Games and Economic Behavior 160 (2026) 104038

Contents lists available at ScienceDirect

Games and Economic Behavior

journal homepage: www.elsevier.com/locate/geb

Legitimate decision authority and motivation in organizations ⋆

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ARTICLE INFO

JEL classification:
D01
D23
D91
M5

Keywords:
Hierarchies
Motivation
Legitimacy

ABSTRACT

The allocation of decision rights—and the decision hierarchies it creates—shape incentives in organizations and thus individual motivation. We study whether the motivational effects of decision hierarchies go beyond pecuniary incentives and how they relate to the perceived legitimacy of the decision hierarchy. In a laboratory experiment, we exogenously manipulate the payoff structure of an organization in a way that leaves the pecuniary incentives of all involved parties unaffected but shifts subordinates' perceived legitimacy of the decision hierarchy. Our data show that subordinates' motivation to provide effort is causally affected by the organizational payoff structure, and significantly associated with the perceived legitimacy of the decision hierarchy.

1. Introduction

It has long been argued that behavioral reactions to authority and power are positively influenced by an authority's legitimacy (Selznick et al., 1949; Parsons, 1956; French and Raven, 1959; Weber, 1978; Zelditch, 2001; Beetham, 2013). However, our empirical understanding of the relationship between the perceived legitimacy of an authority and the behavior of those subject to its influence remains less well understood.

A key challenge in empirically examining this relationship stems from the intertwined nature of factors influencing both legitimacy perceptions of an authority and the immediate incentives individuals encounter when interacting with the authority. Perceived legitimacy and individual incentives may not only be co-determined by third factors, perceptions of legitimacy may even be directly shaped by individual incentives.[1]

In this paper, we use a controlled laboratory experiment to study subordinate motivation across decision hierarchies with identical pecuniary incentives but differences in the organizational payoff structure that are hypothesized to affect the perceived legitimacy of the decision hierarchy. We do so in the context of organizations, where legitimacy is widely recognized as an important property (Dowling and Pfeffer, 1975; Zucker, 1987). To this end, we build on the authority game developed by Fehr et al. (2013), which is

⋆ This experiment was pre-registered before data collection and approved by the IRB of the University of Fribourg, Switzerland. We thank Patrick Haack, Ivo Schedlinsky, Christian Zehnder, two anonymous reviewers, seminar and conference participants at the Universities of Fribourg and Lausanne, the SIOE Annual Congress in Frankfurt 2023, the Matterhorn Symposium 2023 in Brig, and the GEABA 2024 in Bonn for valuable comments, and Arnaud Gougler, Michèle Jungo and Oliver Zumstein for excellent research assistance. Holger Herz acknowledges financial support from the ERC Starting Grant 803332.

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[1] The potential impact of incentives on perceived legitimacy is, for example, evident in Suchman's definition of *pragmatic legitimacy*, in which an organization's legitimacy is derived from *"the self-interested calculations of an organization's most immediate audiences"* (Suchman, 1995, p. 578).

https://doi.org/10.1016/j.geb.2026.08.005
Received 21 November 2024
Available online 29 August 2026
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based on the theory of formal and real authority introduced by Aghion and Tirole (1997). Following French and Raven (1959), we conceptualize perceived legitimacy as subordinates' acceptance of the authority structure as rightful.

In the authority game, a principal and an agent form a minimal organizational unit and must select one out of N potential projects for implementation. One party holds decision authority as the controlling party, while the other can only recommend a project as the subordinate. Two projects generate benefits for both parties, but interests are only partially aligned: one project is best for the principal, the other for the agent. Implementing either beneficial project requires costly effort to acquire project information.

The subordinate, if informed, recommends their preferred project. An informed controlling party overrules this recommendation and implements their own preferred project, whereas an uninformed controlling party rubber-stamps the subordinate's recommendation because it yields a higher payoff than the outside option. Thus, both parties have incentives to acquire information, although the subordinate's incentives are weaker because their recommendation is overruled whenever the controlling party is also informed.

Initially, the principal holds decision authority, but authority may be transferred to the agent before effort is exerted. Delegation makes the agent the controlling party and the principal the subordinate, generating two possible decision hierarchies: principal control or agent control.

While our experimental environment builds on the authority game, our research question is fundamentally different: Fehr et al. (2013) study the motivational consequences of authority and delegation themselves, focusing on individuals' willingness to retain authority and the behavioral effects of being in a controlling versus subordinate role. In contrast, we study whether subordinates' motivation depends on the perceived legitimacy of the authority structure, which is an endogenous perception shaped by multiple organizational and contextual factors. While these underlying factors can be experimentally manipulated, the resulting perception of legitimacy cannot itself be directly manipulated.

To study the impact of legitimacy perceptions on subordinate motivation, we exploit variation from Fehr et al. (2013) with respect to one potential determinant of perceived legitimacy of the decision hierarchy: The agent's payoff when the principal's preferred project is implemented. In treatment SYM, the payoffs received when the other party's preferred project is chosen are symmetric, and the two parties' interests are highly aligned (treatment SYM). In treatment ASYM, the principal still receives a relatively high payoff when the agent's preferred project is implemented, but the agent receives a significantly smaller payoff when the principal's preferred project is implemented.[2] While this payoff asymmetry is adverse to the agent, it does not affect the agent's pecuniary incentives when the principal retains authority.[3]

We hypothesize that the payoff asymmetry in ASYM reduces the legitimacy perception of principal control relative to SYM. In SYM, delegation merely switches roles between otherwise identical parties. In ASYM, however, the agent suffers a substantially larger loss when the other party's preferred project is chosen. Drawing on distributive justice theories that emphasize equity as a determinant of authority acceptance (e.g. Rawls, 1971; Deutsch, 1975), we therefore predict that principal control is perceived as less legitimate in ASYM than in SYM. If perceived legitimacy affects agents' motivation, this should in turn reduce agent effort under principal control in ASYM relative to SYM.

The data from Fehr et al. (2013) provide suggestive evidence consistent with this mechanism. In their experiment, agents exert less effort when principals retain decision authority in ASYM than in SYM, despite identical monetary incentives. However, Fehr et al. (2013) neither measured agents' perceptions of the legitimacy of the decision hierarchy nor examined legitimacy as a potential mechanism underlying the effort response. Our experiments complement their findings by directly measuring perceived legitimacy, by examining whether the payoff variation changes legitimacy perceptions, and whether these changes are associated with subordinate motivation.

We therefore conducted an additional series of experiments that directly measure perceptions of the legitimacy of the decision hierarchy and include design features that allow us to rule out reciprocity-based channels.

Our data show that the treatment variation indeed affects perceptions of legitimacy of the decision hierarchy. In SYM, the vast majority of agents consider it equally legitimate that the principal keeps or transfers the decision right to the agent. However, under ASYM, we find strongly divergent legitimacy perceptions: agents perceive it significantly less legitimate when principals retain authority.

Moreover, we find that agents are less motivated to provide effort when principals keep decision authority in ASYM compared to SYM. Despite identical monetary incentives, effort provision is reduced by approximately 8% in ASYM, aligning with the evidence in Fehr et al. (2013). Exploiting the fact that treatment variation was within-subject in our experiments, we can additionally demonstrate a significant correlation between effort provision and legitimacy perceptions at the individual level: A greater reduction in the perceived legitimacy of the principal's decision-making authority is significantly associated with a larger reduction in agent effort.

As noted before, a caveat in interpreting these effects as being driven by perceptions of legitimacy is that the principal can intentionally choose the organizational structure in the first stage of the game. Agents' motivational response might therefore reflect a reciprocal reaction to the intentional non-delegation in ASYM rather than a response to the perceived illegitimacy of principal control itself, consistent with intentions-based reciprocity (Rabin, 1993; Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006). Fehr et al. (2013) address a related question in their HIGH-RAND treatment, where delegation is determined randomly rather

[2] In Fehr et al. (2013), the respective treatments were HIGH and PHIGH. For our purposes, SYM and ASYM are more immediate acronyms, reflecting the (a)symmetry in payoffs.

[3] When the principal keeps authority, the agent's incentive to invest comes only from the contingency in which the principal remains uninformed and rubber-stamps the agent's proposal. Hence, only the outside option and the payoff from the agent's preferred project matter for the agent's pecuniary incentives, and both are identical across treatments. Appendix A.1 in supplementary material shows that this also holds when accounting for social preferences (Fehr and Schmidt, 1999).

than intentionally by the principal. They find that subordinate effort in HIGH is unaffected by whether the allocation of authority is intentional or random, providing evidence that intentionality does not affect subordinate effort in that payoff structure. However, because random delegation was implemented only in HIGH, their design does not reveal whether the role of intentionality changes with the payoff structure. We therefore implement RAND under both the SYM and ASYM payoff structures. This allows us to examine whether the effect of the payoff asymmetry on legitimacy perceptions and subordinate motivation persists when the decision hierarchy is not intentionally chosen by the principal.

Our results show that also in RAND, agents perceive it as less legitimate for the principal to have the decision right in ASYM than in SYM, despite the fact that the decision hierarchy is no longer intentionally chosen by the principal. The reduction in agent motivation is also replicated: agents significantly reduce their effort in ASYM relative to SYM. This suggests that intentions-based reciprocity is not the major driver of the motivational reduction when the project payoff structure changes.

Finally, LLM-based text analyses also support the proposed mechanism. Increased inequality in project payoffs in ASYM is the most frequently mentioned explanation for changes in legitimacy perceptions, and agents expressing this concern are also those who reduce effort most strongly.[4]

Our findings contribute to the literature in organizational economics that studies the optimal design and evolution of organizational structures theoretically (Grossman and Hart, 1986; Hart and Moore, 1990; Aghion and Tirole, 1997; Baker et al., 1999; Garicano, 2000; Dessein, 2002; Aghion et al., 2004) and empirically (Bartling et al., 2014; Wu, 2017; Bandiera et al., 2021). While this literature demonstrates how the optimal allocation of authority is shaped by factors such as interest alignment, knowledge, coordination needs, or intrinsic preferences for control, our paper shows that incentive-neutral asymmetric organizational payoff structures can have additional motivational consequences that are associated with the perceived legitimacy of the decision hierarchy, adding a further dimension to the design of optimal decision hierarchies.

Further, our study contributes to the literature that explores alternative determinants of motivation beyond the mere provision of incentives. Prior research shows that communication, delegation, and restrained use of control can affect effort provision (Brandts and Cooper, 2007; Falk and Kosfeld, 2006; Charness et al., 2012; Herz and Zihlmann, 2024; Antonakis et al., 2022; Cooper et al., 2024; De Chiara et al., 2026). More closely related, legitimacy can affect the effectiveness of leaders as well as the motivational response to control (Schnedler and Vadovic, 2011; Brandts et al., 2015; Silverman et al., 2014).

A growing strand of literature shows that delegation of decision rights plays a central role in shaping beliefs and incentives. Delegation can serve as a commitment device that limits opportunistic behavior (Fershtman and Gneezy, 2001; Hamman et al., 2010) as well as a signal of intentions and social preferences (Coffman, 2011; Argenton et al., 2023). Delegation can affect responsibility (or the attribution of responsibility) and fairness judgments (Bartling and Fischbacher, 2012; Garofalo and Rott, 2018; Inderst et al., 2019). Our study builds on this literature by focusing on how non-delegation interacts with inequity considerations that shape the perceived legitimacy of authority and subsequent effort provision by subordinates.

We also relate to a broader literature in management and psychology that studies how perceived legitimacy shapes individual motivation, much of which has focused on rule-following in legal settings (e.g. Tyler, 2003; Tyler and Jackson, 2014). Our setting studies this relationship inside organizations and independent of pecuniary incentives.

2. Experimental design

Our experimental design follows the authority game developed in Fehr et al. (2013), but partially amends it to assess the novel hypothesis that subordinate motivation is related to perceptions of legitimacy of the decision hierarchy. Because of the close relation of the basic experimental structure, we keep the discussion of the basic authority game brief and refer the interested reader to Fehr et al. (2013) and Aghion and Tirole (1997) for the underlying theory.

In each period of the authority game, a principal is randomly matched with an agent and the pair must choose one of 36 face-down cards representing projects. The cards include an outside option (O), the principal's preferred project P, the agent's preferred project A, and 33 zero-payoff projects (N). The payoff of project i to the principal (P_i) and to the agent (A_i) can be ordered as follows: $P_P > P_A > P_O > P_N$ and $A_A > A_P > A_O > A_N$. The potential values of all projects are known, but all projects initially look identical ex ante (except for the outside option). The task of each principal-agent pair is to select a project that will be used for payment. The game is played in six stages.

Initially, the principal holds the decision right. In the first stage of the game, the principal can keep the decision right or delegate it to the agent. In what follows, the party with the decision right is referred to as the controlling party, and the party without the decision right is referred to as the subordinate party. In the second stage, each party simultaneously chooses a search intensity in private in increments of 5 from $\{0, 5, \dots, 95, 100\}$, corresponding to the probability that the participant will learn the location of all projects. This search effort has an associated cost generated via a quadratic cost function $g(E) = 25(\frac{E}{100})^2$, and is elicited via the strategy method. Stage 3 elicits unincentivized beliefs about the other party's effort under both decision right allocations. In the fourth stage, parties privately learn about projects. Based on the search intensity chosen in the second stage, they either learn the payoffs associated with all projects (all cards are turned) or they learn nothing (no card is turned). In stage 5, the subordinate recommends a project to the controlling party, and in stage 6, the controlling party selects one project to implement. Note that an informed controlling party

[4] Again, note that this motivation reduction is not a direct consequence of inequity-averse preferences per se (Fehr and Schmidt, 1999), as we show in Appendix A.1 in supplementary material.

Table 1
Overview of project payoffs.

	Project P		Project A		Outside	Other
	Principal	Agent	Principal	Agent	Option	Projects
SYM	40	35	35	40	10	0
ASYM	40	20	35	40	10	0

Table 2
Predicted Nash effort levels and expected profits.

	Principal has control				Agent has control			
	E^{NE}	e^{NE}	Π_P	Π_A	$E^{d^{NE}}$	$e^{d^{NE}}$	Π_P^d	Π_A^d
SYM	45	35	23.3	24.0	35	45	24.0	23.3
ASYM	45	35	23.3	17.2	25	55	25.6	20.1

Note: Nash equilibrium predictions for the principal's effort are denoted by E^{NE} in case of keeping authority and $E^{d^{NE}}$ in case of delegating the decision right to the agent. Nash equilibrium predictions for the agent's effort are denoted by e^{NE} in case the principal keeps the decision right and $e^{d^{NE}}$ in case the principal delegated the right to the agent. Π_P, and Π_P^d denote expected equilibrium profits for the principal depending on the decision right allocation. Π_A and Π_A^d denote expected equilibrium profits for the agent depending on the decision right allocation.

will overrule any subordinate recommendation in favor of her own preferred project, while an uninformed controlling party will rubber-stamp it.

The theoretical solution under risk neutrality, including the utility functions and the reaction functions for both authority allocations, is identical to Fehr et al. (2013). Since our experiment is primarily concerned with agent effort under principal control, we only briefly review the key theoretical insights directly concerning this subgame. Utility of a risk-neutral agent under principal control is given by

$$\Pi_A = E \cdot \hat{A}_P + (100 - E) \cdot e \cdot \hat{A}_A + A_O - g_A(e), \tag{1}$$

where $\hat{A}_i = A_i - A_O$.

The agent's maximization problem then generates the following first-order condition:

$$(100 - E)\,\hat{A}_A \;=\; g'_A(e), \tag{2}$$

It can be seen that the marginal return to effort only depends on the agent's payoff at the agent's preferred project ($\hat{A}_A$) but *not* on the agent's payoff at the principal's preferred project ($\hat{A}_P$). Because the principal's reaction function is only affected by payoffs to the principal, it follows that the equilibrium in this subgame is not affected by $\hat{A}_P$.

2.1. Variation in the organizational payoff structure

To assess our hypothesis that perceived legitimacy of the decision hierarchy affects agent motivation, we utilize two treatments from Fehr et al. (2013) which provide a specific variation in A_P: SYM and ASYM. In both treatments, each party earns 40 points for the selection of their preferred project. In the SYM treatment, the payoffs from the other party's preferred project are symmetric and equal to 35 for the principal and agent. In the ASYM treatment, the payoffs from the other party's preferred project are asymmetric, with a payoff of 35 for the principal but only 20 for the agent. Table 1 summarizes the value of the projects in these two treatments.

Table 2 shows the predicted Nash equilibrium effort levels and expected profits for each treatment and for both principal control and agent control. The principal should optimally delegate authority in both treatments because expected profits are higher in the case of delegation (SYM: $\Pi_P = 23.3$ vs. $\Pi_P^d = 24.0$; ASYM: $\Pi_P = 23.3$ vs. $\Pi_P^d = 25.6$).

The key feature of our experimental design is that predicted agent effort under principal control is identical across the two treatments. This follows from Eq. (2) and the fact that the principal's reaction function is only governed by payoffs to the principal, which remain constant across treatments.

While the point predictions in Table 2 are derived under the assumption of risk neutrality, this assumption is inconsequential for the key comparative statics prediction with respect to A_P in this subgame. In addition, we show in Appendix A.1 in supplementary material that, when assuming inequity-averse preferences regarding realized payoffs (Fehr and Schmidt, 1999), $\hat{A}_P$ still does not affect the agent's best-response function in this subgame. Finally, we show in Appendix A.2 in supplementary material that allowing for decision errors at all stages, captured via sequential quantal response equilibrium (McKelvey and Palfrey, 1995), does not yield a clear comparative static prediction that agent effort under principal control should differ systematically between treatments either.

Table 3
Experimental Design (2 × 2).

	Delegation Rule	
Payoff Structure	Intentional (INT)	Random (RAND)
Symmetric (SYM)	INT-SYM	RAND-SYM
Asymmetric (ASYM)	INT-ASYM	RAND-ASYM

2.2. Variation in intentional delegation

To differentiate whether any potential reduction in agent motivation across organizational payoff structure is driven by perceptions of legitimacy or intentions-based reciprocity (Dufwenberg and Kirchsteiger, 2004; Sebald, 2010; Von Siemens, 2013; Sloof and von Siemens, 2021), we introduce a second variation with respect to the principal's ability to intentionally choose to retain decision authority in stage 1 of the game.

In the INT condition, the principal decides whether or not to delegate the decision right to the agent. The treatment comparison in INT thus captures the combined effect of the organizational payoff structure and the principal's intentional choice to retain authority on agent motivation.

The RAND condition is identical to INT except that delegation in stage 1 of the game is randomly determined by a fair coin toss, rather than an intentional decision by the principal. RAND allows us to separate the direct motivational effects of the organizational payoff structure from those related to intentions-based reciprocity in the delegation decision (Blount, 1995). Potential reciprocity motives are therefore muted in RAND. If changes in $\hat{A}_P$ reduce agent motivation under principal control also in RAND, it would indicate that agents respond directly to the asymmetric organizational structure, rather than to a principal's intentional decision to implement a specific decision hierarchy conditional on the payoff structure.

Taken together, the experiment features a 2 × 2 factorial design, implementing variations in (i) organizational payoffs and (ii) intentionality of delegation. A treatment overview is provided in Table 3.[5]

2.3. Hypotheses

Under SYM, the principal and agent are fully symmetric with respect to project payoffs. Although there is a conflict of interest—each party prefers a different project—the degree of payoff inequity when the principal's preferred project is chosen is the same as when the agent's preferred project is chosen. Consequently, the payoff structure in SYM does not provide either party with a basis for claiming to be the legitimate holder of decision authority.

In contrast, under ASYM, granting control to the agent represents a more equitable allocation, as delegation reduces the expected payoff difference between the two parties. Delegation is likely also socially efficient, as it increases expected payoffs of both parties in equilibrium. We therefore hypothesize that variation in the organizational payoff structure influences agents' perceptions of the legitimacy of the decision hierarchy.

To assess this hypothesis directly, we elicit agents' perceptions of legitimacy over the authority structure. Specifically, at the end of each part (SYM and ASYM), agents were asked the following question: "Who should legitimately have the decision right?", which was answered on an 11-point Likert scale, where 0 meant "Principal", and 10 meant "Agent".[6]

Hypothesis 1. When project payoffs are asymmetric and unfavorable to agents (ASYM), agents perceive the principal's retention of the decision right as less legitimate than when payoffs are symmetric (SYM).

Next, we hypothesize that a reduction in perceived legitimacy translates into lower agent motivation beyond purely pecuniary incentives. Accordingly, we expect that the inequitable organizational structure ASYM reduces agents' motivation when the principal retains control.

Hypothesis 2. When the principal retains decision authority, agents provide less effort in ASYM compared to SYM.

Since principal and agent effort are strategic substitutes, an effort reduction by agents could also simply be the consequence of an adjustment in beliefs about principal effort in ASYM vs. SYM, and not reflect a true reduction in motivation conditional on principal effort. Based on agents' beliefs about principal's effort, we assess the difference in actual effort provision relative to the best-response.

Hypothesis 3. When the principal retains decision authority, agents provide lower effort relative to the theoretical best-response in ASYM compared to SYM.

Finally, the comparison between INT and RAND allows us to assess whether motivational effects depend on delegation being intentional rather than random.

[5] Compared to Fehr et al. (2013), INT-SYM corresponds to their HIGH treatment, and INT-ASYM corresponds to their PHIGH treatment. Fehr et al. (2013) also features a HIGH-RAND treatment, which is equivalent to our RAND-SYM treatment. The RAND-ASYM treatment has no equivalent in Fehr et al. (2013).

[6] Principal and agent were neutrally referred to as participant A and B.

Hypothesis 4. Agent motivation is not (only) driven by intentions-based reciprocity: The effort reduction from SYM to ASYM is also present when delegation is random.

2.4. Procedures

The design and hypotheses of both experiments were pre-registered prior to data collection.[7] The authority game was computerized using the software oTree (Chen et al., 2016) and conducted at FriLab, the laboratory of the University of Fribourg, Switzerland. Subjects were recruited using ORSEE (Greiner, 2015).

Sessions for INT took place from November 2021 to February 2022, sessions for RAND were conducted in November 2025. The conditions SYM and ASYM were administered in a within-subject design. The participants thus played first one condition and then the other. Each condition was played for five rounds. Thus, the experiment lasted a total of 10 rounds. Before playing SYM and ASYM, participants went through a two-period single-player authority game in order to familiarize themselves with the software, the game, and the effort-cost schedule. The order of the two conditions SYM and ASYM was randomized within session. Each session, whenever possible, was thus divided into two groups. Principals and agents were randomly rematched within those groups, which we call henceforth matching groups. In total, there were 42 matching groups, and the modal size of a matching group was eight participants.

In total, 388 participants took part in our study. A total of 202 participants took part in INT, 101 agents and 101 principals each, divided into 13 sessions. Thus, an average session featured around 16 participants. A total of 186 participants took part in RAND, 93 agents and 93 principals each, divided into 11 sessions. Thus, an average session featured around 17 participants. Sessions lasted on average 75 min. Participants received a show-up fee of CHF 10 and a variable part depending on their choices in the game. The variable payoff amounted on average to approximately CHF 33, yielding an average total payout of approximately CHF 43. This translates into an average hourly pay of approximately CHF 34 (approx. $44 or €37 as of 27 February 2026).

3. Results

3.1. Agents' perception of legitimacy

Hypothesis 1 examines whether agents perceive the principal's retention of decision authority as more legitimate when project payoffs are symmetric (SYM) rather than asymmetric (ASYM). Fig. 1 provides strong support for Hypothesis 1.

Result 1. *Agents consider it significantly less legitimate that the principal holds decision authority in treatment ASYM compared to treatment SYM. This holds true regardless of whether retaining authority is intentional or random. Thus, the organizational payoff structure significantly affects the legitimacy perception of the decision hierarchy.*

Panel Fig. 1a displays agents' perception of legitimacy when delegation is intentional. When project payoffs are symmetric, 85.15% of agents express indifference as to whether the principal or the agent should legitimately hold the decision right. Only 4.95% of agents perceive the principal having the decision right as illegitimate. In sharp contrast, the proportion of indifferent agents decreases to 24.75% in ASYM, a reduction of about 60 percentage points compared to SYM. In fact, in ASYM, a large majority of agents (66.34%) believe that they should legitimately have the right to decide, rather than the principal. Therefore, agents in INT perceive the allocation of the decision right to the principal as significantly less legitimate when project payoffs are asymmetrically in favor of the principal, confirming our pre-registered Hypothesis 1 (paired $t-$test: $p < .001$, Wilcoxon signed-rank: $p < .001$).

Panel Fig. 1b displays agents' perception of legitimacy when delegation is random. The pattern is directionally the same: when project payoffs are symmetric, 90.32% of agents express indifference. The proportion of indifferent agents decreases to 15.05% in ASYM, a reduction of about 75 percentage points compared to SYM. Again, in ASYM, a large majority of agents (65.59%) believe that they should legitimately have the right to decide, rather than the principal. Agents in RAND perceive the allocation of the decision right to the principal as significantly less legitimate when project payoffs are asymmetrically in favor of the principal, again confirming our pre-registered Hypothesis 1 (paired $t-$test: $p < .001$, Wilcoxon signed-rank: $p < .001$).

Further, we find that the SYM payoff structure is perceived as equally legitimate in INT ($M = 4.91$) as in RAND ($M = 5.14$), this difference is not statistically significant (t-test: $p = .147$). In ASYM, the principal having the decision right is perceived as more illegitimate in INT ($M = 7.19$) than in RAND ($M = 6.46$; t-test: $p = .066$). This suggests that intentionality does play some role in determining individuals' legitimacy perceptions. Yet, even absent intentionality, the RAND treatment demonstrates that the payoff structure alone causally impacts perceptions of legitimacy of the organizational structure.

The within-subject nature of our design also allows us to look at the individual level. When delegation is random, we find that the majority of agents (62.37%) do indeed perceive the principal's retention of decision authority as less legitimate in the ASYM decision structure, but there are also 37.63% of agents who do not. Of these agents, 20.43% perceive the principal retaining decision authority to be more legitimate than in SYM, while 17.20% consider the principal retaining decision authority as equally legitimate in SYM and ASYM. When delegation is intentional, we find that the majority of agents (65.35%) perceive the principal's retention of decision authority as less legitimate in the ASYM decision structure, but there are also 34.65% of agents who do not. Of these agents, 8.91% perceive the principal retaining decision authority to be more legitimate than in SYM, while 25.74% consider the principal

[7] See aspredicted.org, trial #80680 and aspredicted.org, trial #251535.

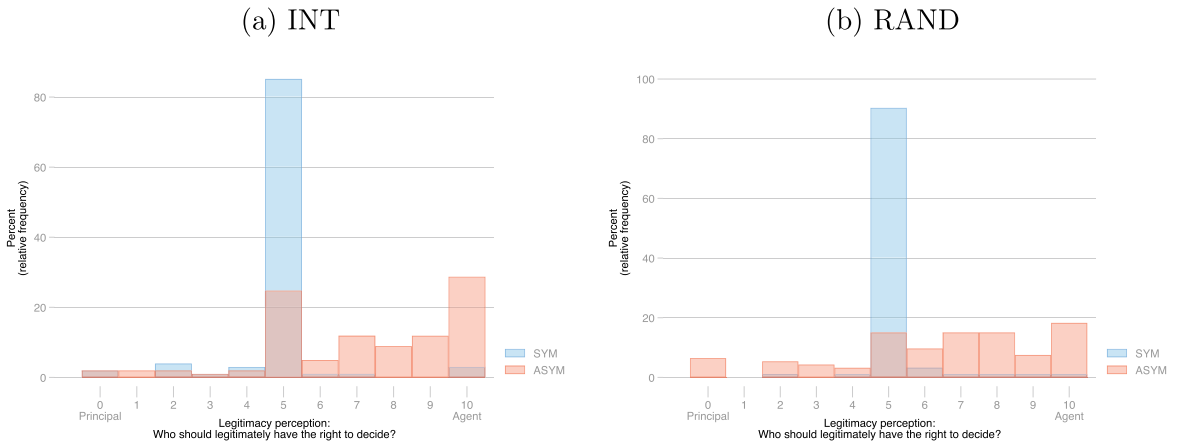


Fig. 1. Agents' perception of legitimacy.

Note: The graph displays a histogram of how legitimate the agents perceive the allocation of decision authority. On an 11-point scale, agents were requested to state who they think should legitimately have the right to decide, with the midpoint of the scale, i.e., 5, representing indifference. The left panel displays INT with $N_{INT} = 101$, the right panel RAND with $N_{RAND} = 93$. In both INT and RAND, the legitimacy perception across the two organizational structures SYM and ASYM significantly differs among their mean and median (paired t-test: $p < .001$, Wilcoxon signed-rank: $p < .001$) as well as their distribution (Kolmogorov-Smirnov: $p < .001$).

retaining decision authority as equally legitimate in SYM and ASYM.[8] Taken together, we observe that in both INT and RAND, the largest fraction of agents perceive it as less legitimate that the principal retains decision authority in ASYM than in SYM.

3.2. Agent effort

Hypothesis 2 posits that the inequitable payoff structure ASYM lowers agent motivation when principals do not delegate the decision right. Table 4 shows the mean of the agents' average effort in case of no delegation, for all four treatment combinations, and provides evidence for Result 2.

Result 2. *Agents reduce their effort in treatment ASYM relative to SYM.*

When delegation is intentional, agents on average provide an effort of 36.91 in SYM but only 34.27 in the ASYM organizational structure. Thus, in line with our hypothesis, agents reduce effort in the inequitable organizational structure by 2.64, a difference that is statistically marginally significant ($p = .084$).[9]

When delegation is random, agents on average provide an effort of 39.60 in SYM but only 36.28 in the ASYM organizational structure. Agents thus reduce effort by 3.32 points in the inequitable organizational structure even when delegation is random, a difference that is statistically significant ($p = .024$).

Pooling the data from the INT and RAND treatment, the average effort reduction between SYM and ASYM is 2.97, or approximately 7.77% ($p = .005$), see Fig. B.1 in the Appendix and column (4) in Table 5.[10] We also observe that the distributions of effort significantly differ between SYM and ASYM (Kolmogorov-Smirnov, pooled data $p < .001$; INT only $p < .001$; RAND only $p < .001$). Therefore, in line with our hypothesis, agents reduce effort in ASYM relative to SYM.

The agent's effort reduction could merely be a strategic reaction rather than a reduction in motivation. In this interpretation, the observed reduction in effort would simply be a best response to changed beliefs about principal effort in ASYM relative to SYM. However, our data is not consistent with this explanation. As we show in Appendix B.2 in supplementary material, and in line with Hypothesis 3, (i) agents' beliefs about principal effort do not differ between SYM and ASYM; and (ii) agents also reduce effort relative to their best response in ASYM compared to SYM (Tables B.1 and B.2).

[8] Perceived legitimacy might reflect realized earnings in previous rounds. Empirically, we find the average payoff in the previous rounds does not predict perceived legitimacy (Pearson's $r = .045$, $p = .536$; Spearman's $\rho = .033$, $p = .643$).

[9] As noted in the Introduction, our finding aligns with the data in Fehr et al. (2013): agent effort under no delegation drops from 26.5 in HIGH (SYM) to 17.3 in PHIGH (ASYM) (t-test: $p = .054$; Mann-Whitney test: $p = .085$; tests conducted by the authors, based on the original data). Fehr et al. (2013) contain another treatment comparison that can be used to assess our proposed mechanism. In their LOW treatment, both the principal and the agent receive a low payoff of 20 at the other parties' preferred project. In the PLOW treatment, the agent's payoff under the principal's preferred projects increased from 20 to 35. Again, the agent's pecuniary incentives under principal control are constant between these two treatments, but arguably principal control is more legitimate in PLOW than in LOW (for the exact same arguments by which agent control becomes more legitimate in ASYM). Based on our proposed mechanism, we should thus expect agent effort to be higher in PLOW than in LOW. Indeed Fehr et al. (2013, Table C.1) report that the subordinate agent's effort rises from 14.3 to 22.8 (t-test: $p = .035$, Mann-Whitney test: $p = .085$; tests conducted by the authors, based on the original data).

[10] In the contingency in which the principal delegates the decision right to the agent, effort in SYM is 57.02, and effort in ASYM is 58.47 ($p = .178$).

Table 4
Agent effort.

	INT	RAND	
SYM	36.91	39.60	$e_{SYM} = -2.69$ { .426}
$ASYM$	34.27	36.28	$e_{ASYM} = -2.01$ { .581}
	$e_{INT} = 2.64$ {.084}	$e_{RAND} = 3.32$ { .024}	

Note: The table displays the means of agent effort, by treatment combinations, when the principal retains decision right. In INT, there are $N_{INT} = 101$ agents, in RAND, there are $N_{RAND} = 93$ agents. SYM vs. ASYM is within-subject. The p-values are obtained from a random-effects panel regression on the respective dummy, standard errors are robust and clustered on matching group level.

Can the observed treatment effect between SYM and ASYM be attributed to intentionality in the INT treatment? This may be the case if the reciprocal reaction to non-delegation is stronger in ASYM than in SYM. First, when only considering treatment differences between our INT and RAND treatments, we find that effort levels are indeed smaller in INT, but the difference is significant neither in the SYM treatment ($p = .426$) nor in the ASYM treatment ($p = .581$).[11] The same conclusion can be drawn from comparing INT vs. RAND in the asymmetric payoff structure. Pooling the data from the SYM and ASYM treatments, we find that effort is larger in RAND compared to INT by 2.35, but this difference is still statistically not significant ($p = .483$).

Result 3. *Intentionality of non-delegation does not explain the agents' effort reduction when facing the asymmetric payoff structure instead of the symmetric payoff structure.*

Table 5 displays results of regression analyses of provided effort that additionally allow us to assess potential interactions between the change in the payoff structure and the intentionality of delegation, as well as for additional controls. The coefficient on the regressor $ASYM \times INT$ in columns (1) to (3) tests this hypothesis using different sets of controls, and does not provide evidence to this effect. The interaction terms are insignificant in all models. This suggests that agents in the subordinate role significantly reduce their effort in ASYM relative to SYM, independent of whether non-delegation was intentional. Column (4) does not control for INT vs. RAND and replicates the treatment effect of the organizational payoff structure on agent motivation for the pooled data.

4. Further results

In this section, we conduct further analyses of the data that were not pre-registered.

4.1. Perceived legitimacy and effort

The previous subsections have shown that agents reduce their effort in ASYM compared to SYM, and perceive ASYM as less legitimate than SYM. However, not all agents perceive the principal retaining decision authority as more illegitimate in ASYM. If the motivational effect works through perceived legitimacy, the effect could be diluted when considering the intent-to-treat effect only: agents who perceive both conditions as similarly legitimate ought not to adapt their effort—these agents do not react to the random assignment of the organizational structure by changing their perception of legitimacy, and, in turn, ought not react with a change in effort provision. If perceived legitimacy of decision authority translates into behavior, we should thus observe a correlation between these two variables.

To explore this mechanism further, we utilize an instrumental variables approach in which the instrument is experimentally randomized (Sajons, 2020).[12] This ERIV approach is useful because it exploits only the exogenous component of variation in perceived legitimacy induced by treatment assignment and isolates the behavioral response of the agents whose perceptions are changed by the organizational structure, thus correcting for potential dilution from non-compliers.

Panel A in Table 6 displays the results. Column (1) is a random-effects estimation and shows that perceived legitimacy is significantly correlated with an increase in agents' effort: a one-point increase in perceived legitimacy on the 11-point scale is associated

[11] Our evidence from the SYM treatment aligns with the data in Fehr et al. (2013), who also do not find negative motivational effects of intentional (non-)delegation from INT-SYM to the RAND-SYM treatment. Our evidence from the ASYM treatment has no equivalent in Fehr et al. (2013).

[12] Among other assumptions, ERIV requires an exclusion restriction, namely, that the treatment conditions affect effort only through perceived legitimacy. This assumption is inherently untestable. Our experimental design aims to make it plausible by exogenously varying the organizational structure, as well as the delegation procedure, without changing pecuniary incentives or other design features. The Hansen J test does not provide evidence against the exclusion restriction (but it cannot establish that the assumption is satisfied). See Appendix B.3 in supplementary material for a detailed discussion.

Table 5
The asymmetric organizational structure decreases agents' effort.

Agents' effort	(1)	(2)	(3)	(4)
ASYM	−3.32**	−3.35***	−3.35***	−2.97***
	(1.45)	(1.28)	(1.28)	(1.05)
INT	−2.69	−2.69	−2.69	
	(3.38)	(3.39)	(3.38)	
ASYM × INT	0.68	0.68	0.68	
	(2.09)	(1.89)	(1.89)	
Constant	39.60***	42.68***	41.58***	38.20***
	(2.49)	(2.69)	(3.54)	(1.69)
Time FE		✓	✓	
Order FE			✓	
N	1940	1940	1940	1940
N Matching Groups	42	42	42	42
N Panels	194	194	194	194

Note: The table displays linear panel regression results by regressing agents' actual effort on treatment indicators for ASYM and INT, respectively. Robust standard errors, clustered on matching group level, are reported in parentheses. All models report the results of a random effects estimator. Time FE means that we control for round fixed effects, order FE controls for order effects of which condition was played first. N is the total number of observations, N Matching groups is the number of matching groups, N Panels is the number of individual participants (panel units). $^{*}p < 0.10, ^{**}p < 0.05, ^{***}p < 0.01$

with an effort increase of 0.76. Column (2) includes fixed effects, but the coefficient estimate remains stable. Column (3) is the instrumented estimate of perceived legitimacy on effort. The instrumented coefficient estimate grows in magnitude, reflecting that the endogenous models presented in columns (1) and (2) capture the intention-to-treat effect, which is potentially diluted given that not all agents changed their legitimacy perception in response to the treatment. Indeed, the coefficient in the two-stage least-squares regression is more than twice as large as in the endogenous models.

Result 4. *Increases in agents' perceived legitimacy of the decision hierarchy are correlated with increases in agents' effort provision.*

Finally, Panel B in Table 6 mimics Panel A but additionally controls for agents' beliefs. We observe that the positive relationship between legitimacy perception and effort remains statistically significant, confirming that the change in effort is not simply a strategic reaction to changed beliefs.

To sum up, when the organizational structure reduces the perceived legitimacy of the principal's authority, effort declines, despite unchanged pecuniary incentives. The correlational patterns are consistent with a legitimacy-based mechanism, and using treatment assignment as an instrument for perceived legitimacy, the ERIV estimates suggest that exogenously induced reductions in perceived legitimacy lead to lower effort provision.

4.2. What determines the perception of legitimacy? A LLM-based text analysis

To better understand the determinants of legitimacy perceptions and their impact on motivation, we asked agents to describe the sources of their legitimacy ratings when the principal maintained control in SYM and ASYM, respectively. The question was free-form, as open questions have been shown to be helpful in gaining a deeper understanding of the mechanisms underlying observed perceptions and behaviors (Haaland et al., 2024). We systematically analyze those responses with the help of a large language model (LLM) and refer the reader to Appendix B.4 in supplementary material for further methodological information.

Three potential sources of legitimacy perception of the decision authority emerge when analyzing the agents' text responses: social efficiency, equity, and procedural fairness.

Someone voicing social efficiency reasons indicated that their perception of legitimacy depends on the total payoff of the authority structure. A typical (translated) response was: "I feel that the ultimate aim of the experiment is to get maximum points in total, so it's smarter for me to give the choice to participant B [the agent], because even though she [or he] is selfish, she [or he] causes less harm to the whole team."

Someone voicing inequity reasons typically referred to the equity of payoffs between the two parties. A typical response was, for example, "If the red card is selected in the second part [ASYM], participant B [the agent] has a clear disadvantage (20 points difference). It would therefore be a smaller loss for participant A [the principal] if participant B [the agent] were to select the blue card (5 points difference)."

Participants voicing procedural fairness reasons referred to the fairness of the procedure itself, independent of outcomes. For example, "It is only fair if both participants have the right to decide equally often." Finally, some participants gave responses that

Table 6
Perceived legitimacy of authority and agent effort.

Agents' effort			
	(1)	(2)	(3)
	Random Effects	*Fixed Effects*	*ERIV*
Panel A			
Legitimacy perception	0.76**	0.76**	1.62***
	(0.36)	(0.36)	(0.57)
Constant	33.63***	33.61***	30.13***
	(2.41)	(1.48)	(3.01)
F 1st stage			24.12
Weak iden. test (AR)			0.05
Underidentification test			0.00
Endogeneity test			0.20
Overidentification test			0.42
Panel B			
Legitimacy perception	0.79**	0.78**	1.60***
	(0.36)	(0.36)	(0.56)
A belief about P effort	0.14**	0.15**	0.04
	(0.06)	(0.06)	(0.07)
Constant	25.08***	24.40***	27.99***
	(4.05)	(4.17)	(4.73)
F 1st stage			24.28
Weak iden. test (AR)			0.05
Underidentification test			0.00
Endogeneity test			0.22
Overidentification test			0.43
N	1940	1940	1940
N Matching Groups	42	42	42
N Panels	194	194	194

Note: The table displays linear panel regression results by regressing agents' actual effort on their legitimacy perception in Panel A, and regressing agents' actual effort on their legitimacy perception, conditional on their belief about principal's effort, in Panel B. Robust standard errors, clustered on matching group level, are reported in parentheses. Model (1) reports the results of a random effects estimator. Model (2) reports the results of a fixed effects estimator and controls for fixed effects such as individual, treatment order, matching group and time fixed effects. Model (3) reports the results of two-stage least squares estimation using instrumented legitimacy perception. Instruments are the randomly assigned treatment conditions (SYM/ASYM and RAND/INT and their interaction). The reported F-statistic is the Kleibergen-Paap effective F. The weak identification test reports the traditional Anderson-Rubin test based on the F-stat. The underidentification test is a Lagrange-Multiplier test based on the Kleibergen-Paap rk statistic of whether the equation is identified. The endogeneity test reports a Durbin-Wu-Hausman statistic and tests the null hypothesis whether the endogenous instrumented variable can be treated as exogenous. The overidentification test has the joint null hypothesis that the instruments are valid instruments (Hansen J statistic is reported).
$^{*}p < 0.10, ^{**}p < 0.05, ^{***}p < 0.01$

referred to multiple sources or could not be classified for other reasons, classified as "not identifiable". The results of the LLM classification for agents are shown in Table B.4.

The most frequent category by far turns out to be concerns about equity: In INT, 68.3% of agents argue that their legitimacy perception is influenced by the equity of the organizational structure. In RAND, this share is very similar with 71.0%, which is statistically indifferent from the share in INT (proportion test: $p = .688$). This shows that the determinant of the legitimacy perception—an equitable organizational structure—does not depend on whether the principal's formal authority is intentional or random.

Also, the fraction who voice social efficiency concerns, as well as procedural fairness concerns, does not significantly differ in INT vs. RAND when assessed with proportion tests. Because the number of observations in the latter three categories is relatively small, we also pool them under "Other" in Table B.4.[13]

[13] We can also apply the LLM classification of determinants of legitimacy perceptions to the text answers of principals in our study (see Table B.5 in the Appendix in supplementary material). Results are very similar to those for agents.

Table B.4 further shows the average difference in the perception of legitimacy between treatment SYM and ASYM, conditional on the classification. It can be seen that agents whose legitimacy perceptions are governed by equity considerations consider the principal retaining control to be substantially less legitimate in ASYM than in SYM, and this difference is highly significant in both INT and RAND, as well as the pooled data (t test: $p < .001$). Taken together, our analysis of the open-text reasoning of agents suggests that multiple reasons of legitimacy perceptions are given, but equity concerns are by far the most prevalent.

5. Conclusion

This paper provides evidence that the effects of decision hierarchies on individual motivation go beyond the pecuniary incentive effects inherent in the decision hierarchy. In particular, we find that the motivation of subordinates is positively correlated with their perceived legitimacy of the decision hierarchy. Perceived legitimacy was varied through exogenous changes in the payoff structure of the organization that were incentive neutral but changed the equity of outcomes between the controlling party and the subordinate. The association is robust to controlling for beliefs about the effort provided by the controlling party.

To dig deeper into the behavioral mechanism, we conduct an experimental variation where delegation of decision authority is random rather than intentional. Both our findings, lower perceptions of legitimacy and reduced subordinate motivation when the organizational payoff structure is asymmetric, are also present when decision authority is randomly allocated. This suggests that effects are not driven by intentions-based reciprocity motives.

While our approach rules out the possibility that differences in motivation between the two different organizational structures are the consequence of differences in pecuniary incentives, it does not identify the causal behavioral mechanism that ultimately governs the treatment effect of lower motivation among subordinates. Although the effect of perceived legitimacy on motivation might be causal, we cannot fully rule out the possibility that perceptions of legitimacy and motivation are co-determined by a third factor, as legitimacy is not a stand-alone concept. Rather, it is derived from underlying factors. We isolate one underlying factor, asymmetries in the payoff structure of the organization, and show that variations in this factor causally change perceptions of legitimacy and reduce motivation. Future research should continue to investigate the psychological underpinnings of agents' perceptions of legitimacy and the causal structure of motivational forces in decision hierarchies.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Holger Herz reports financial support was provided by European Research Council. If there are other authors, they 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.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at 10.1016/j.geb.2026.08.005

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