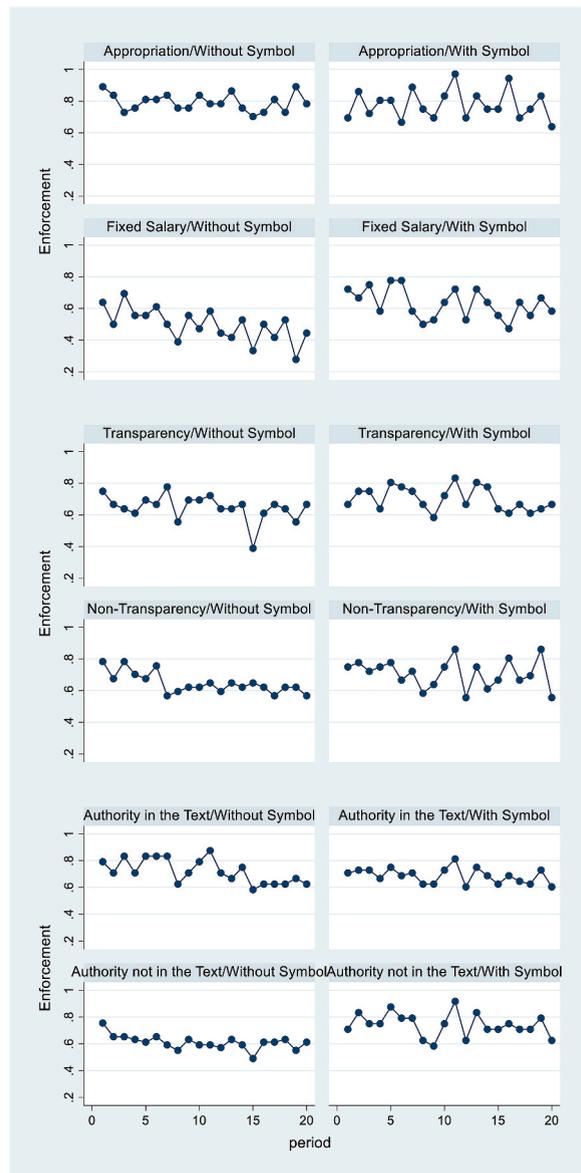


Fig. 2. Dynamics of enforcement decisions.

Under the influence of political symbols, only 18% of decisions are made to hinder the authority, while citizens choose to support the authority in 34% of all cases. The left and middle cells in Panel B of Fig. 4 display the distributions of support/neutral/hinder decisions under different payment schemes and information transparency. The comparisons in Panel B deliver similar information as Panel A, although the magnitudes of the symbol’s treatment effect seem to have nuanced differences across different institutional environments. The right two graphs in Panel B split the sample according to whether the instructions mention “authority” to enforce the punishment. The citizens tend to be more likely to support the authority’s decisions regardless of mentioning “authority” in the instructions.²³ Hence, the treatment effect of the political symbol is not overestimated due to the extra salience of “authority” describing the meaning of the symbolic scepter.

To provide formal analysis, Table 2 regresses the citizens’ support/hinder decision on the binary treatment of political symbols. The dependent variable is defined as 1 if the individual citizen chooses to support the enforcement proposed by the authority in this period, -1 if the individual citizen decides to hinder the authority in this period, or 0 if the citizen prefers to do nothing. In the absence of enforcement proposed by the authority in this period, the observation is excluded from the regression. Table 2 reports the results from

²³ Put another way, the effect of the symbol on the likelihood of supporting the authority is significant both in the first and second experiments.

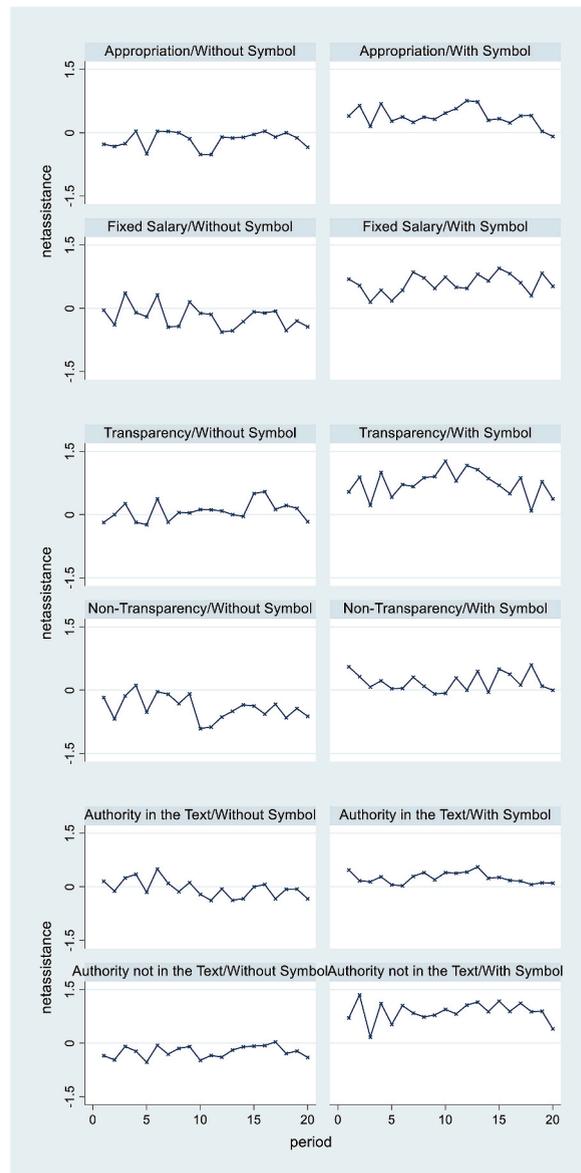


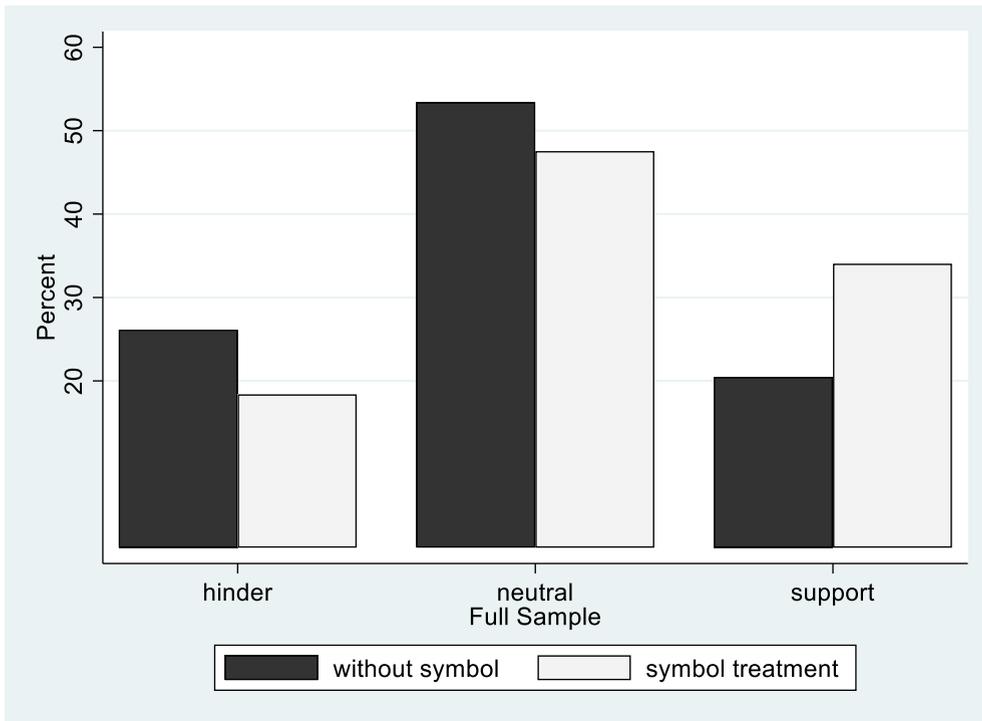
Fig. 3. Dynamics of net assistance.

the ordinary least square (OLS) estimation.²⁴ Column 1 only includes the dummy for the symbol intervention and period fixed effects as the explanatory variables. This column shows that an individual exposed to the political symbol is significantly more likely to support the authority. Column 2 further adds the dummies for the payment scheme and information transparency into the regression.²⁵ Due to the random treatment assignment that ensures the orthogonality between political symbol intervention, payment scheme, and information transparency, the coefficient of the political symbol unsurprisingly remains almost unchanged. It is worth noting that participants in the role of citizen show a sharp appreciation of transparency,²⁶ which may be due to the lack of transparency in Chinese

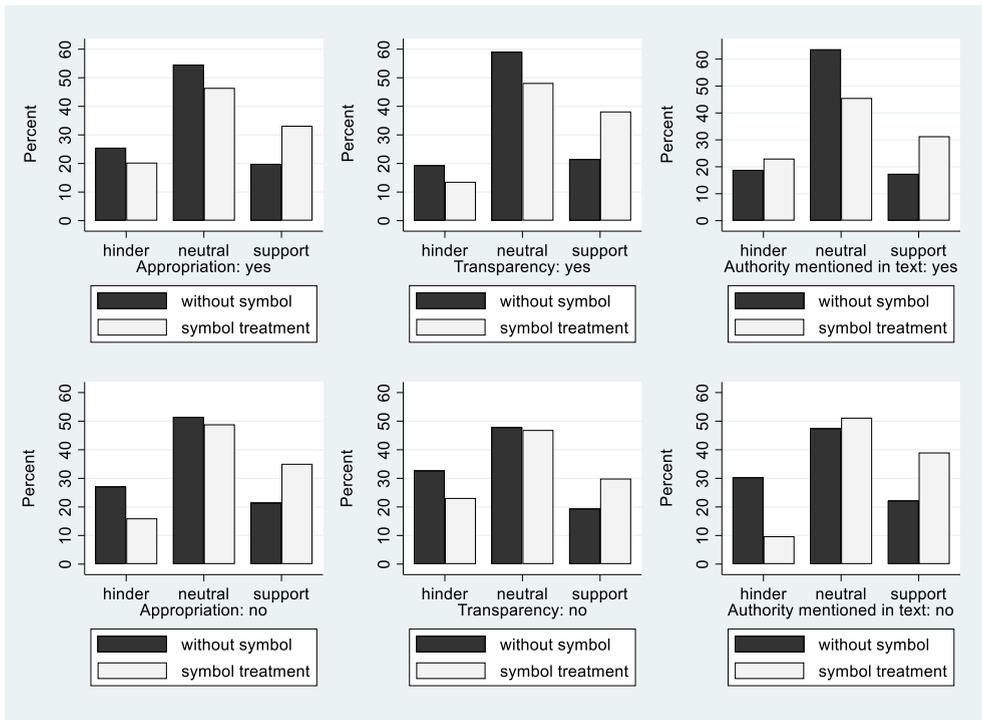
²⁴ Table A2 of the appendix reports the results from ordered Probit estimation that are similar to the OLS estimating results.

²⁵ It is noteworthy to discuss the association between the model specification and potential threats to the causal inference in repeated public goods experiments. DGH's appendix discusses several identification problems. First, including lagged outcomes may lead to the Nickell bias. Furthermore, these explicatory variables, including group contribution, enforcement, and symbol intervention, are correlated. Therefore, I follow DGH to present results with and without these variables and highlight whether or not adding these covariates does not remarkably change the estimates of the treatment variable.

²⁶ It is partly consistent with DGH's columns 3–4 of Table 4.



Panel A: Overall Comparison



Panel B: Comparisons under Different Environments

Fig. 4. Support/hinder choices with or without symbol intervention.

Table 2
Impacts of symbol on support/hinder.

	(1)	(2)	(3)	(4)
Dependent vars: 1 support; 0 neutral; -1 hinder				
Mean: 0.054 S.D.: 0.702				
symbol	0.213*** (0.051)	0.209*** (0.048)	0.210*** (0.050)	0.226*** (0.052)
appropriation		-0.046 (0.048)	-0.046 (0.049)	-0.014 (0.052)
transparency		0.172*** (0.048)	0.173*** (0.046)	0.160*** (0.047)
Group Contribution			-0.017 (0.019)	-0.016 (0.021)
Lagged Enforcement			0.037 (0.035)	
Lagged Resoluteness				0.105*** (0.035)
constant	-0.046 (0.047)	-0.100* (0.059)	-0.105 (0.082)	-0.179** (0.089)
Period FE	Yes	Yes	Yes	Yes
adj.R-squared	0.022	0.037	0.040	0.047
Observations	5880	5880	5559	4428

Notes: Robust standard errors clustering at the group level are reported in the parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

administration. Column 3 adds the group contribution (0–4) in the current period and the binary indicator of whether the authority proposed enforcement in the previous periods. Group contribution may affect the authority's tendency to enforce the contribution by targeting a free rider, while enforcement may also affect the group contribution in the next period. Because citizens care about their revenue from cooperation, both variables may directly or indirectly affect the citizens' willingness to support the authority. Although the three variables—symbol intervention, group contribution, and enforcement by the authority—have a complicated endogenous relationship, this study primarily focuses on the coefficient on the symbol intervention. The result in Column 3 establishes that the coefficient on the symbol treatment is still significant and remains almost unchanged. Column 4 replaces the dummy for enforcement with a dummy variable of resoluteness, which equals 1 if a free rider is targeted in this group/period and 0 if a contributor is targeted in this group/period. In particular, if citizens recognize that authorities may be more or less resolute in their response to the symbolic and institutional interventions, citizens may substitute the authority's resoluteness with more support to maintain deterrence. Controlling for lagged resoluteness mitigates this concern. Again, the symbol's treatment effect is still close to the benchmark estimate in Column 1. Hence, the symbol's effect on perceived legitimacy is robust regardless of the authority's tendency to implement punishment. Taken together, the previous discussion is summarized by Result 1 supporting **Hypothesis 2–1**:

Result 1: *Exposure to the political symbol increases the citizens' tendency to support the authority.*

Notably people choose not to intervene for different reasons. First, the opt-out decision can be interpreted as the “middle” option between supporting and hindering. Second, if the subjects are reluctant to express their feelings explicitly, the opt-out decision may reveal the latent willingness to support, or vice versa.²⁷ Third, some citizens choose not to intervene because of strategic thinking, as they tend to free ride on the other citizens' intervening efforts. In the case of the last two situations, OLS and ordered Probit/Logit models may have limitations in capturing the effects of the political symbol on citizens' willingness to intervene.²⁸ Therefore, the Appendix includes the Multinomial Logit estimation in Table A3, which is particularly suitable for categorical outcome variables without a natural ordering. Columns 1 and 2 both set the opt-out decision as the base reference. Column 1 only includes the period fixed effects, while Column 2 further controls the group contribution and institutional settings. Compared to the treatments without the political symbol, individual citizens' relative preference for supporting over opting out increases, while their relative preference for hindering over opting out decreases. However, these effects are modest. By contrast, Columns 3 and 4 set hindering as the base reference. The lower-panel results suggest that exposure to the political symbol increases individual citizens' relative propensity to support over hindering the authority. This finding is consistent with the distributional shift in citizen intervention due to the symbol (Fig. 4). In other words, the political symbol makes the comparison between supporting and hindering sharper but not necessarily the comparison between intervention and opting out. Therefore, the Multinomial Logit estimation supports the second and third motives for opting out, which blur the impact of the political symbol on the relative preferences for intervention over opting out.

Note that the experiment was implemented in two batches: specifically, the first batch, in which the instructions in the treatment describes the meaning of the symbolic scepter as a representation of authority, and the second batch, which mentions the “authority” for enforcement only in the control group. Hence, splitting the sample by the textual salience of “authority” enables us to examine

²⁷ This situation is particularly relevant in the context of Chinese culture, which appreciates the implicit expression of their attitudes.

²⁸ I thank an anonymous referee who points out the possibility that opt-out decision may not be a middle option.

Table 3
Symbol effects on support/hinder conditional on institutional environment.

Subsample	(1) Appropriation: Yes	(2) Appropriation: No	(3) Transparency: Yes	(4) Transparency: No
Dependent vars: 1 support; 0 neutral; -1 hinder				
Mean (Y)	0.040	0.082	0.138	-0.029
symbol	0.185*** (0.067)	0.246*** (0.078)	0.223*** (0.050)	0.203** (0.082)
constant	-0.074 (0.069)	-0.015 (0.064)	-0.053 (0.061)	-0.038 (0.072)
Period FE	Yes	Yes	Yes	Yes
Appropriation Transparency	Yes	No	Yes	No
adj.R-squared	0.016	0.027	0.029	0.019
Observations	3444	2436	2913	2967

Notes: Robust standard errors clustering at the group level are reported in the parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

whether the effect of the political symbol is overestimated due to the additional description of the symbolic scepter's meaning. [Table A4](#) reports the relevant analysis. Columns 1–4 focus on the sessions with “authority” mentioned in the instructions, while columns 5–8 focus on the ones without “authority” in the instructions. The estimation results show that the effect of the political symbol on the perceived legitimacy is significantly positive and even larger when the “authority” is not mentioned in the instructions.²⁹ Therefore, the effect of the symbolic manipulation is not driven by the additional mention of the power and authority associated with the political symbol.

3.3. Heterogeneous effects of the institutional environment: payment schemes and transparency

[Table 3](#) examines the impact of the political symbol on the perceived legitimacy under different payment schemes and information transparency. Column 1 estimates the effect of the political symbol on citizens' tendency to support the authority's decision when the authority's payout is associated with the success of punishing the targeted citizen. By contrast, Column 2 examines the situation in which the authority's payout is fixed, regardless of the punishment. [Table 3](#) further investigates the symbol's effect on perceived legitimacy when the contribution–enforcement mapping is transparent (Column 3) and when the information is limited to citizens (Column 4). The estimated effects of the political symbol on perceived legitimacy are all significantly positive and are similar across different payment schemes and information transparency.³⁰ The discussion above can be summarized as Result 2:

Result 2: *The effects of the political symbol on perceived legitimacy are similar across different institutions.*

4. Mechanism analysis: citizens' psychological change or authorities' accountability?

There are competing mechanisms in interpreting why the intervention of political symbols can enhance an authority's legitimacy. From the perspective of an authority, the political symbol may arouse the responsibility to promote collective action by targeting free riders more actively (**Hypothesis 2-2b**). From the perspective of the citizens, it is also plausible that the citizens show greater support for the authority under the symbol intervention primarily due to psychological change—that is, more intrinsic obedience. To examine the mechanisms, [Table 4](#) regresses the authority's punishment proposal on the political symbol, controlling for the group contribution and period fixed effects. Accounting for the group contribution, Column 1 suggests that the symbol does not significantly increase the authority's targeting attempts. Including the institutional environments, Column 2 further shows that, consistent with DGH (p.114 and 120) and **Hypothesis 1–3**, appropriator authorities target citizens more than salaried ones, irrespective of information transparency. Moreover, Columns 3–6 conduct the regression under different institutional environments. The results indicate that the symbol intervention does not significantly increase the authority's tendency to attempt sanctions in most scenarios.³¹ The only exceptional case is Column 4, which displays a marginally significant coefficient on the symbol intervention, whereas the payout of authorities is not directly associated with the outcome of the attempt. This could be caused by the fact that a more independent authority may tend

²⁹ This is because the estimated treatment effect is larger in the second experiment than in the first one.

³⁰ The statistical test cannot reject the null hypothesis of equal coefficients ($p = 0.93$).

³¹ [Table A5](#) shows the similar results from Logit estimation.

Table 4
Symbols and the Authority's choice on enforcement.

Subsample	(1)	(2)	(3)	(4)	(5)	(6)
	Full	Full	Appropriation: Yes	Appropriation: No	Transparency: Yes	Transparency: Yes
Dependent vars: Enforcement = 1, otherwise 0						
Mean (Y)	0.676		0.786	0.564	0.674	0.678
symbol	0.059 (0.045)	0.061 (0.042)	-0.010 (0.048)	0.134* (0.068)	0.053 (0.064)	0.049 (0.063)
Group Contribution appropriation	-0.016 (0.019)	-0.024 (0.015)	-0.038** (0.018)	-0.010 (0.025)	0.004 (0.025)	-0.047* (0.027)
transparency		0.227*** (0.041)				
constant	0.750*** (0.060)	0.663*** (0.062)	0.902*** (0.059)	0.637*** (0.081)	0.673*** (0.091)	0.860*** (0.069)
Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Appropriation Transparency			Yes	No	Yes	No
adj.R-squared	0.010	0.068	0.017	0.031	0.008	0.020
Observations	2900	2900	1460	1440	1440	1460

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

Table 5
Symbols and behaviors of authority.

	(1)	(2)	(3)	(4)	(5)	(6)
	Resoluteness	Resoluteness	Perverse	Perverse	Predation	Predation
Mean (Y)	0.591		0.111		0.416	
symbol	0.044 (0.043)	0.049 (0.040)	0.001 (0.026)	0.002 (0.025)	0.068 (0.113)	0.063 (0.102)
Group Contribution appropriation	0.039* (0.021)	0.043** (0.018)	-0.006 (0.007)	-0.013** (0.006)		
transparency		0.138*** (0.039)		0.037 (0.025)		0.393*** (0.097)
constant	0.470*** (0.070)	0.345*** (0.075)	0.180*** (0.034)	0.214*** (0.042)	0.511*** (0.108)	0.317*** (0.100)
Period FE	Yes	Yes	Yes	Yes	Yes	Yes
adj.R-squared	0.010	0.037	-0.002	0.013	0.008	0.169
Observations	2467	2467	2900	2900	433	433

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

to use their power without worrying about accusations of extractive autocracy.

Furthermore, Table 5 investigates how the authorities target citizens and whether the symbol intervention can significantly alter the authority's targeting styles. Specifically, three binary indicators are defined, following DGH. First, a dummy variable of *resoluteness* is defined as 1 if a free rider was targeted in this group/period and 0 if there is a free rider but no free rider was punished in this group/period. As such, resolute enforcement may have deterrent effects on free riding. In contrast, the authority escapes responsibility if the variable *resoluteness* is 0. Second, the authority's punishment proposal is defined as *perverse* if the targeted citizen in this group/period

Table 6
Impacts of symbol on contribution.

Subsample	(1)	(2)	(3)	(4)	(5)	(6)
	Full	Full	Appropriation: Yes	Appropriation: No	Transparency: Yes	Transparency: No
Dependent vars: contribution = 1, free riding = 0						
Mean (Y)	0.503		0.526	0.479	0.430	0.574
symbol	0.007 (0.012)	0.007 (0.012)	0.009 (0.017)	0.004 (0.017)	0.018 (0.014)	-0.024 (0.020)
Lagged Group Contribution	0.188*** (0.006)	0.183*** (0.006)	0.182*** (0.009)	0.193*** (0.008)	0.209*** (0.006)	0.143*** (0.010)
Lagged Enforcement	0.022* (0.011)	0.018 (0.011)	0.022 (0.018)	0.015 (0.015)	0.013 (0.014)	0.017 (0.017)
Targeted in period t-1	-0.016 (0.014)	-0.016 (0.014)	-0.036* (0.022)	0.012 (0.016)	-0.030 (0.021)	-0.002 (0.020)
appropriation		0.008 (0.012)				
transparency		-0.050*** (0.013)				
constant	0.112*** (0.029)	0.146*** (0.031)	0.096** (0.045)	0.135*** (0.037)	0.021 (0.032)	0.279*** (0.042)
Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Appropriation Transparency			Yes	No	Yes	No
adj.R-squared	0.233	0.235	0.197	0.269	0.348	0.103
Observations	11020	11020	5548	5472	5472	5548

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

was not a free rider but there is a free rider in this group/period. Perverse enforcement is a type of irresponsible misconduct that does not increase perceived legitimacy. The third variable is defined under the condition that all citizens are contributors: The variable *predation* equals 1 if a citizen was targeted when all citizens are contributors, or 0 if no citizen was targeted when all citizens are contributors. Appropriators clearly have an incentive for predatory enforcement to increase earnings, while this predation may cause backlash from the citizens. The latter two indicators both reflect negative targeting behaviors.

Table 5 examines how the authorities target citizens on average and how the symbolic and institutional factors affect their targeting behaviors. Columns 1–2 indicate that authorities do not always attempt to punish the free riders. In almost half of all cases, no free riders are targeted. Salaried authorities do not have the material incentive to target either contributors or free riders. As predicted by **Hypothesis 1–3**, Column 2 shows that appropriators are 13.8 percentage points more likely to attempt resolute enforcement than salaried authorities. Meanwhile, transparent information increases the likelihood of resolute enforcement.³² This may be motivated by the honored images from transparent information about enforcement. Columns 3–4 suggest that authorities engage in perverse targeting occasionally, although the frequency is low. Transparent information can significantly reduce the likelihood of perverse enforcement. Columns 5–6 indicate that in 46% of instances when all citizens were contributors, authorities attempted to implement enforcement. In particular, consistent with **Hypothesis 1–3**, the stronger incentive leads appropriators to be 39.3 percentage points more likely to pursue predatory enforcement than salaried authorities.³³

Most relevant to the main aim of this study, Table 5 shows that the coefficients of the symbol indicator are all insignificant to these authority's behavioral outcomes. In other words, the symbol intervention does not increase or decrease the authority's tendency to overuse their power and take responsibility. In turn, these analyses produce Result 3, which is consistent with **Hypothesis 2-2a**:

Result 3: *Irrespective of the institutional environment, the political symbol does not evoke the authorities' greater accountability or tendency for enforcement.*

Additionally, one may worry that the insignificant impact of the political symbol on authorities' behaviors may be driven by the different levels of necessity (that is, the contributions levels) in different environments. For example, prevalent free-riding behaviors may induce the authority's responsibility to use punishment as a tool to increase contributions and thus affect their legitimacy. However, the experimental evidence does not support this possibility. Accounting for period fixed effects, lagged group contribution,

³² Consistently with my experiment, DGH also discover that appropriator authorities behave more resolutely, and information transparency increases the authorities' willingness to target free-riders.

³³ The subjects in this experiment, on average, behaved more predatorily than their American counterparts. DGH also find that appropriator authorities are more predatory than salaried authorities. DGH and my experiment both demonstrate that information transparency increases the authorities' willingness to target free-riders, while the effect is only nuanced in this experiment.

the enforcement indicator in the previous period, and an indicator of whether being targeted in the previous period, [Table 6](#) uses linear probability regressions to estimate the impacts of the political symbol on the individual contribution in the current period. Columns 1 and 2 differ in whether the indicators for payment scheme and information transparency are included in the regression. Columns 3–6 examine the association between political symbols and contribution under different payment schemes and transparency levels. Accordingly, this analysis is summarized by Result 4:

Result 4: *The intervention of the political symbol does not alter the citizens' willingness to contribute.*

Therefore, the analysis in [Table 6](#) supports **Hypothesis 2-3a** and excludes the channel that low contribution increases the authorities' tendency to implement punishment, which then improves collective actions and their own legitimacy. The results in [Table A6](#) of the Appendix further show the robustness of using Logit estimation. Unsurprisingly, [Table A7](#) shows that the profit level in various roles and environments accounting for the deadweight losses from sanctions is not significantly different between the symbol treatment and the control condition. Therefore, the insignificant impact of the political symbol on authorities' behavior is not driven by the different levels of necessity. Accordingly, observed differences in citizen intervention in this experiment are more likely to be attributed to the symbol intervention rather than differential responses to the previous group contributions.

Taken together, the experimental evidence does not support the hypothesis from the authority side. Instead, it is more reasonable that the intrinsic obedience resulting from the symbol intervention is the leading cause for the greater support for the authority.

5. Concluding remarks

Legitimacy is essential for the survival and prosperity of organizations and societies. Legitimacy can be granted by various sources, such as leader characteristics, accountability, checks and balances, and so forth. This study experimentally investigates the symbolic origins of legitimacy in a game of collective actions. The results show a significant increase in perceived legitimacy resulting from exposure to a political symbol representing the authority. Moreover, further analysis documents the mechanism at work and suggests that the increased perception of legitimate authority is primarily driven by the psychological alteration of the masses rather than any behavioral changes of the authorities.

The experimental findings deepen our understanding of the non-institutional sources of legitimacy and underscore the interplay between symbolic and institutional factors in enhancing perceived legitimacy. Because political symbols can also enhance authoritarian legitimacy, this study underlines the role of democratic institutions (including the rule of law and the system of checks and balances) in strengthening the association between political symbols and perceived legitimacy in an appropriate manner.

Three points concerning the limitations and future extensions of this article are worth highlighting. First, these experimental results may be subject to the externality validity problem because the fundamental mechanism of political symbols is largely culture-based. Civil disobedience (as defined by Henry David [Thoreau \(2016\)](#)) is considered a civic duty against tyranny in Western civilization. By contrast, China has been criticized for its entrenched totalitarianism and stagnated development of civic spirit, and the Confucian culture emphasizes submission to emperors, husbands, and family elders. Although this study compares experimental findings with DGH, we still do not know whether the association between political symbols and perceived legitimacy exists in other cultures. I therefore call for future replication with Western samples. Second, I do not intend to conclude that symbols are universally effective in all instances. Using symbolic icons to enhance perceived legitimacy in the wrong places may backfire. In further studies, alternatives can directly examine whether the electoral procedure (such as plural voting or merit-based selection) effects of political symbols. The impacts of political symbols on perceived legitimacy may also be associated with the merits of the authority. Third, this study tests the effects of one specific symbol, while other symbols might have different effects. The design of visual symbols that can arouse emotional resonance and common identity could be critical to their effectiveness in building and maintaining a coalition. Namely, a symbol with stronger and more specific meanings may yield greater obedience than salient but senseless ones. Because various types of organizations may require different context-based symbols, future research can compare the effectiveness of different symbols.

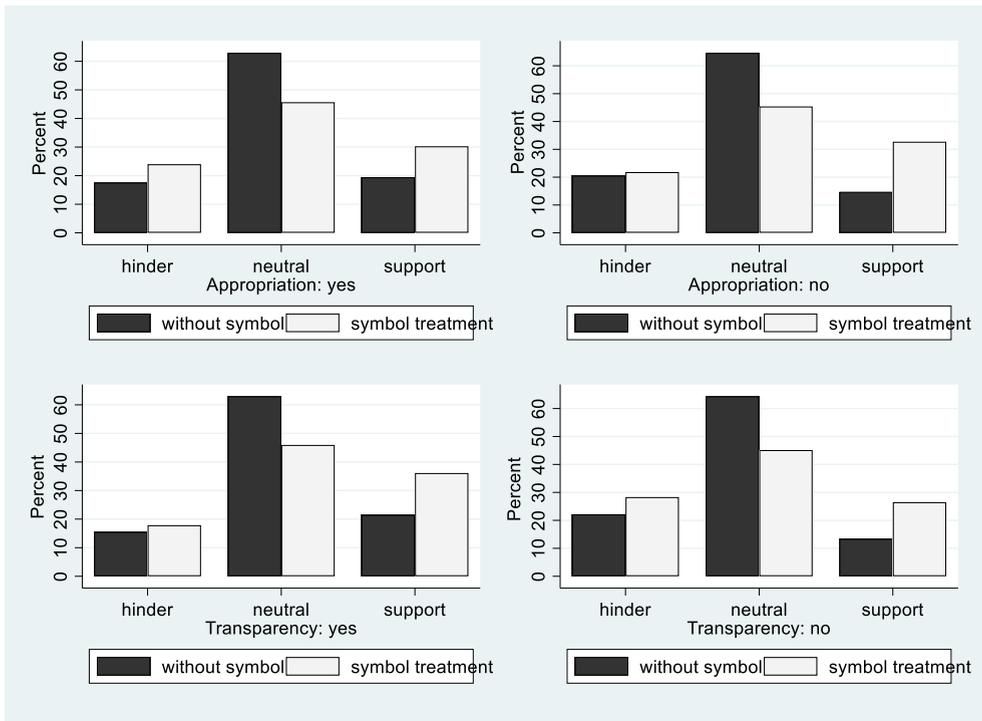
Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

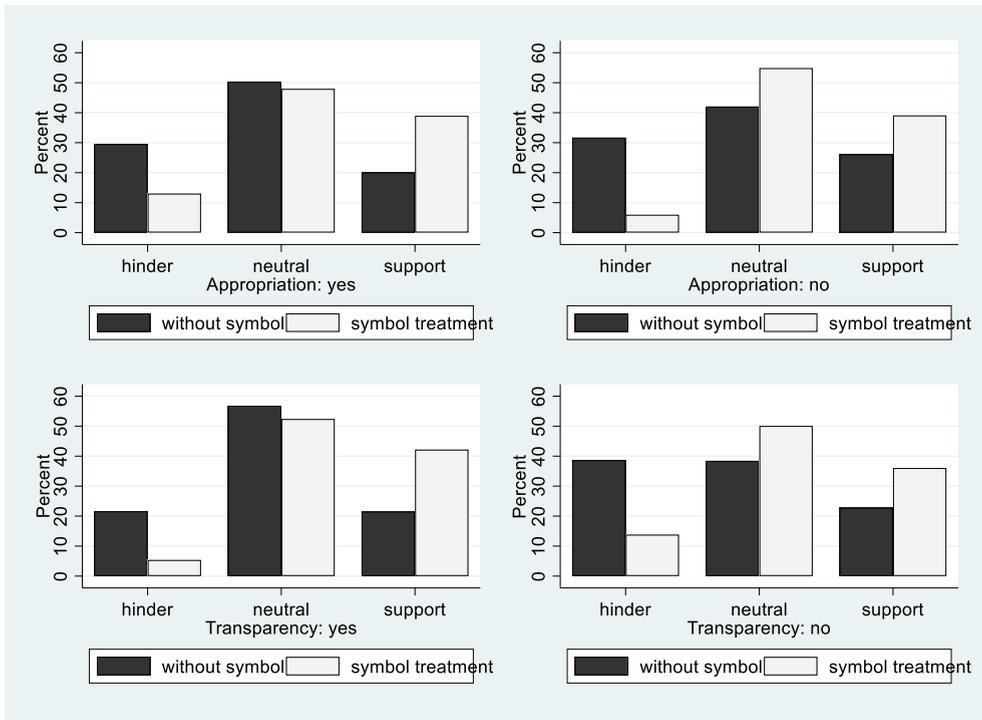
Data availability

Data will be made available on request.

Appendix A Additional Figures and Tables



Panel A "Authority" mentioned in the text



Panel B "Authority" not mentioned in the text

Fig. A1. Support/Hinder Choices: "Authority" in the Instruction or Not.

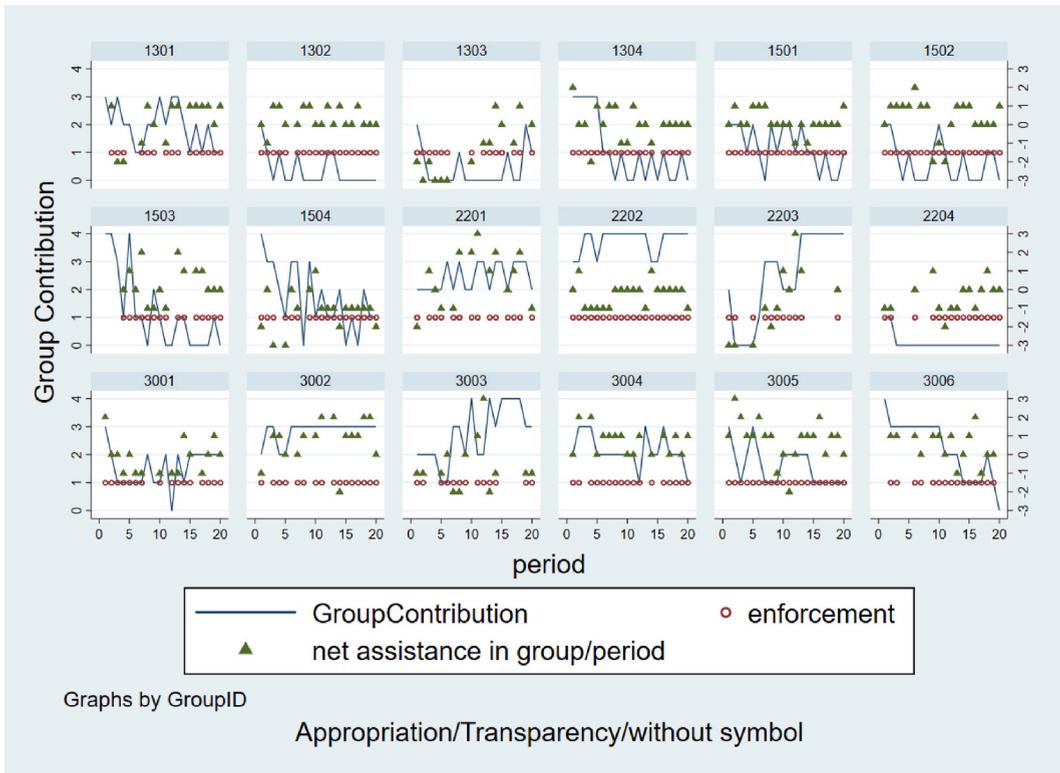


Fig. A2. Complete History of All Groups in Appropriation/Transparency/without Symbol Treatment.

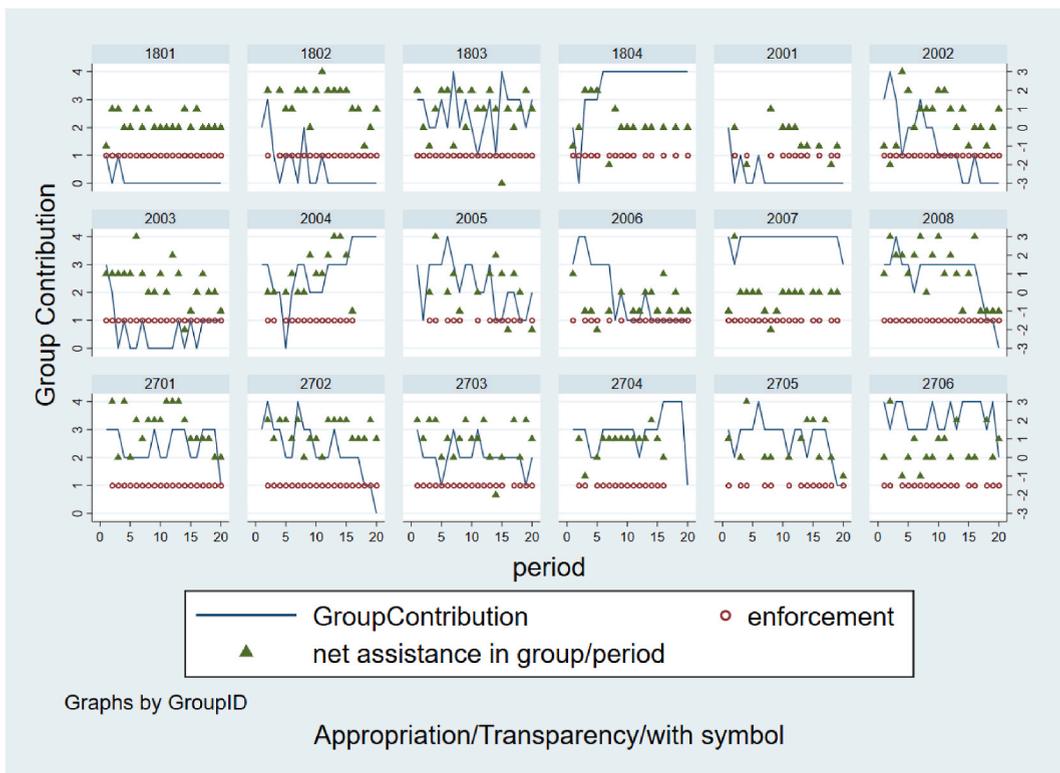


Fig. A3. Complete History of All Groups in Appropriation/Transparency/with Symbol Treatment.

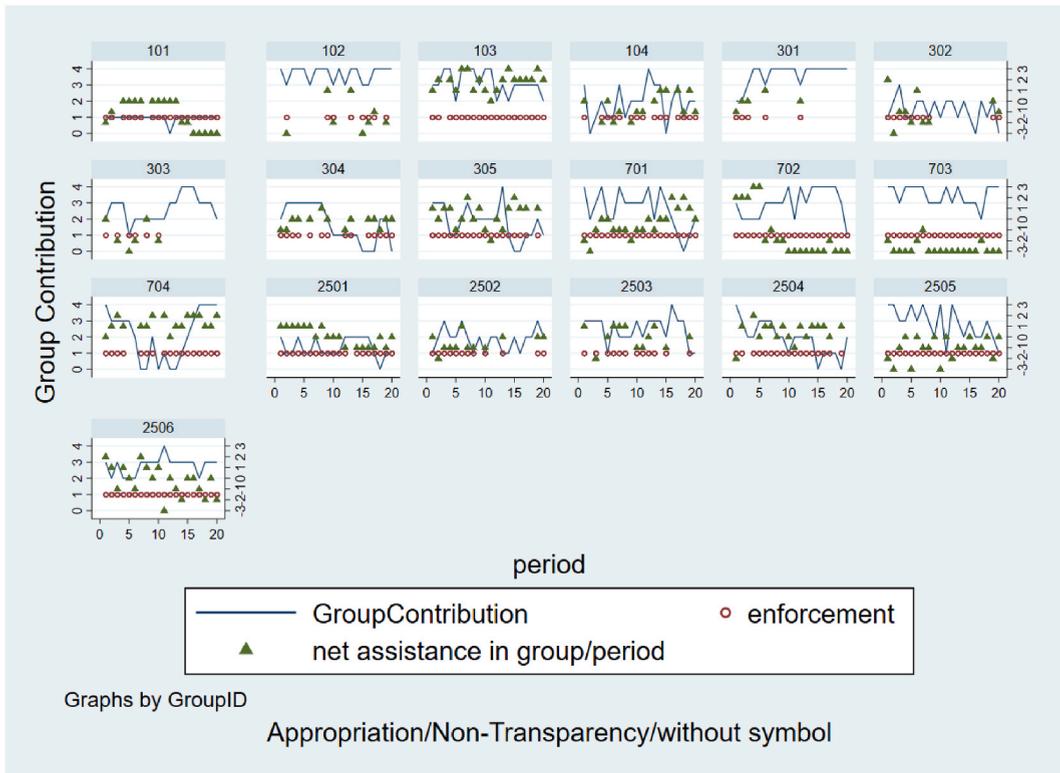


Fig. A4. Complete History of All Groups in Appropriation/Non-Transparency/without Symbol Treatment.

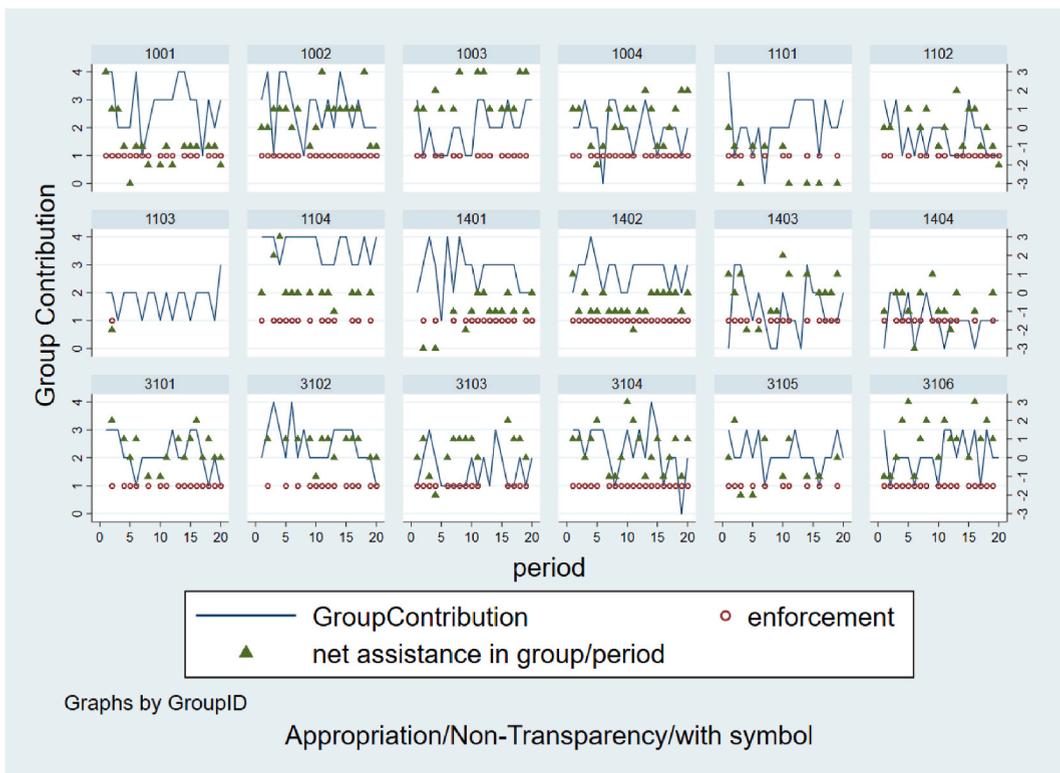


Fig. A5. Complete History of All Groups in Appropriation/Non-Transparency/with Symbol Treatment.

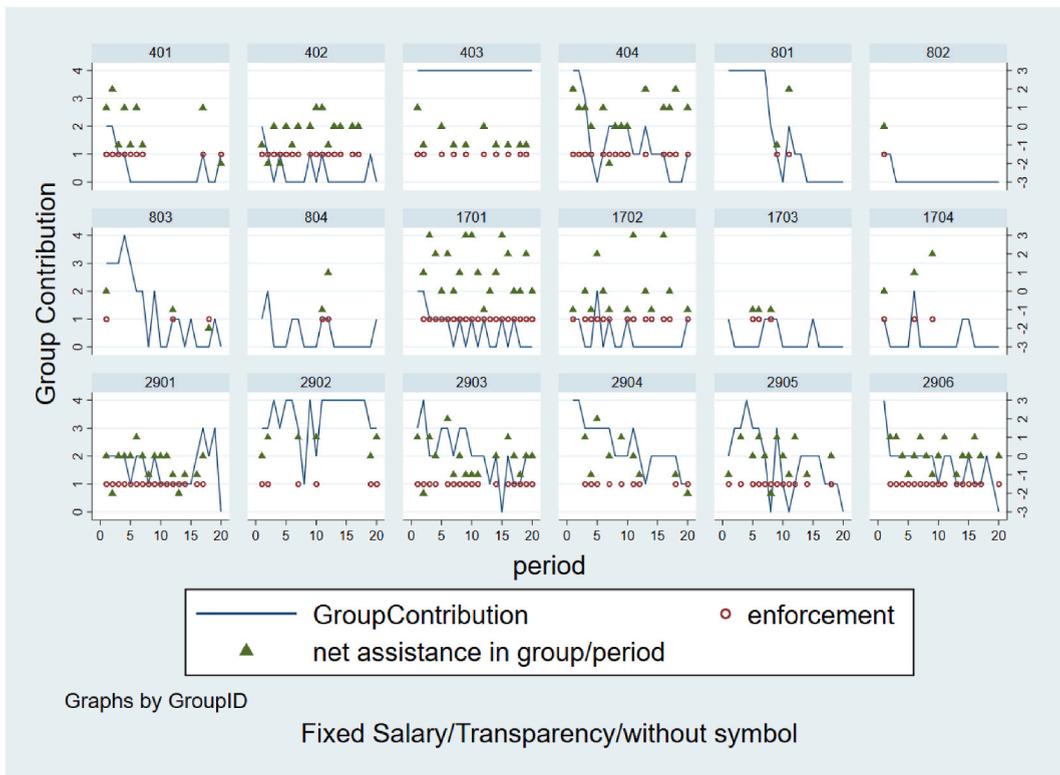


Fig. A6. Complete History of All Groups in Salary/Transparency/without Symbol Treatment.

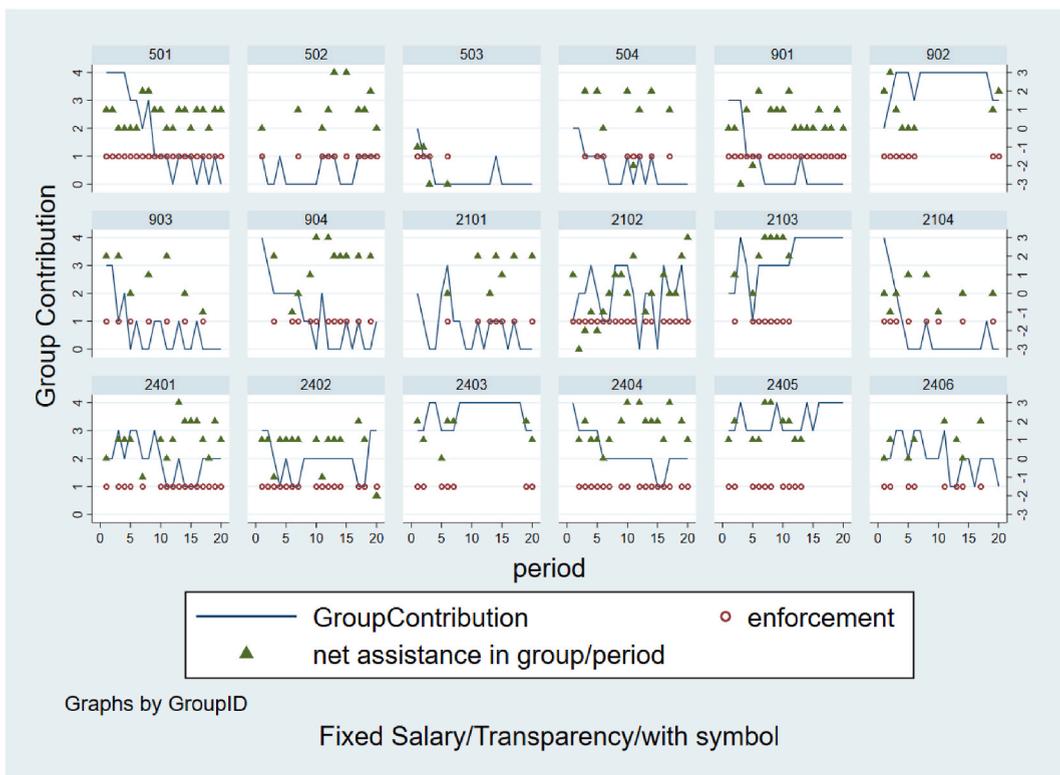


Fig. A7. Complete History of All Groups in Salary/Transparency/with Symbol Treatment.

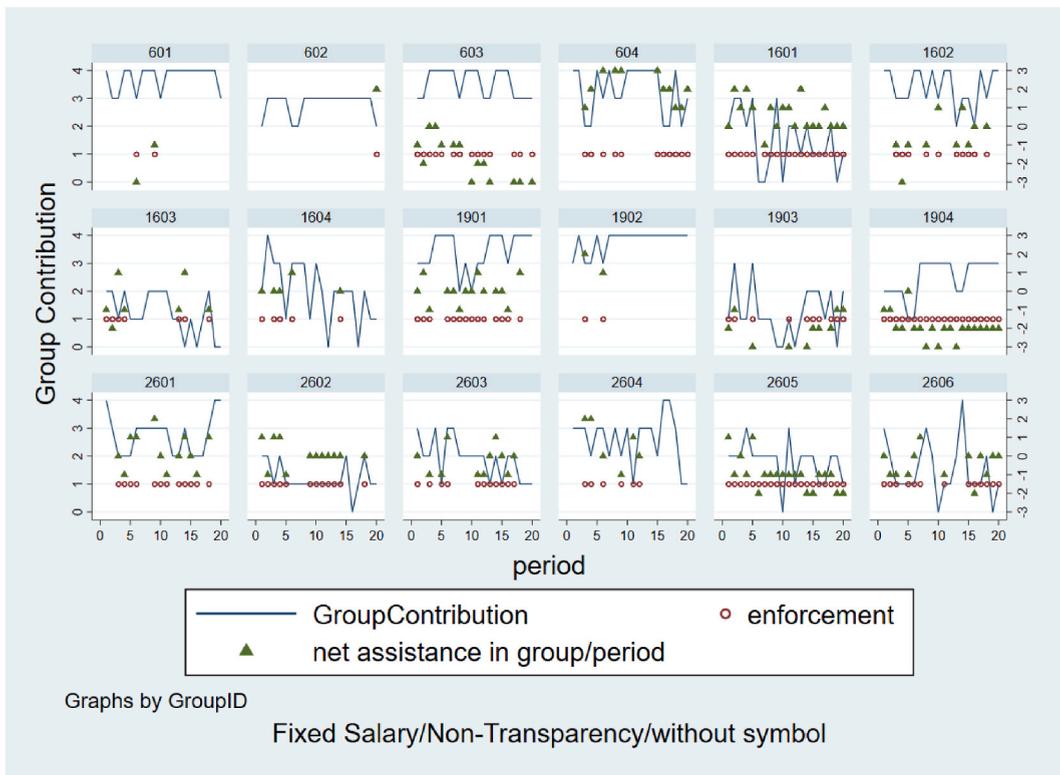


Fig. A8. Complete History of All Groups in Salary/Non-Transparency/without Symbol Treatment[]

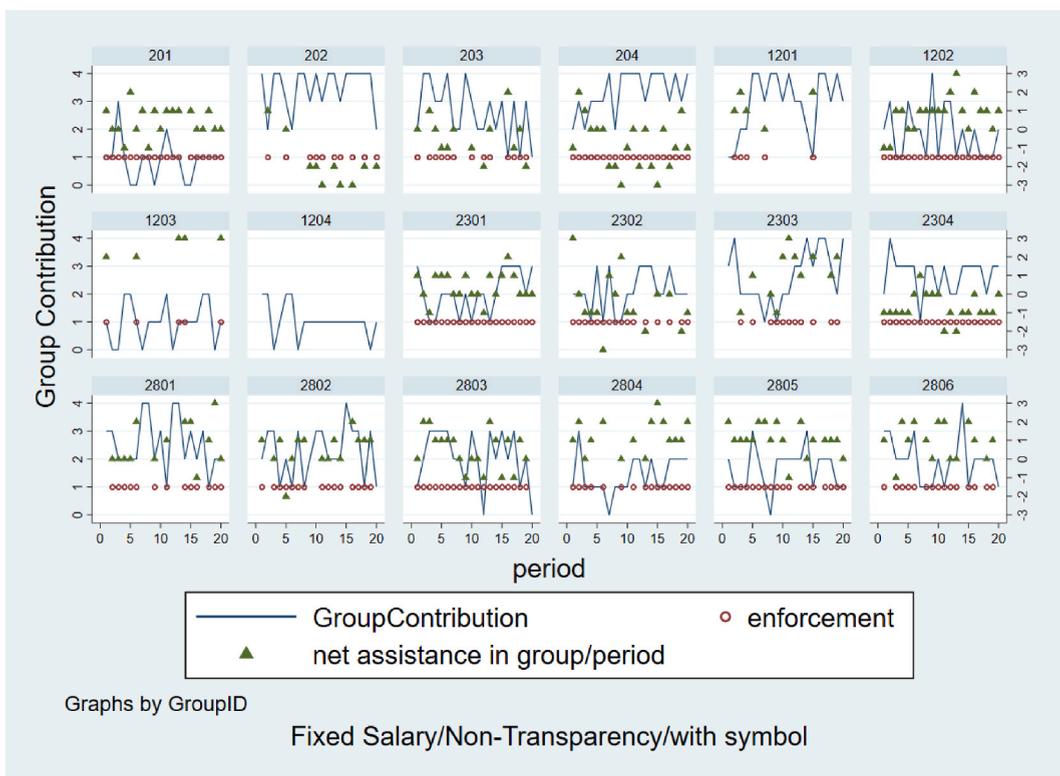


Fig. A9. Complete History of All Groups in Salary/Non-Transparency/with Symbol Treatment.

Table A1
Sample Balance Checks

	Mean	Obs.	Mean	Obs.	Mann-Whitney <i>U</i> test <i>p</i> value
	Without symbol		With symbol		
Male = 1	0.156	365	0.142	360	0.584
Economics major = 1	0.740	365	0.764	360	0.452
Rural <i>Hukou</i> = 1	0.833	365	0.783	360	0.090
Communist party member = 1	0.107	365	0.128	360	0.382
	"Authority" not mentioned in the text		"Authority" mentioned in the text		
Male = 1	0.145	365	0.153	360	0.775
Economics major = 1	0.745	365	0.758	360	0.683
Rural <i>Hukou</i> = 1	0.816	365	0.800	360	0.574
Communist party member = 1	0.107	365	0.128	360	0.382
	Salary payment		Appropriation payment		
Male = 1	0.167	360	0.132	365	0.184
Economics major = 1	0.789	360	0.715	365	0.022
Rural <i>Hukou</i> = 1	0.797	360	0.819	365	0.453
Communist party member = 1	0.797	360	0.819	365	0.117
	Limited information		Transparent information		
Male = 1	0.142	365	0.156	360	0.621
Economics major = 1	0.740	365	0.764	360	0.452
Rural <i>Hukou</i> = 1	0.811	365	0.806	360	0.854
Communist party member = 1	0.132	365	0.103	360	0.230

Table A2
Symbol and Support/Hinder: Ordered Probit Estimation

Subsample	(1)	(2)	(3)	(4)	(5)	(6)
	Full	Full	Appropriation: Yes	Appropriation: No	Transparency: Yes	Transparency: Yes
	Dependent vars: 1 support; 0 neutral; -1 hinder					
symbol	0.342*** (0.082)	0.372*** (0.086)	0.297*** (0.106)	0.396*** (0.128)	0.381*** (0.087)	0.314** (0.127)
Group	-0.029 (0.032)	-0.026 (0.035)				
Lagged	0.060 (0.056)					
Enforcement						
appropriation	-0.075 (0.081)	-0.023 (0.086)				
transparency	0.283*** (0.075)	0.264*** (0.077)				
Lagged		0.174*** (0.059)				
Resoluteness						
cut1	-0.536*** (0.139)	-0.422*** (0.151)	-0.576*** (0.118)	-0.672*** (0.110)	-0.676*** (0.112)	-0.585*** (0.117)
cut2	0.875*** (0.137)	1.014*** (0.153)	0.813*** (0.117)	0.721*** (0.114)	0.856*** (0.110)	0.704*** (0.120)
Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Appropriation			Yes	No		
Transparency					Yes	No
Observations	5559	4428	3444	2436	2913	2967

Notes: Robust standard errors clustering at the group level are reported in the parentheses. **p* < 0.1, ***p* < 0.05, ****p* < 0.01.

Table A3
Symbol and Support/Hinder: Multinomial Logit Estimation

	(1)	(2)	(3)	(4)
	Base reference: neutral		Base reference: hinder	
	Alternative outcome: hinder		Alternative outcome: neutral	
symbol	-0.234 (0.202)	-0.248 (0.217)	0.234 (0.202)	0.248 (0.217)
Group		0.166*		-0.166*
Contribution		(0.094)		(0.094)
Lagged		-0.382***		0.382***
Resoluteness		(0.127)		(0.127)
appropriation		0.123 (0.221)		-0.123 (0.221)
transparency		-0.567*** (0.207)	0.264 (0.210)	0.567*** (0.207)
constant	-0.563*** (0.169)	-0.020 (0.434)	0.563*** (0.169)	0.169 (0.339)
	Alternative outcome: support		Alternative outcome: support	
symbol	0.629*** (0.169)	0.688*** (0.198)	0.863*** (0.215)	0.936*** (0.232)
Group		0.075		-0.090
Contribution		(0.078)		(0.091)
Lagged		0.062		0.444***
Resoluteness		(0.168)		(0.148)
appropriation		0.054 (0.189)		-0.069 (0.227)
transparency		0.150 (0.193)		0.717*** (0.201)
constant	-0.779*** (0.155)	-0.880*** (0.330)	-0.216 (0.188)	-0.711* (0.366)
Period FE	Yes	Yes	Yes	Yes
Observations	5880	4428	5880	4428

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

Table A4
Support/Hinder Decision: whether or not "authority" mentioned in the instruction

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent vars: 1 support; 0 neutral; -1 hinder							
symbol	0.098* (0.058)	0.097* (0.053)	0.095* (0.055)	0.133** (0.057)	0.374*** (0.066)	0.366*** (0.062)	0.374*** (0.069)	0.373*** (0.072)
appropriation		-0.016 (0.055)	-0.012 (0.058)	0.034 (0.057)		-0.067 (0.075)	-0.069 (0.076)	-0.057 (0.084)
transparency		0.186*** (0.055)	0.187*** (0.056)	0.172*** (0.057)		0.162** (0.074)	0.158** (0.065)	0.155** (0.070)
Group Contribution			-0.029 (0.022)	-0.022 (0.024)			-0.019 (0.031)	-0.023 (0.034)
Lagged			0.031 (0.047)				0.043 (0.050)	
Enforcement				0.057 (0.041)				0.062 (0.052)
Lagged								
Resoluteness								
constant	0.056 (0.063)	-0.021 (0.071)	-0.081 (0.111)	-0.148 (0.118)	-0.124** (0.061)	-0.163* (0.085)	-0.090 (0.118)	-0.115 (0.132)
	"Authority" mentioned in the instruction				"Authority" not mentioned in the instruction			
Period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj.R-squared	0.001	0.018	0.022	0.025	0.063	0.076	0.079	0.085
Observations	3015	3015	2856	2277	2865	2865	2703	2151

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

Table A5
Symbol and Enforcement: Logit Estimation

Subsample	(1) Full	(2) Full	(3) Appropriation: Yes	(4) Appropriation: No	(5) Transparency: Yes	(6) Transparency: Yes
Dependent vars: Enforcement						
symbol	0.272 (0.209)	0.300 (0.205)	-0.062 (0.289)	0.563** (0.286)	0.245 (0.293)	0.230 (0.296)
Group Contribution appropriation	-0.074 (0.087)	-0.117 (0.074) 1.092*** (0.198)	-0.237** (0.111)	-0.041 (0.105)	0.016 (0.113)	-0.219* (0.129)
transparency		-0.082 (0.199)				
constant	1.097*** (0.286)	0.755** (0.301)	2.028*** (0.379)	0.590* (0.345)	0.726* (0.422)	1.649*** (0.361)
Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Appropriation Transparency			Yes	No	Yes	No
Pseudo R-squared	0.014	0.062	0.031	0.034	0.017	0.027
Observations	2900	2900	1460	1440	1440	1460

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

Table A6
Impacts of Symbol on Contribution: Logit Estimation

Subsample	(1) Full	(2) Full	(3) Appropriation: Yes	(4) Appropriation: No	(5) Transparency: Yes	(6) Transparency: Yes
Dependent vars: contribution						
symbol	0.034 (0.063)	0.036 (0.064)	0.041 (0.085)	0.033 (0.093)	0.084 (0.088)	-0.112 (0.092)
Lagged Group Contribution	0.904*** (0.044)	0.885*** (0.044)	0.855*** (0.063)	0.960*** (0.061)	1.126*** (0.057)	0.631*** (0.052)
Lagged Enforcement	0.114* (0.064)	0.105* (0.062)	0.089 (0.093)	0.101 (0.085)	0.140 (0.098)	0.057 (0.081)
Targeted in period t-1 appropriation	-0.080 (0.072)	-0.081 (0.072) 0.043 (0.063)	-0.180* (0.107)	0.062 (0.081)	-0.179 (0.120)	-0.009 (0.089)
transparency		-0.276*** (0.066)				
constant	-1.886*** (0.169)	-1.716*** (0.168)	-1.914*** (0.247)	-1.836*** (0.230)	-2.655*** (0.216)	-0.953*** (0.197)
Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Appropriation Transparency			Yes	No	Yes	No
Pseudo R-squared	0.185	0.188	0.156	0.217	0.291	0.081
Observations	11020	11020	5548	5472	5472	5548

Notes: Robust standard errors clustering at the group level are reported in the parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

Table A7
Comparison of Total Profit

Mean (without symbol)	Mean (with symbol)	Diff	p value
All Subjects			
29.77521	29.55597	.2192333	.6680633
Authority			
34.69452	36.26806	-1.573535	.3142872
Citizen			
28.54538	27.87795	.6674254	.1197239
Authority/Appropriation: Yes			
30.28378	33.34167	-3.057883	.1328866
Authority/Appropriation: No			
39.22778	39.19444	.0333337	.9870402
Authority/Transparency: Yes			
32.06944	36.61111	-4.541667	.0505965
Authority/Transparency: No			
37.24865	35.925	1.323649	.523408
Authority/Text mentions authority			
36.77917	34.8375	1.941667	.3703172
Authority/Text does not mention authority			
33.67347	39.12917	-5.455697	.0300093
Citizen/Appropriation: Yes			
28.26892	27.98299	.2859328	.6499307
Citizen/Appropriation: No			
28.82951	27.77292	1.056597	.0703066
Citizen/Transparency: Yes			
26.97431	27.22743	-.253125	.6352941
Citizen/Transparency: No			
30.07399	28.52847	1.545514	.016541
Citizen/Text mentions authority			
28.62865	27.69323	.9354166	.1513854
Citizen/Text mentions authority			
28.50459	28.2474	.2571961	.6873036

Appendix B. A Sample of the Instructions in the First-Batch Experiment (Symbolic Treatment with Appropriation Pay and Full Information)³⁴

Instructions

Welcome to this experiment! In the following experiment you will make a series of choices. At the end of the experiment, you will be paid according to your choices during the experiment and the choices made by other participants. Please keep silent and carefully read the instructions.

In addition to the show-up fee of RMB5, during the course of the experiment you will have the opportunity to earn “tokens” that will be converted into cash at the end of the experiment. The conversion rate is:

20 tokens = 1 RMB.

You will be randomly assigned into a group of 5 participants. This assignment will be fixed for the whole experimental session. All of your interactions will be through the computer terminals in front of you, and your true identity will never be revealed to any other participants. The experiment will repeat for 20 rounds.

Within that group, you will be randomly assigned to one of two roles in the experiment: Role A, or Role B. Within a given group, one participant will be randomly assigned to Role A; the other four participants will be assigned to Role B. **The participant in Role A will have a symbolic scepter that represents his/her authority in the experiment.**³⁵ **The scepter will be seen on the screen by all participants in the group when he/she is making decision or his/her decision is shown to the other participants.** The assignments will remain fixed for the whole experimental session. Every participant of Role B will also receive an ID number: 1, 2, 3, or 4. This ID number will be randomly re-assigned from one period to the next.

Each round includes three steps.

First Stage

At the beginning of each round, each participant in Role B receives 20 tokens, and then decides whether to allocate all these 20

³⁴ The experiment was conducted in Chinese. The original instructions written in Chinese are available upon request.

³⁵ In the second batch of experiments, this sentence was modified to: “The participant in Role A will have a symbolic scepter in the experiment.”

tokens to a public account, or to keep them all in a private account. All tokens that are saved in the public account will be doubled and equally divided to 5 participants in the same group (including the participant of Role A).

That is, the payoff to a participant in Role B in the first stage is composed of two parts:

The number of tokens the person keeps in his/her private account $+0.4 \cdot$ the number of tokens that all participants in Role B allocate to the public account.

Although the participant in Role A does not make a choice in the first stage, he/she also receives first-stage payoffs:

$0.4 \cdot$ (total tokens allocated to public account).

Consider the following examples:

1. Suppose that every participant in Role B keeps all 20 tokens in his/her private account. Then the first-stage payoffs of each participant in Role B will be 20 tokens. The first-stage payoffs of the participant in Role A will be 0 tokens.
2. Suppose that every participant in Role B allocates all 20 tokens in the public account. Then the first-stage payoffs of each participant in Role B will be $0 + 80 \cdot 0.4 = 32$ tokens. The first-stage payoffs of the participant in Role A will be also 32 tokens.
3. Suppose that two participants in Role B each keep their 20 tokens for themselves, and other two participants in Role B each allocate their 20 tokens to the public account. Then the first two participants in Role B would therefore have first stage payoffs equal to $20 + (0.4 \cdot 40) = 36$ tokens; the other two participants in Role B would therefore have first stage payoffs equal to $0 + (0.4 \cdot 40) = 16$ tokens. The participant in Role A would receive first stage payoffs equal to $0 + (0.4 \cdot 40) = 16$ tokens.

Second Stage

At the beginning of the second stage, everyone receives some information about what happened in the first stage. All participants are told: the decision of each participant in Role B in the first stage, whether each participant in Role B allocated his/her tokens to his/her private account or the public account, and his/her payoff.

Once this information has been received, the participant in Role A must decide whether or not to choose one participant in Role B and attempt to reduce his or her first-period payoff by 30 tokens. If the participant in Role A decided not to choose any participant in Role B, then this round ended. Otherwise, attempting to reduce the payoffs of a participant in Role B costs the participant in Role A 2 tokens, whether the attempt is successful or not. Whether or not this attempt to reduce payoffs is determined according to a likelihood that depends on choices made by the other participants in Role B in the third stage. If the participant in Role A made a successful reduction of the targeted participant's payoff by 30 tokens, then participant in Role A would receive 30 tokens.

Third Stage

In this stage, the people in Role B who were not targeted by the participant in Role A observed the decisions made by all participants in Role A and the participant in Role B. Then each participant in Role B who was not targeted by the participant in Role A has three choices: 1) support participant in Role A by paying a cost of 1 token; 2) hinder participant in Role A by paying a cost of 1 token; 3) do nothing without cost. If all three participants in Role B choose to do nothing, then the final likelihood that 30 tokens will be taken from the targeted participant will be $1/2$. One more support would increase this likelihood by $1/6$, while one more hinder would decrease this likelihood by $1/6$. Consider the following examples.

1. If all three of the other people in Role B choose to support the decision made by participant in Role A, then the final likelihood of success will be 100%.
2. If all three of the other people in Role B choose to hinder the decision made by participant in Role A, then the final likelihood of success will be 0%.
3. If one participant in Role B chooses to support the decision made by participant in Role A and two other participants in Role B choose to hinder the decision, then the final likelihood of success will be $1/3$.
4. If one participant in Role B chooses to support the decision made by participant in Role A and two other participants in Role B choose to do nothing, then the final likelihood of success will be $2/3$.

Then the outcome under this determined probability will be realized by the computers.

Finally, all group members observe: whether a participant was targeted, how many participants chose to support/hinder/do nothing for participant A's decision, whether the targeted participant was eventually punished, and tokens earned by each participants in this period.

Appendix C Some Snapshots of the Experimental Platform³⁶

³⁶ All pages of the experimental platform are only Chinese. English on the screen is the translation.

请做出决策 Please make decision

现在是20轮中的第1轮 This is Round 1 of 20 rounds.

您被选为角色B,且您的ID为2 You are assigned as Role B, and your ID is 2.

您将会得到20个积分,您可以选择要么把20个积分都留在私人账户,要么将所有积分都存入本组的公共账户,请选择: You have 20 tokens. You can choose to either keep them all in your private account or allocate them all in the public account in your group. Please choose:

都留在私人账户 都存入本组公共账户

Private account Public account

下一页

Fig. C1. Screen Interface When a Role B Participant Allocating Tokens.

请做出决策 Please make decision

现在是20轮中的第1轮 This is the Round 1 of 20 rounds

您是角色A,持有权杖 You are assigned as Role A with a scepter.



如下为四位角色B的成员做出的决策
The choices made by other group members in Role B:

ID	存入 Allocate tokens to:
1	都留在私人账户 Private account
2	都留在私人账户 Private account
3	都留在私人账户 Private account
4	都存入本组公共账户 Public account

Please decide whether to choose a participant as the target. This round ends if you prefer not to choose anyone. If you choose a participant as the target, you need to pay 2 tokens, and the experiment proceeds to the next step. Please choose your target:

不选择任何人 ID为1的参与者 ID为2的参与者 ID为3的参与者 ID为4的参与者

not any one ID 1 ID 2 ID3 ID 4

下一页

Fig. C2. Screen Interface When a Role A Participant Making Targeting Decision.

Note: This figure is the interface in the second-batch experiment. In the first-batch experiment, the relevant text is that “You are assigned as Role A. You have the scepter representing the authority.”

请做出决策 Please make decision

现在是20轮中的第1轮 This is Round 1 of 20 rounds.

您被选为角色B,且您的ID为3 You are selected as Role B. Your ID is 3.

如下为四位角色B的成员做出的决策The choices made by all group members in Role B:

ID	存入账户	Allocate tokens into
1	都留在私人账户	Private account
2	都留在私人账户	Private account
3 (自己) Youself	都留在私人账户	Private account
4	都存入本组公共账户	Public account

The participant in Role A with a scepter chose the participant with ID 1
当前持有权威的角色A选择针对的角色B成员的ID为1, 您需要选择支持、反对角色A的决策 (需要付出一个1个积分), 或者什么也不做 (不需要付出积分), 请选择:
as the target. You need to choose to support or hinder this decision at cost of 1 token. You can also do nothing without any cost. Please make your choice:

什么也不做 同意A的决策 反对A的决策
do nothing support hinder

[下一页](#) proceed

Fig. C3. Screen Interface When a Role B Participant Making Supporting/Hindering Decision.

Note: This figure is the interface in the second-batch experiment. In the first-batch experiment, the relevant text is that “The participant in Role A has the authority to target a participant in Role B. The scepter represents his/her authority.”

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