

Enhancing Autonomy to Motivate Effort: An Experiment on the Delegation of Contract Choice

SHEREEN CHAUDHRY
Department of Social and Decision Sciences
Carnegie Mellon University

DAVID KLINOWSKI*
Department of Economics
University of Pittsburgh

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Abstract

We investigate whether giving workers autonomy through delegation of contract choice intrinsically motivates effort. In a novel laboratory experiment that controls for contract preferences and outcomes, principals can either choose the contract under which agents work on a real-effort task, or delegate the contract choice to the agents. We evaluate whether agents exert higher effort when they are allowed to choose the contract versus when the contract is imposed on them. We find no difference between the two conditions, even after controlling for baseline ability and for locus of control. Because our design excludes the possibility that preferences play a role, and because workers engaged in a real-effort task, this result casts doubt on an intrinsic link between the autonomy granted through delegation and the motivation of employees in the workplace. Our results do not deny, however, the possible instrumental benefits of autonomy (which did not play a role in our design) and their potentially powerful impact on motivation.

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*Chaudhry: sjchaudh@andrew.cmu.edu. Klinowski: djk59@pitt.edu. For helpful comments, the authors thank Lise Vesterlund, Alex Imas, and participants of the University of Pittsburgh Experimental Economics Seminar Series, the 2014 NYU-CESS Experimental Political Science Conference poster session, and the 2014 Rady Spring School in Behavioral Economics. We are grateful to J. Forrest Williams for sharing with us z-Tree code upon which we built our version of the slider task.

1 Introduction

Starting with the work of Marschak (1955), economists have made the firm a central object of study, rather than treating it as a black box that automatically achieves profit maximization. One focus of attention has been the problems that arise when owners and managers delegate tasks to other members of the firm. In particular, a large literature now exists exploring how principals can optimally incentivize agents when there is asymmetry of information and divergence of preferences between the parties involved in the delegation relationship (Laffont and Martimort, 2002).

In this paper, we explore whether the action of delegation itself can incentivize agents' productivity. Previous work gives reasons to believe so. Black and Lynch (2001) find from observational data that joint decision-making which incorporates worker input can make the firm more productive. In discussing theories and effects of employee involvement in the workplace, Handel and Levine (2006) write that "jobs with more autonomy may reduce the disutility of effort, in part because employees find it less onerous to perform a job they have helped design." And Stern (2004) notes that "individuals forego earnings for their self-employment, which is also true for scientists." What is not clear is whether this enhanced autonomy is prized for its impact on flexibility, creativity, and efficiency (all instrumental gains), or also because workers intrinsically value the right to make decisions, i.e., autonomy. In our study, we conducted an experiment to test whether granting workers autonomy through the right to choose a payment contract is enough to motivate their effort.

The idea that decision rights are intrinsically valuable to individuals is not new to economics research. Experimental work has recently shown that in a principal-agent relationship, principals value autonomy beyond its instrumental value, and thus delegate decision rights to agents less than what is monetarily optimal. For instance, Fehr et al. (2013) and Bartling et al. (2014) find that principals value a lottery presented in a delegation context more than the equivalent lottery presented in a neutral framework. Neri and Rommeswinkel (2014) also find that principals have a preference for keeping decision rights that is not fully captured in the material value that can be obtained by them, and show further that this preference is driven primarily by the principal's desire to prevent the agent from influencing his outcome. These findings agree with previous evidence (discussed below) of individuals responding negatively to being controlled.

The experimental literature on monitoring in principal-agent settings suggests that agent motivation declines in response to control, or a lack of choice. Falk and Kosfeld (2006) and Dickinson and Villeval (2008) study the effect of imposing minimum effort levels on agents, finding that agents choose more effort when the principal does not force a minimum amount of effort. Other work on the impact of monitoring on effort includes Schnedler and Vadovic (2011), who find that agents are less averse to control when it is exerted to prevent selfishness or theft, and Aimone and Butera (2015), who find that agents dislike control even when their preferences are aligned with that of the principals. Additional work considering the implication of control on motivation is that of Dal Bó et al. (2010), who find that the effect of a policy on the level of cooperation is greater when the policy is chosen democratically than when it is exogenously imposed.

Surprisingly, although there is work on the impact of control on motivation, there is little work on the complementary question of increased autonomy and motivation: Does enhancement of freedom to choose result in higher motivation and effort? Charness et al. (2012) tackle this question with respect to the issue of delegating the wage choice, and thus, their work is closest to ours. They find that agents who are allowed to set their own wages select higher effort levels and produce larger earnings to both principals and agents relative to the case in which principals do not delegate the wage decision. But as the authors note, in their design non-delegation implies a restriction to the feasible set of wage-

effort pairs available to the agent, and thus the observed effect may come not only from a value of delegation of choice per se, but also from the agent being able to access his most-preferred outcome (or the fulfillment of the expectation of such ability) when he is delegated. Our design eliminates this channel by using a novel design of the payment contracts and also by collecting agents preferences before the wage decision is made.

We conduct a similar experiment to Charness et al. (2012) in which we investigate whether workers whose principals allow them to choose their own payment scheme become motivated to exert higher effort (or whether they become less motivated when these rights are not granted to them). However, a key aspect and novel feature of our study is an experimental design that controls for the effect of the outcome of a choice, isolating the effect of being able to make that choice. In the experiment, agents face two possible payment schemes under which to work, one of which is more lucrative if the agent decides to exert more effort. As detailed in Section II, the more lucrative payment contract should be more desirable to both principals and agents, leading both groups to prefer the same contract. Principals have the right to select which scheme to implement; however, principals can delegate this decision right to the agents. Prior to the delegation stage, agents indicate privately which scheme they would select if they had the right to choose. This allows us to create experimental conditions in which agents work under a given scheme, with the only difference between conditions being whether the principal imposed the scheme or granted the agent the right to select the scheme. With this design, greater effort in response to the principals delegation of the wage decision to the worker will strongly support the idea that delegation of contract choice is intrinsically motivating.

We find no difference in effort between conditions: among agents who prefer a given contract, those who get to select the contract for themselves exert the same level of effort on average than those who get the contract imposed on them. This result continues to hold after controlling for baseline ability and for locus of control (the agent's perception that he can control events that affect him; see Rotter (1966)). Since our design takes great care of controlling for preferences over the contracts, and since agents exert effort on a task that has been shown to respond to incentives in within-subject designs as our own, the result casts doubt on the link between autonomy (provided through the delegation of decision rights) per se and motivation of effort. We discuss these points in detail in the Conclusion. However, our result by no means dismisses the possible instrumental benefits of delegation of choice (none of which plays a role in our design) and their potentially powerful impact on motivation.

The next section of the paper describes the experimental design in detail. Then we present the findings, and lastly discuss the implications and avenues for future research.

2 Experiment Design

The experiment was conducted at the Pittsburgh Experimental Economics Laboratory (PEEL), and programmed using the software z-Tree (Fischbacher, 2007). Participants were undergraduate students from the University of Pittsburgh and Carnegie Mellon University, recruited by email through the PEEL system. In total 126 subjects participated in six sessions, with 18 to 26 participants per session. A session lasted approximately 90 minutes.

A session consisted of two parts, and instructions for each part were given at the beginning of the corresponding part.

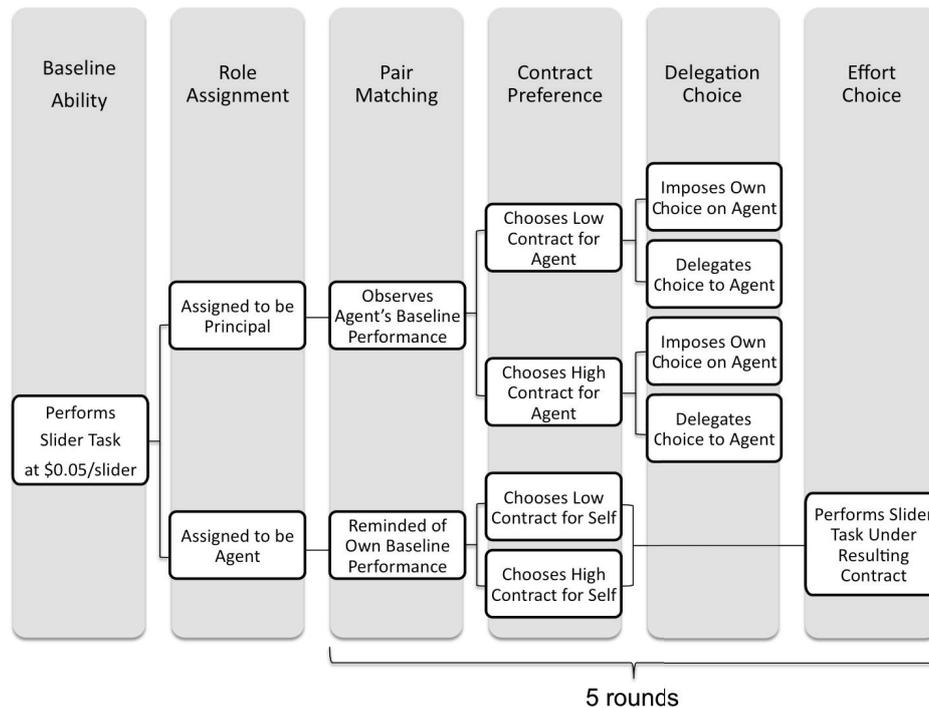


Figure 1: *Timeline of the experiment session*

2.1 Part 1

For the first part of the experiment each participant solved a modified version of Gill and Prowse (2012) slider task that consisted in moving scroll bars to target positions for five minutes. Participants received \$0.05 for each bar successfully scrolled to its target. The total number of sliders completed provided a baseline measure of the participant’s ability at this task.

2.2 Part 2

The second part of the experiment consisted of five identical rounds, and in each round participants solved the slider task for five minutes. Earnings in this part were determined differently from the previous part; in particular, participants were randomly assigned the role of principal or agent (called respectively “blue” and “green” in the experiment) and were paired with a participant of the opposite role. Only the number of sliders completed by the agent in a given round generated earnings for the principal-agent pair in that round. (How the agent’s performance translated to earnings is described below.) Participants remained in the same role throughout the five rounds, but were randomly rematched with a partner at the beginning of each round. Participants were never matched with the same partner twice in a row.

A round occurred chronologically as follows (see 1 for a visual representation of the experimental procedure): Participants were informed/reminded of their roles. Principals and agents were matched, and each principal was then informed of his partner’s baseline (Part-1) ability. Then, the principal and the agent each privately indicated the contract under which they would prefer the agent to work (again, details of the contracts are described below). Following this, the principal selected whether to delegate the contract choice to the agent. When making this delegation decision, the principal was not informed of the agent’s preferred contract however, the principal was aware that if he decided to delegate, the agent would work under the contract privately indicated by the agent, whereas if he decided not to delegate, then the agent would work under the contract privately indicated by the principal.

After the principal decided whether to delegate, both parties were informed of this decision and the resulting contract for the agent. The principal and the agent then each worked for five minutes on the slider task, although, as noted before, only the agent's performance generated earnings for the pair, and participants knew this. At the end of the five minutes, participants were informed of their earnings, and a new round began.¹

2.3 Contracts

The earnings for the principal and the agent in a round depended on the number of sliders completed by the agent and the contract under which he worked in the round. There were two possible contracts. In either contract the earnings generated by the agent were equally split between the principal and the agent. Notice that unlike the standard principal-agent setup, the principal had no initial endowment and paid no wage to the agent. Dividing earnings equally prevented distributional preferences from driving behavior in the experiment.

The "Low" contract (called "Scheme 1" in the experiment) required the agent to complete at least 21 sliders to generate a nonzero payoff. If the agent completed 21 or more sliders, each player in the pair earned \$0.25 for each of the first 20 sliders completed by the agent, and \$0.05 for each additional slider completed by the agent. Panel A of Table 1 illustrates the payoff generated by the agent for completing different number of sliders under the Low contract.

The "High" contract (called "Scheme 2" in the experiment) required the agent to complete at least 41 sliders to generate a nonzero payoff. If the agent completed 41 or more sliders, each player in the pair earned \$0.25 for each of the first 40 sliders completed by the agent, and \$0.05 for each additional slider completed by the agent. Panel B of Table 1 illustrates the payoff generated by the agent for completing different number of sliders under the High contract.

Preliminary pilot sessions revealed that participants could easily complete 41 sliders in five minutes when paid \$0.05 per slider. Based on this, we chose the thresholds of 21 and 41 to make the High contract monetarily more attractive than the Low contract, while still feasible. With this design we expected most principals and agents to prefer the agent to work under the High contract, and therefore the High contract would be implemented (and preferred by both parties) for the majority of the observations. This unique aspect of our design would lead to the only difference between conditions being whether the principal imposed the contract or delegated the choice.

2.4 Additional Control Variables

Once Part 2 concluded, participants completed a risk preference elicitation (Gneezy and Potters, 1997), a "locus of control" (Rotter, 1966) questionnaire, and a demographics questionnaire.

In the risk preference elicitation participants were endowed with 100 points that they could invest in any proportion between a risky and a safe asset. The risky asset paid 2.5 times the number of points invested with 50% probability, and paid no points with 50% probability. The safe asset paid the number of points invested with certainty. After participants invested their points and it was determined whether

¹We let principals work on the task, even though they do not generate earnings, to equalize the participants' action sets as much as possible, and thus reduce any possible effect on the principals' and agents' decisions of allowing only the agents to work while forcing the principals to do nothing. On the other hand, the feature of informing principals of the agents' baseline performance was simply a design choice. An anonymous referee subsequently pointed out that this feature might cause agents to construe delegation as something they earned, which may influence their response to delegation. However, we do not find evidence that delegation has a differential effect on the worker's effort based on their baseline performance. We thank an anonymous referee for raising this concern.

Table 1: Earnings under the different contracts

<i>Panel A: Low contract</i>			
Number of sliders completed by the agent	Amount generated for the principal-agent pair	Share for the principal	Share for the agent
0-20	\$0	\$0	\$0
21	$\$10.00 + \$0.10 = \$10.10$	\$5.05	\$5.05
22	$\$10.00 + \$0.20 = \$10.20$	\$5.10	\$5.10
23	$\$10.00 + \$0.30 = \$10.30$	\$5.15	\$5.15
24	$\$10.00 + \$0.40 = \$10.40$	\$5.20	\$5.20
25	$\$10.00 + \$0.50 = \$10.50$	\$5.25	\$5.25
30	$\$10.00 + \$1.00 = \$11.00$	\$5.50	\$5.50
40	$\$10.00 + \$2.00 = \$12.00$	\$6.00	\$6.00
50	$\$10.00 + \$3.00 = \$13.00$	\$6.50	\$6.50
60	$\$10.00 + \$4.00 = \$14.00$	\$7.00	\$7.00

<i>Panel B: High contract</i>			
Number of sliders completed by the agent	Amount generated for the principal-agent pair	Share for the principal	Share for the agent
0-40	\$0	\$0	\$0
41	$\$10.00 + \$0.10 = \$10.10$	\$10.05	\$10.05
42	$\$20.00 + \$0.20 = \$20.20$	\$10.10	\$10.10
43	$\$20.00 + \$0.30 = \$20.30$	\$10.15	\$10.15
44	$\$20.00 + \$0.40 = \$20.40$	\$10.20	\$10.20
45	$\$20.00 + \$0.50 = \$20.50$	\$10.25	\$10.25
50	$\$20.00 + \$1.00 = \$21.00$	\$10.50	\$10.50
60	$\$20.00 + \$2.00 = \$22.00$	\$11.00	\$11.00

Table 2: *Number of agent-rounds in which an agent preferred and worked under the given contract*

Preferred Low				Preferred High			
Worked Under Low		Worked Under High		Worked Under Low		Worked Under High	
Imposed	Delegated	Imposed	Delegated	Imposed	Delegated	Imposed	Delegated
10	58	28	0	24	0	260	250

the risky asset succeeded or failed, the participant’s resulting total number of points was translated to dollars at a rate of \$0.05 per point. Because of its simplicity to implement and its predictive power, this elicitation procedure is useful when the goal is to explain behavior rather than to estimate risk preference parameters (Charness et al., 2013).

The locus of control questionnaire consisted of twenty-three questions intended to measure the extent to which the respondent attributes the cause of events to herself versus the environment. The questionnaire yields a score between 0 and 23. Individuals who score low on the questionnaire tend to attribute the cause of events to themselves, and as such, they are considered to have an “internal” locus of control; those who score high tend to attribute the cause of events to external forces, and so they are considered to have an “external” locus of control. Relevant to the question of delegation in a principal-agent relationship, survey data (Runyon, 1973) and laboratory work (Cravens and Worchel, 1977) have shown that employees with internal loci of control prefer a supervisor who involves them in decisions, while employees with external loci of control prefer a supervisor who is more directive and makes decisions for them. This suggests that in our design an agent with an internal locus of control may be pleased when she is delegated the contract choice while an agent with an external locus of control may not be that is, we expect a negative relationship between effort and the interaction of delegation and locus of control.

Finally, the demographics questionnaire asked for the participant’s age, gender, race, college major and year, and English proficiency.

2.5 Payment

Participants were paid privately and in cash at the end of the session. Payment included earnings from Part 1 and the earnings from a randomly-selected round of Part 2, plus earnings from the risk elicitation section and a show-up fee of \$5. Average earnings were \$17.85.

3 Findings

Figure 2 shows the cumulative distribution of Part-1 performance for participants who were assigned the role of agents in Part 2. The threshold for the High contract was indeed feasible, as 75% of agents reached 41 or more sliders at baseline.

As expected, this resulted in both the High contract being preferred by most agents in Part 2, and also the High contract being implemented in most rounds in Part 2. As Table 2 shows, of the 630 agent-round observations in the data, 510 were cases in which the agent preferred and worked under the High contract. These observations, together with those in which the agent preferred and worked under the Low contract (68 cases) make up 92% of the data, and are observations that allow us to evaluate whether being delegated per se motivates effort of the agent. This is because, independently of whether the principal delegated or imposed, the resulting scheme was always the agent’s preferred contract.

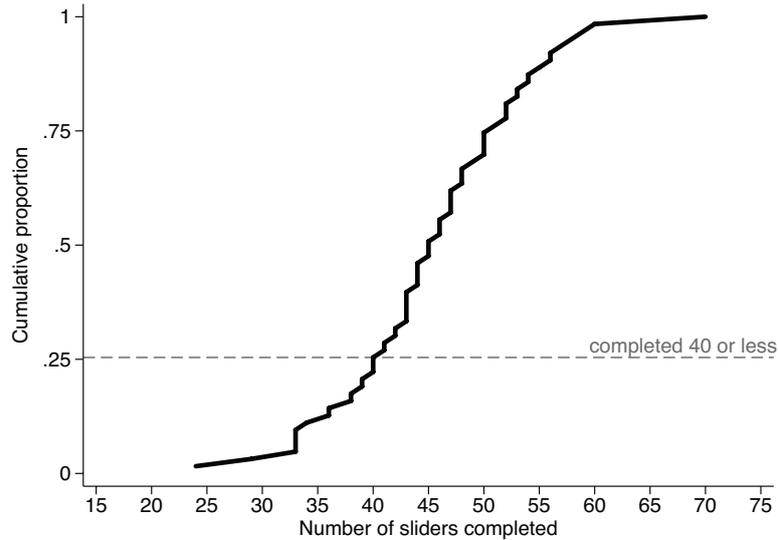


Figure 2: *Baseline performance of agents*

In Table 3, we estimate the intrinsic effect of delegation on the agent’s performance, under various specifications. That is, we examine whether receiving the right to choose his own wage leads the agent to put in more or less effort. The main result is that under no specification is the effect of delegation significant. We estimate the effect separately for agents who preferred and worked under the Low contract, and for agents who preferred and worked under the High contract. The variable of interest is *delegate*, which takes the value 0 if the principal imposed the contract and 1 if the principal delegated the contract choice to the agent. Model 1 includes as controls the baseline performance of the agent, and the round (to control for the significant learning that occurred over the five rounds). Model 2 adds to the controls the interaction of the agent’s baseline performance with *delegate* to explore the possibility that agents who were more skilled at the slider task responded systematically differently to being delegated to than the less skilled agents did. Finally, Model 3 adds to Model 1 the locus of control score and its interaction with *delegate* to explore whether differences in perception of control resulted in differences in the way agents responded to delegation.

The finding that delegation per se does not translate to changes in effort runs counter to our expectations, given previous work that finds that the right to choose is valued intrinsically. The null finding continues to hold in panel regressions (not reported here) that treat subjects as fixed effects and thus exploit variation only within subjects.² In the next section we discuss possible explanations for this null result.

Even though our design is neither intended nor able to test whether principals have an intrinsic preference for delegation or imposition, for the purposes of completeness and as way of robustness on the experiment we also present the behavior of principals in our data. Figure 3 shows the estimated probability that the principal delegates the contract choice to the agent, given the baseline performance of the agent. Principals are significantly more likely to impose their choice on the agent as the agent’s baseline ability is higher. Naturally, in the vast majority of observations the contract imposed is the High contract, especially for cases in which the baseline performance of the agent exceeds 40 sliders. This indicates that principals did not make the delegation decision randomly, but rather decided strategically

²There is substantial within-subject variation to perform these fixed-effects regressions, as 50 out of 63 agents preferred and worked under the High contract in at least two rounds, and in at least one of those rounds got the contract delegated upon them while in at least one of those rounds got the contract imposed upon them.

Table 3: Effect of delegation on the agent's performance

	(1)		(2)		(3)	
	Low	High	Low	High	Low	High
delegate	2.918	0.286	4.622	0.178	2.461	0.287
	-2.401	-1.253	-3.449	-1.279	-2.014	-1.272
baseline	0.498***	0.722***	0.364**	0.690***	0.494***	0.724***
	-0.05	-0.09	-0.16	-0.125	-0.065	-0.091
round	0.38	1.462***	0.415	1.477***	0.313	1.453***
	-0.42	-0.2	-0.427	-0.199	-0.501	-0.205
deleg.*baseline			0.159	0.064		
			-0.168	-0.122		
locus_control					-0.704***	-0.04
					-0.18	-0.243
delegate*locus					0.378	0.137
					-0.362	-0.275
constant	45.353***	51.049***	43.775***	51.112***	46.154***	51.061***
	-2.097	-1.02	-3.309	-1.07	-1.595	-1.031
R2	0.474	0.412	0.479	0.412	0.548	0.413
N	34	255	34	255	34	255

Notes: This table shows the estimated effect of being delegated the right to choose the contract on the agent's effort, based on OLS regressions with observations only from agents who preferred to work under a given contract and ended up working under that contract in the corresponding round. Regressions are conducted separately for the Low contract and the High contract. Both baseline performance and the locus of control score are expressed as deviations from the mean of all agents (means are 45.5 and 9.5 respectively). Standard errors clustered at the subject level are in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

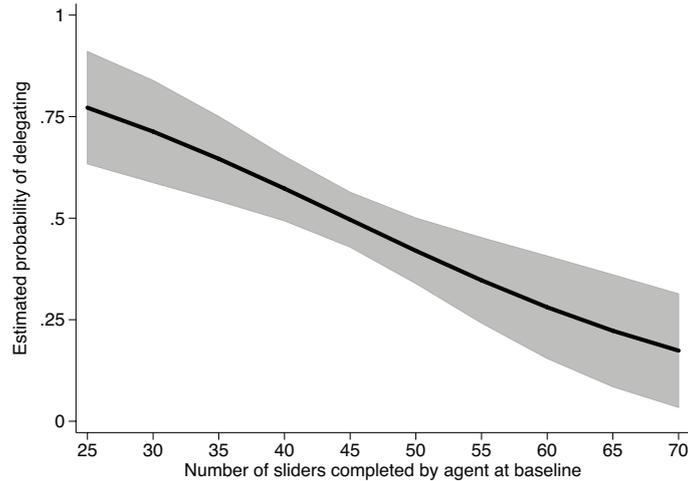


Figure 3: *Estimated probability that the principal delegates the contract choice*

in order to secure themselves a high payoff: they allowed the agent to choose the contract when it was not clear that the agent could reach the High contract threshold, and forced the agent to work under the more lucrative contract when it was clear that the agent could succeed at it. From regressions not reported here, we find that possible explanatory variables such as the round number and the principal’s gender, risk preferences, and baseline ability do not help to predict the probability of delegation.

4 Discussion and Conclusion

This paper presents a laboratory experiment with a novel design that isolates the impact of delegation of the payment contract choice on the worker’s motivation to exert effort. Following the literature that finds that principals value decision rights intrinsically and thus delegate decision rights to agents less than is monetarily optimal, we investigate whether agents also place an intrinsic value on decision rights that leads them to vary their effort levels when these rights are granted or taken away.

We find no evidence that delegation, per se, affects agents’ effort in our experiment: Conditional on working under and preferring a given payment contract, agents who were allowed to choose their own contract did not exert more effort than those who were not allowed to choose their own contract. There are two general possibilities that explain this null result: (1) our design was not able to detect the impact of delegation on worker motivation, or (2) delegation, per se, does not motivate workers in our setting. We consider both of these below.

One concern, common to most experiments that employ a real-effort task, is that the task may have been so engaging that performance was not affected by the incentives in our case, delegation. In fact, Araujo et al. (2015) recently raised concerns over the slider task’s lack of sensitivity to incentives in between-subject designs, where studies using this framework often obtain null results. But as Araujo et al. (2015) point out, using the slider task in within-subject designs such as ours does not appear problematic, as “out of eleven within-subject studies reviewed, ten find at least a partial response, while the majority (six) find a significant response to effort.” Gill and Prowse (2015) also demonstrate the slider task’s sensitivity to incentives in a within-subject design, and describe several other advantages of using this task in experiments. A related concern is that agents may have reached a maximum level of effort on each round such that they could not respond to additional incentives. Again, this does not appear to be the case given the response to incentives observed by Gill and Prowse (2015) and the

within-subject studies reviewed in Araujo et al. (2015). Hence, we do not attribute our null result to a lack of responsiveness to incentives or a ceiling effect on effort.

Another potential explanation for the null result is that our design perfectly aligns the principal's and the agent's preferences. It is true that this makes it more difficult to observe an agent's negative reaction to having a contract imposed upon her, as an agent who wishes to punish the principal in that case must decrease her own payoff to do so. Such an agent may not be willing to incur that cost even if she dislikes imposition. But the converse is also true: Aligning the players' preferences makes it easier to observe a positive reaction to delegation, as an agent who gets motivated when delegated can exert higher effort in that case without hurting their own payoff or worrying about distributional issues. Our setup is thus designed to pick up whether delegation per se enhances effort, and we find no evidence of this.

It is also possible that agents who had the contract imposed upon them felt that the restriction on their decision right was inconsequential, particularly if the principal chose the payment contract that the agent preferred. However, this would suggest that delegation, defined as the granting of the right to make a choice, is not the source of value that individuals claim to experience as a result of enhanced autonomy. Instead, the value associated with delegation or autonomy might arise from another source often correlated with it, such as the ability to make a choice more in-line with one's own preferences.

Therefore, to conclude that delegation does not intrinsically motivate effort is not to say that delegation is not valuable. Enhanced autonomy can be a useful instrument, and this may be the source of its potential power in the workplace. It often allows workers to make choices that increase efficiency: If a worker can work during the hours he feels most awake, he might be more productive than if he cannot work during those hours, regardless of whether he chose those hours or they were assigned to him by his supervisor. Enhanced autonomy can also help to alleviate uncertainty and lack of interpersonal trust, regardless of whether incentives are aligned. For instance, if a worker thinks that the employer might not make the right decision for him, then he might want to avoid relinquishing decision rights to an employer that is, he might choose to self-employ. Our experiment deliberately abstracted from these possible instrumental benefits to focus on the intrinsic value of delegation.

One limitation of our design is that, even though in both delegation and imposition conditions the agent is solely responsible for generating the earnings for the pair, it is possible that an agent to whom the contract choice is delegated feels more responsible for the final outcome of the interaction because he was allowed to implement a choice that led there. It is an empirical question how much more responsible such an agent feels than one who is not allowed to choose but knows that he would have picked the same contract that the principal imposed. This is a question worth exploring, as responsibility is the mechanism put forth by Charness (2000) and Charness et al. (2012) to explain the value of delegation, proposing that agents put in more effort when it is more difficult to blame a poor outcome on another party. Had we obtained a positive effect of delegation on effort, our design would require additional treatments to tease out responsibility from the intrinsic value of delegation. We thank the referees for pointing this out to us, and we deem it an important avenue of future work to study how delegation of choice can be operationalized separately from responsibility over making the choice.

Finally, our study explores the value of delegation in only one particular choice context. It is possible that delegation intrinsically motivates effort in other domains, for instance, in choices over the methods to achieve a task, and under different incentive structures. Again, we thank the referees for suggesting this avenue of future work. Perhaps the main contribution of our paper is in developing a novel experimental paradigm that controls for preferences and for choice outcomes, making it possible to ask and more cleanly answer questions regarding the intrinsic value of delegation in various contexts.

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