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Third-Party vs. Second-Party Control: Disentangling the Role of Autonomy and Reciprocity

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ABSTRACT

Third-Party vs. Second-Party Control: Disentangling the Role of Autonomy and Reciprocity

This paper studies the role of autonomy and reciprocity in explaining control averse responses in principal-agents interactions. While most of the social psychology literature emphasizes the role of autonomy, recent economic research has provided an alternative explanation based on reciprocity. We propose a simple model and an experiment to test the relative strength of these two motives. We compare two treatments: one in which control is exerted directly by the principal (second-party control); and the other in which it is exerted by a third party enjoying no residual claimancy rights (third-party control). If control aversion is driven mainly by autonomy, then it should persist in the third-party treatment. Our results, however, suggest that this is not the case. Moreover, when a third party instead of the principal exerts control, control results in a greater expected profit for the principal. The implications of these results for organizational design are discussed.

JEL Classification: C72, C91, D23, M54

Keywords: third party, second party, control aversion, autonomy, principal-agent game, social preferences, trust, reciprocity

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1. Introduction

In contemporary societies, significant resources are devoted to control people's actions. For instance, a substantial fraction of the labor force is allocated to supervisory tasks in both developed and developing countries (Acemoglu and Newman, 2002; Jayadev and Bowles, 2006; Fafchamps and Söderbom, 2006). According to figures computed from the European Working Condition Survey (EWCS), more than half (57%) of non-supervisory employees lack procedural autonomy at work in at least one dimension (i.e. the ability to change or choose the order of tasks, the speed or rate of work and the method of work) and 42% perceive that their work rate depends on the direct control of their bosses.[1] Hence, understanding the precise behavioral mechanisms underlying people's reactions to control and their economic consequences remain important concerns.

Traditionally, two main streams of literature have focused on people's reactions to control. On the one hand social psychologists have emphasized the role of individual orientations towards autonomy and control. According to Self-Determination Theory (SDT), human beings have a basic psychological need for autonomy (Deci and Ryan, 1985). That is, humans require "a form of freedom in which a party experiences himself to be the locus of causality for his own behavior " (Gagné and Deci, 2005, p. 333). This approach sees people's wellbeing as inseparable from their experience of personal and motivational autonomy (Chirkov et al, 2011) and considers the quest for autonomy as one of the main drivers of individual reactions to control.[2]

On the other hand, behavioral economists have focused primarily on intention-based social preferences, in particular reciprocity (Falk and Fischbacher, 2006; Dufwenberg and Kirchsteiger, 2004; Von Siemens, 2013). Nowadays, there is ample evidence that many agents behave in a reciprocal manner even when acting on reciprocal preferences is costly and yields no future rewards (see, for instance, Fehr and Gächter, 2000). On this basis Falk and Kosfeld (2006, henceforth, F&K) have provided a reciprocity-based

[1] Own calculations from EWCS wave 2010.

[2] Several experiments conducted by psychologists in highly differentiated contexts have shown that environments supporting autonomy (control) to significantly increase (decrease) intrinsic motivations and prosocial behavior, and therefore that autonomy and control can severely affect task performance (see Gagné, 2003; Greene-Demers et al., 1997; Pelletier et al., 1998; Fabes et al., 1989; Kunda and Schwartz, 1983; Upton, 1974; Batson et al., 1978; Sobus,1995).

explanation for individual reactions to control. In a principal-agent game they explore the phenomena of hidden costs of control and the idea that 'control aversion' may be one of the reasons why incentives sometimes degrade performance. They found a sizeable fraction of agents react negatively to control and that control is not profitable, i.e. principals earn more if they leave agents to decide freely than if they control. F&K explain their result in terms of negative reciprocity on the side of the agents who punish the controlling principals for their distrust.[3]

Although both the autonomy and the reciprocity explanations are plausible, there is still no clear evidence that help to disentangle them. F&K explored the agents' emotional perception of control in their experiment and the most frequent answers among those agents who react negatively to control were distrust and lack of autonomy. However, the experimental design does not allow the authors to separate the explanatory role of these two motives and thus leaves their relative importance unexplained. Distinguishing between these two motives is important as it affects the way in which control practices ought to be implemented. If reciprocity is the main driver, then third-party control (i.e. through salaried supervisors enjoying no residual claimancy rights) is to be preferred over second-party control (i.e. through supervisors entitled with residual claimancy rights). On the contrary, if autonomy is the strongest motive, then control is always perceived in a negative way and it may thus degrade performance independently of whom is exerting it.

In this paper we extend F&K's experimental design to disentangle the role of autonomy and reciprocity in explaining how individuals react to control in a principal-agent relationship. We vary their experiment to permit it to include three parties: the principal, who benefits from the effort of the agent, the agent, and a third party who is given a show-up fee and chooses whether or not to exert control over the agent, but does not directly benefit from the agent's actions (i.e. he does not have any claim over the residual). On this basis, we obtain three main results: (1) in the presence of a third party who can exert control we find no hidden costs of control; (2) when a third party instead of the principal exerts control, the fraction of control averse agents dramatically

[3] Recent experimental evidence also suggests that individuals intrinsically value decisional autonomy over their own and others' outcomes (Bartling et al, 2014; Owens et al, 2014). Moreover, greater procedural autonomy and lower monitoring intensity appear to correlate positively with greater job satisfaction (Bartling et al, 2013).

decreases and control results in a greater expected profit for the principal; (3) independently of the type of control, a relatively high degree of heterogeneity in behavioral responses to control exist. Regression analysis shows no correlation between the probability of being control averse and a psychological measure of autonomy orientation (General Causality Orientation Scale; GCOS). In contrast, we find a significantly negative correlation between this probability and individuals' controlled orientation as measured by GCOS. Overall, control aversion appears to be driven (at least in this very specific and highly stylized experimental setting) by negative reciprocity rather than by agents' preference for autonomy.

The paper contributes to the growing experimental economics literature on authority and control in organizations (Falk and Kosfeld, 2006; Ziegelmeyer et al, 2012; Fehr et al., 2013; Charness et al., 2011; Schnedler and Vadovic, 2011). The study also adds to the literature on crowding out (in) effects of incentives on intrinsic motives (see Frey and Jegen, 2000; Bowles and Polanía, 2012). Finally, the paper contributes to the research agenda in organizational economics trying to improve the mapping of individual preferences and assessing the consequences of the mismatch between preferences and organization design (Ben Ner, 2013). By disentangling the precise behavioral motives underlying reactions to control, the results presented in this paper may have implications for key aspects of organizational design, such as the optimal level of employees' discretion and monitoring practices. Specifically, our results may provide a rationale for why fixed wage contracts are still dominant in supervisory occupations, despite standard economic reasoning would suggest to couple monitoring responsibilities and residual claimancy (Alchian and Demsetz, 1972).[4] The reason is that in the presence of reciprocal types, the exercise of control combined with residual claimancy rights may trigger workers' control averse dispositions.

The rest of the paper is structured as follows. In Section 2 we sketch a simple model to rationalize the role of reciprocal preferences and autonomy preferences in explaining costs of control. In section 3, we present the experimental design, including the original F&K design and our third-party treatment. Section 4 describes practical procedures

[4] According to own calculations from EWCS wave 2010, only 29% of supervisory employees are paid through performance-contingent schemes (price rates, profit sharing, company shares). This fraction is slightly lower for non-supervisory employees (20.3%).

related to the experiment. Section 5 presents the main results. Finally, in section 6 we conclude and discuss potential extensions.

2. Reciprocity and Autonomy: A Simple Model

Consider a principal-agent interaction in which the principal (P) chooses the degree of control *c* and the agent (A) chooses the level of a productive activity *x*. P's payoff is monotonically increasing in *x*, whereas for A *x* is costly. Control is modeled as a minimum threshold on *x*, which we call $\underline{x}$. For the sake of simplicity we model control as a binary choice: either P chooses to control – i.e. $c = 1$, or P chooses not to control – i.e. when P sets c = 0. A's choice set is bounded on *x* and A can choose only $x \geq \underline{x}$. When P sets $c = 0$, A can choose any $x \geq 0$.

P's payoff takes the following form:

(1) $$\pi_P = qx$$

where *q* is the marginal product of activity *x*. In line with F&K we assume that the behavior of A is motivated by social preferences. In particular we focus on two main types of such motives: autonomy and reciprocity. Autonomy is assumed to affect the disutility that A experiences in performing the activity *x* (i.e. intrinsic motivation). Reciprocity is assumed to affect the extent to which A evaluates the payoff of P in her own utility function. As a way to distinguish between these two motives, we assume A's utility function takes the following form:

(2) $$U_A = w - \gamma(c)\frac{x^2}{2} + \beta\pi_P$$

where *w* is the wage (exogenous in this model), $\gamma(c)$ where $\gamma' > 0$ captures the increase in the disutility of *x* as a result of control (preference for Autonomy) and β is the weight with which A evaluates P's payoff. In particular we assume that β takes the following form:

(3) $$\beta = \frac{x^F}{q} + \lambda(c)$$

where x^F is a fair level of x which depends on an agent-specific social norm, and $\lambda(c)$ with $\lambda'<0$ is a function capturing the extent to which A conditions their evaluation of P's payoff on P's decision to control (Reciprocity). In order to make clear predictions we assume $\gamma(c)$ and $\lambda(c)$ have the following form:

(4)
$$\gamma(c)=\begin{cases}1 & if \quad c=0\\ \gamma & if \quad c=1\end{cases}$$

(5)
$$\lambda(c)=\begin{cases}0 & if \quad c=0\\ -\lambda & if \quad c=1\end{cases}$$

where $\gamma \geq 1$.

The timing of the interaction is as follows. At stage 1, for a given level of *w*, P chooses whether to exercise control, i.e. sets $c=0$ or $c=1$. At stage 2, having observed P's control decision, A chooses the level of *x*. We solve the model by backward induction.

From equations (2) and (3) together we obtain the following first order condition (FOC) for A:

(6)
$$x(c)=\frac{x^F+q\lambda(c)}{\gamma(c)}$$

Equation (6) provides A's optimal level of *x* as a function of c. By substituting equation (6) into equation (1) we have the following maximization problem for P:

(7)
$$\max_{c=\{0,1\}} \pi_P(c)=q\left[\frac{x^F+q\lambda(c)}{\gamma(c)}\right]$$

Given the binary nature of P's choice we can directly compare the payoff for each value of *c*. From equations (4), (5) and (6) we obtain the following:

(8) $$c = 0 \iff x* = x^F \iff \pi(p) = qx^F$$

(9) $$c = 1 \iff x^* \begin{cases} \dfrac{x^F - q\lambda}{\gamma} & if \quad \underline{x} < \dfrac{x^F - q\lambda}{\gamma} \iff \pi_P(1) = q\left[\dfrac{x^F - q\lambda}{\gamma}\right] \\ \underline{x} & if \quad \underline{x} \geq \dfrac{x^F - q\lambda}{\gamma} \iff \pi_P(1) = q\underline{x} \end{cases}$$

By comparing equations (8) and (9) we can see that the optimal choice for P is to control if and only if $\underline{x} \geq x^F$.

In our paper, the main focus is on the behavior of A. While SDT explains the negative effect of control on A's actions mainly in terms of autonomy, i.e. it tends to assume that $\gamma > 1$ and $\lambda = 0$ for any *c*, F&K primarily focus on reciprocity, i.e. they assume $\gamma = 1$ and $\lambda > 0$ for any *c*. According to our model, however, both motives can be relevant and distinguishing between them is important. If reciprocity is the predominant factor there could be a rationale for designing control in such a way that negative signals on the side of the principal are somewhat attenuated, for instance by decoupling monitoring and residual claimancy rights. On the contrary, if autonomy is the prevalent force control *per se* may be perceived in a negative way, independently on whom is exerting it. Our experiment is expressly aimed at disentangling these effects.

3. Experimental Design

Principal-agent Game

In order to test the extent to which control aversion depends on both reciprocity and autonomy we rely on a simple laboratory experiment. The experiment is based on the two-stage principal-agent game used in F&K and replicated in Ziegelmeyer et al (2012), which are similar to the setting of our model. The agent chooses a productive activity *x*, which is costly to him but beneficial for the principal. The monetary cost for the agent is *c(x) = x*, while the benefit for the principal is 2*x*; i.e., the marginal cost of providing the productive activity is always smaller than the marginal benefit. The agent has an initial endowment of 120 experimental currency units (ECUs), while the endowment of the principal is 0. The payoff functions are thus given by:

(10) $\pi_P = 2x$

(11) $\pi_A = 120 - x$

Before the agent decides on x, the principal determines the agent's choice set. The principal can either restrict the agent's choice set, in which case the agent can choose any integer value $x \in \{\underline{x}, \underline{x}+1, \dots, 120\}$, or the principal can leave the choice set unrestricted to $x \in \{0, 1, \dots, 120\}$. Thus the principal can control the agent's decision environment, thereby guaranteeing a minimal payoff of $2\underline{x}$, or the principal can leave the decision completely up to the agent, trusting that the agent will not choose an x below $\underline{x}$.

Treatment

In line with the model of Section 1, we conjecture that the principal's choice to control has two main effects. First, as conjectured by F&K, it signals distrust and thus motivates reciprocity on the side of the agent ($\lambda(c)$). Second, as a consequence of a reduction in decisional autonomy, it crowds out the agent's intrinsic motivation to contribute ($\gamma(c)$). We call the first the *reciprocity effect*, and the second the *autonomy effect*. In order to disentangle these two effects we consider 2 distinct experiments: Experiment 1 (C10) and Experiment 2 (TP10). In C10, the principal chooses whether or not to control (replicating F&K's baseline treatment with $\underline{x} = 10$. In TP10 the decision to control is taken by a neutral third party (i.e. a subject outside the main principal-agent interaction) whose payoff is not affected by the agent's choice as the third party is only paid a show-up fee. The third party chooses whether or not to set $x = \underline{x} = 10$. Each agent makes their decision using the strategy method specifying the level of x in the condition when the principal exerts control and the level of x when the principal does not exert control, or, in the TP10 treatment, the level of x in the condition when the third party exerts control and the level of x when the third party does not exert control. Since in TP10 the principal is only a passive player, no reciprocity motive can explain the agent's behavior in this treatment.

On this basis, if we were to find that in TP10 control significantly reduces the level of x chosen by the agent (comparing across the conditions), there would be room to argue that it is not solely reciprocity that explains the hidden cost of control, and the autonomy effect holds. Referring to our model the result would imply $\gamma > 1$ that. Alternatively, if in TP10 control did not affect performance, that is, were the agents to transfer the same level of *x* when controlled relative to when not controlled, then the results would support the existence of reciprocity motives. Referring to our model, the result would imply λ=1.

The treatment TP10 is different from the treatment EX10 included in F&K's original design. In EX10 the principal and the agent play only the sub-game of the game in treatment C10. Such a treatment is thus used to control for the effects associated with an exogenously given smaller size of the agent's choice set. By fixing the size of the choice set ex-ante, however, EX10 cannot control for the effect associated with an exogenous *variation* in the size of the choice set, i.e. an exogenous variation in decisional autonomy. Finally, the design is between subjects as in F&K.

Questionnaire study

In addition to the experiment we conduct a questionnaire study to help evaluating the subjects' motivations. In contrast with previous research on control aversion, we do not use F&K's standard questionnaire. Rather, we use a psychological questionnaire aimed at measuring the strength of individuals' considerations for choices considering the roles of impersonal, autonomous or controlling forces (Deci and Ryan, 1985). The questionnaire is called the General Causality Orientation Survey (GCOS) and it has been used and verified in a variety of circumstances to understand peoples' preferences for self-determination or autonomy. In the GCOS, subjects answer questions relating to their preferences for an autonomy orientation, impersonal orientation, or control orientation. As the study focuses on adults' decisions in an economic setting, we employ the original 12-vignette version of the GCOS.

Deci and Ryan define each of the orientations in the following ways. A person's autonomy orientation involves, "a high degree of experiences choice in the initiation and regulation of one's own behavior" and people who rate highly on the autonomy orientation "seek out opportunities for self-determination and choice" (p. 111) or they are more likely to experience intrinsic motivation. With the control orientation, people "seek out, select or interpret events as controlling" with a person who is rated highly on the scale being motivated significantly by extrinsic benefits and rewards. Lastly, with the impersonal orientation people experience their behavior as "beyond their intentional control." A person who rates highly on the impersonal orientation may view himself or herself as incompetent, or see their behavior as subject to the whims of impersonal forces.

4. Practical Procedures

As in F&K and Ziegelmeyer et al (2012), all experiments were facilitated with the use of z-Tree experimental economics software (Fischbacher, 2007). We used a modified version of the official English-language translations of the F&K instructions, with the minor modifications proposed by the Institutional Review Board of Smith College to make certain differences clear to home language English-speakers.

All sessions were conducted at the Cleve E. Willis Experimental Economics Laboratory at the University of Massachusetts, Amherst. Subjects were invited using the ORSEE recruitment system (Greiner, 2004). All subjects were students at the University of Massachusetts, Amherst. Subjects did not participate in more than one session. Most subjects had participated in at least one other economics experiment, but all were inexperienced in that they had not participated in an experiment of this type before. The subjects interacted only once and each session lasted 45 minutes on average (including time for private payment). Table 1 summarizes the experimental conditions of the two experiments.

At the start of each experimental session subjects arrived and randomly drew a cubicle number. Cubicles are separated from each other visually and physically. Subjects are prohibited from speaking. In experiment 1, half of the subjects were assigned the role of principal and half of the subjects were assigned the role of agent. In experiment 2, one third of the subjects were assigned to the role of principal, one third to the role of agent, and one third to the role of third party. All subjects received a common set of instructions and all questions were answered privately.

As in F&K and Ziegelmeyer et al (2012), the subjects' understanding of the players' choice sets and payoffs were assured by three control questions. Once all subjects had answered the control questions correctly (with opportunities to ask questions privately), the subjects played the principal-agent experiment (Experiment 1) or principal-agent-third party experiment (Experiment 2) once. After they had played and before they received information about their payoffs, they filled out the General Causality Orientation Scale discussed in section 2 and a basic demographic survey. Responding to the questionnaire was not incentivized and subjects were told that their responses on the survey were not connected to their final payments. After completing the survey, a payment screen showed final earnings in the experiment. Once payment information was revealed, subjects were called to a cubicle in order to privately receive their final earnings (including the show-up fee).

5. Results

In this section, we present our findings about the replication of the F&K experiment (Experiment 1 or C10) and discuss the subject's answers to the questionnaires. We proceed to discuss the results from the third-party variation (Experiment 2 or TP10) and the answers to the questionnaires in that experiment.

We report results from two-sided statistical tests and we either reject or do not reject the relevant null hypotheses based on a 5 percent level of significance. We refer to the agents' choices as occurring in either the "control" or "no-control" setting, consistent with Ziegelmeyer et al (2012). Consequently, any reference to "significance" in this section should be read as referring to statistical rather than economic or substantive significance.

The sample comprises 235 subjects: 76 subjects in the C10 treatment with 38 subjects playing the role of the principal and 38 the role of the agent; 159 subjects in the TP10 treatment with 53 subjects playing the role of the principal, 53 the agent and 53 the third party. Much of the analysis refers either to transfers (by the agent to the principal) or to experimental currency units (ECUs). We use either term where appropriate. One ECU was equivalent to $0.20.

[Figures 1 and 2 here]

5.1 The replication

Result 1: We observe significant hidden costs of control in Experiment 1.

In Experiment 1, we observe significant costs of control. First, consistent with F&K, we present the cumulative distributions of the players' transfers where equal transfers were given the same probability weight. The no-control distribution is depicted in blue and the control distribution is depicted in red. Were there no hidden costs of control then the two distributions would coincide for all $x \geq \underline{x}$. On the contrary, the distributions differ. For each value of $x > \underline{x}$ there are more agents in the no-control condition who choose at least that value of x than in the control condition. For instance, more than 40% of agents choose $x > 20$ when they are not controlled. In contrast, less than 20% of agents choose $x > 20$ if controlled and, hence, forced to choose at least 10. A greater mass of x-choices is centered at $\underline{x} = 10$ if the principal restricts agent's actions.

Second, examining the distributions in greater detail, we follow F&K and Ziegelmeyer et al (2012) by constructing a modified distribution for the no-control condition, such that all $x \leq \underline{x}$ in the no-control condition are set equal to $\underline{x}$. In experiment 1, we reject the null hypothesis that the modified distribution from the no-control setting and the distribution from the control setting have the same medians (Wilcoxon signed-rank test for paired observations, z = -3.385, p=0.007).

We can therefore confirm the results from F&K and from Ziegelmeyer et al, that there are significant costs of control in dyadic principal-agent relationships. But, as Ziegelmeyer et al argue, we should be particularly concerned about hidden costs of control if they are economically substantial and large enough to undermine the use of incentives in relevant settings. That is, do the costs of control outweigh the benefits of control? Consistent with Ziegelmeyer et al (2012), but inconsistent with F&K, in our replication we find that the costs of control do not outweigh the benefits.

Result 2: Hidden Costs do not outweigh benefits of control in Experiment 1

Table 2 presents the agents' transfers as a function of the principals' decisions in the two experiments. The first row presents the average transfers for each of the control (column 1) and no-control (column 2) conditions in the experiments and the difference between the two (column 3). The second row for each experiment reports the standard deviation, followed by the 1st quartile, the median, and the 3rd quartile. For the difference between x^{NC} and x^{C}, the 95% bootstrap confidence interval is reported in the second row based on 10^5 replications.[5]

[Tables 2 and 3 About Here]

In Experiment 1, the mean number of ECUs is higher in the no-control condition than in the control condition. Furthermore, though the median number of ECUs initially may appear larger in the no-control condition than in the control condition, the median is not significantly larger (Wilcoxon signed-rank z=-1.001, p=0.32). The 95% bootstrap confidence interval of the difference $x^{NC} - x^{C}$ includes zero suggesting that the hidden costs of control do not significantly outweigh the benefits of control. The sign of the difference in principal's average profits between control and no-control conditions remains undetermined.

5.2 The third-party treatment (Experiment 2)

Result 3: We do not observe hidden costs of control in Experiment 2

Referring to figure 2, the cumulative distributions of transfers in the control (red) and no-control (blue) conditions are shown. When there are no hidden costs of control, the values of the cumulative distributions ought to coincide for all $x \geq \underline{x}$. As can be seen in the CDFs, the two distributions approximately coincide for all $x \geq \underline{x}$, suggesting no hidden costs of control. Next, we compare the distributions using Kruskal-Wallis tests, then we compare modified distributions using Wilcoxon Signed-Rank tests.

Comparing the distributions from the two experiments under the two conditions, we use Kruskal-Wallis tests to understand whether the distributions differ. For the control condition, we do not reject the null hypothesis that the distributions are equivalent across the distributions (X^2 = 0.007 (1 d.f), p = 0.9326). For the no-control condition,

[5] F & K do not compute bootstrap confidence intervals. However, we have computed them based on the data available as supplementary materials to their article. Our calculations provided the following information on their three treatments based on the value of $x^{NC} - x^{C}$ reported as follows: mean [bootstrap confidence interval]: C5 Treatment: 12.92 [8.47, 17.39]; C10 Treatment: 5.46 [2.75, 8.17], C20 Treatment: 1.31 [-3.06, 5.69]. These results are consistent with those reported in Ziegelmeyer et al, who also performed bootstrap confidence intervals with F&K's data.

we reject the null hypothesis that the distributions are equivalent (X^2 = 4.048 (1 d.f.) p = 0.0442).

Using the modified distribution for the no-control condition, such that all $x \leq \underline{x}$ in the no-control condition are set equal to $\underline{x}$. In experiment 2, we do not reject the null hypothesis that the modified distribution from the no-control setting and the distribution from the control setting have the same medians (Wilcoxon signed-rank test for paired observations, z = 0.840, p=0.4007).

In contrast with F&K and Ziegelmayer et al, the result above suggests that when a third-party exerts control instead of a principal, then significant costs of control do not emerge. To understand whether control by a third-party on behalf of a principal might result in benefits of control outweighing costs of control, we go into greater detail in examining the behavior of agents in the third-party treatment.

Result 4: The benefits of control outweigh the costs of control in Experiment 2

The properties of Table 2 were discussed in detail in Result 2. In Experiment 2, the mean number of ECUs is lower in the no-control condition than in the control condition. The median number of ECUs transferred by the agent is significantly lower in the no-control condition than in the control condition (Wilcoxon signed-rank z = 5.030, p<0.001). The mean difference $x^{NC} - x^{C}$ is negative and the bootstrap confidence interval around the mean excludes zero. Referring to Table 3, the expected payoff to a principal when a third party exerts control is greater than the expected payoff to a principal when a third party does not exert control. This suggests that hidden costs of control are eliminated when a third a third party rather than a principal exerts control.

As a consequence of using the strategy method to elicit the agents' choices, we can observe whether the players are heterogeneous in their types by gaining greater understanding of whether players react positively, neutrally or negatively to control.

[Table 3 About Here]

5.3 Comparing C10 (experiment 1) and TP10 (experiment 2)

Result 5: Players react to control heterogeneously in both experiments; far fewer players react negatively to control in Experiment 2

Table 3 summarizes the agent's responses to control in each of the experiments. In experiment 1, our result where 42.10% of agents react negatively (control aversely) are consistent with Ziegelmeyer et al who found a proportion of agents who react negatively in the range 40.62% to 45.45%. This result contrasts with F&K who found that a majority of agents (56.94%) reacted negatively. The proportion of agents who react positively to control (36.84%) is consistent with Ziegelmeyer et al (39.40% to 60.00% in various C10 experiments) rather than relative to F&K (25% in C10). In experiment 1, the minority of subjects responds neutrally to control (21.05%). Control-averse agents transfer approximately the same in experiment 1 as they do in C10 in F&K and in Experiment 1 by Ziegelmeyer et al, that is, control-averse agents transfer roughly double in the no-control condition relative to the control condition. Agents who respond neutrally to control transfer (25.13) within the range of what they did in F&K (22.3)) and Ziegelmeyer et al (range: 14.8 to 30.71).

In experiment 2, on the other hand, few agents respond negatively to control (3.77%), a large proportion responds neutrally to control (41.51%) and the majority of agents respond positively to control (54.72%). These results are consistent with the preceding results examining the distributions of transfers and the difference between control and no-control transfers in Experiment 2. Fisher's exact tests contrasting differences in proportions between the treatments suggest the following: we reject the null hypothesis that the proportions are the same for neutral responses to control ($p=0.045$) and negative responses to control ($p<0.001$), but we cannot reject the null that the proportions are the same for positive responses to control ($p=0.136$).[6]

[Tables 4 and 5 About Here]

[6] Comparisons of Fisher's exact tests between our proportions and those in Ziegelmeyer et al (2012) and F&K are available upon request.

We interrogate these results further using regression analysis, the results of which are presented in Tables 4 and 5. The data are pooled from the data from the C10 experiments in F&K and Ziegelmeyer et al (2012) with permission from the authors. Column 1 presents an OLS regression where the independent variable is the difference between the agent's transfer in the no-control condition and their transfer in the control condition: $x^{NC} – x^{C}$. Standard errors are corrected using the MacKinnon & White (1985) residual-variance estimator HC3. Columns 2 through 4 are logistic regressions where the agent is classified as having either a positive, neutral or negative reaction to control depending on whether the differences between their transfers in the no-control vs. control conditions were negative, zero or positive (i.e. $x^{NC} – x^{C} < 0$ for positive response to control, $x^{NC} – x^{C} = 0$ for control-neutral and $x^{NC} – x^{C} > 0$ for negative response to control). In each regression, the explanatory variables are the dummies for each of the C10 experiments, though the very first explanatory variable is a dummy variable for our TP10 experiment. For the logistic regressions, the marginal effects are reported. In the bottom half of the table, p-values from Wald tests for the equivalence of the coefficients are reported for our TP10 experiment against each of the C10 experiments from F&K and ZSP's experiments 1 through 5. In all cases, linear probability models and heteroskedastic probit models have also been specified and the results are consistent across all the models.

First, were there no differences in positive (neutral, negative) responses to control across our experiment 1 and experiment 2, then the treatment dummy for TP10 would be small and not statistically significantly different from zero. Second, if the results from our replication are consistent with preceding C10 experiments, then the other experimental dummies for other C10 experiments ought not to be statistically significantly different from zero.

In regression 1, the TP10 dummy is negative, large and statistically significant. The coefficient suggests that an average agent in experiment 2 has a difference $x^{NC} – x^{C} = -5.14$ in contrast with a difference of 3.76 in the baseline experiment 1 (as shown by the constant). This result is reinforced by the outcomes of regressions 2 and 3 where subjects are significantly more likely to respond positively to control (column 2) or be control-neutral in experiment 2 than in experiment 1 (columns 3) and significantly less likely to respond negatively to control (column 4). These results are borne out in the

Wald tests, where the coefficient on the TP10 treatment dummy is shown consistently not to equal the F&K dummy's coefficient and, for negative responses to control specifically, the TP10 treatment is shown to be consistently statistically significantly different to the other coefficients.

As a further robustness check for the result on the third-party treatment, we use a multinomial logit model where the three categories are Positive, Neutral and Negative. The marginal effects of the model are reported in Table 5. The results are consistent with the logit regressions, suggesting that subjects in the TP10 treatments were significantly less likely to respond negatively to control and significantly more likely to respond neutrally to control.

The results from Tables 4 and 5 suggest that, though hidden costs of control emerge in the dyadic principal-agent interaction, the addition of the third party significantly decreases the likelihood that hidden costs will emerge or that they will outweigh the benefits of control. As principal's signal of distrust cannot play any role under TP10, the fact that the fraction of control averse agents dramatically vanishes in this treatment suggests reciprocity rather than preferences for autonomy to be the main behavioral mechanisms underlying control aversion.

[Tables 6, 7 and 8 About Here]

For robustness across the treatments, we confirm that the samples are not statistically significantly different with respect to the subjects' reported attitudes using the GCOS The means and standard deviations for the subjects' reported preference for each scale in each of the experiments are reported in Table 6. The means in the scales are not statistically significantly different across the experiments, as shown by the t-statistics of the difference between their values by treatment.[7] Standardized values for each scale were incorporated into the regressions replicating those in Tables 4 and 5. The regressions report results for our data only as F&K or Ziegelmeyer et al did not gather the GCOS attitudes. These results are reported in Tables 7 and 8.

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[7] Regarding the internal consistency of each of the three subscales, the Cronbach's α nonstandarized values were autonomy, 0.8469; impersonal, 0.7394; and control, 0.6218.

As with Table 4, in Table 7 the first column represents an OLS regression with the difference $x^{NC} - x^{C}$ as the dependent variable. In specifications 2 through 4, the dependent variable was a dummy variable indicating whether a subject displayed a positive (neutral or negative) response to control. The standardized control variable was statistically significant and negative in the $x^{NC} - x^{C}$ regression (column 1), the positive response to control logit regression (column 2) and the negative response to control logit regression (column 3). A one standard deviation increase in the standardized control GCOS corresponds with a decrease in the probability a subject will respond negatively to control by 6.4%, an increase in the probability the subject will respond positive by 16.6% and an increase in the difference between x^{NC} and x^{C} by -2.17 ECUs.

These results are borne out by the multinomial logit regressions in Table 8, which show that the third-party treatment dummy significantly decreases the probability of a negative response to control and significantly increases the probability of a neutral or positive response to control. The standardized control scale is also significant once again for the negative response to control and positive response to control. Other things equal, one standard deviation increase in the control scale corresponds with a decrease in the probability of a negative response by about 7% and an increase in the probability of a positive response by about 16.3%. This result is consistent with the psychological interpretation given to the controlled orientation, which assesses the extent to which a person is oriented toward being controlled by rewards and the directives of others (Deci and Ryan, 1985). In line with the idea that control-averse reactions in this setting are mainly driven by reciprocity rather than individuals' preferences for self-determination, the standardized autonomy GCOS does not show significant correlation neither with the probability the subject will respond negatively to control nor with the difference between x^{NC} and x^{C}.

Result 6: The proportions of principals (in experiment 1) and third parties (in experiment 2) who exert control are not significantly different

In experiment 1, the 63.15%. of principals exert control. In experiment 2, 77.34%. of third parties exert control. A 95% bootstrap confidence interval of the difference in the proportions contains zero ($-0.051 < p_{C10} - p_{TP10} < 0.335$). These results are consistent with Ziegelmeyer et al who found proportions of control ranging from 57% to 83% in their C10 experiments. Both our results and Ziegelmeyer et al’s results suggest significantly higher proportions of control than F&K who found 29% of principals choosing control in their C10 experiment.

6. Conclusion

Our third-party treatment offers an opportunity to understand the behavioral motives underlying control averse reactions. First, in the presence of a third party rather than a principal who exerts control, we did not find significant hidden costs of control. Second, when the third party exerts control it results in greater expected profits for the principal than when the third party does not control. But, this should not be viewed as a form of delegation or the third party acting on behalf of (or at the orders of) the principal, rather it suggests that the agents respond reciprocally toward the principals in C10, but do not have that incentive in TP10. Third, substantial heterogeneity remains among subjects in the third-party experiment: subjects who respond neutrally to control consistently transfer a substantial proportion of their endowment to the principal, the puzzle though surrounds the ways in which types change given the decision context in the two treatments, suggesting that the subjects' choices may be endogenous (Bowles, 1998).

Social preferences, which we employ in our model, may be more or less active depending on the decision context (Carpenter & Seki, 2011). Correspondingly, the results from our experiments suggest a parameterization of our model in which reciprocity, rather than preferences for autonomy, strongly affects the decision-making process in principal-agent decisions. Control-averse agents reciprocate trust by the principal with higher effort and they reciprocate distrust by the principal with lower effort. Control-neutral agents do not alter their behavior and the small subset of control-loving agents exert greater effort when controlled than when not controlled by a principal. The behavior of the agents appears to be consistent with models of reciprocity that include considerations for the intentions of the principal, rather than any agent exerting control (Falk & Fischbacher, 2006; Von Siemens, 2013).

That reciprocity, rather than preferences for autonomy, drives the behavior of agents in these interactions is the main contribution of this paper. In demonstrating this result, we contribute to a wider literature engaged with understanding the employment relation, hierarchy, coercion and the exercise of power (Fehr et al, 2013; Nikiforakis et al, 2014).

Of course, the limited role played by autonomy preferences in our experiment should not be interpreted as a general claim about the irrelevance of this type of preferences, which have been proven to be very salient in other settings (see, for instance, Bartling et al, 2014). Future work should examine the extent to which preferences evolve over repeated principal-agent interactions and interactions in which the hierarchical relationship between subjects in the experiments may be made clearer either through framing or through changes in experimental design where the loci of control for the principal are more diverse. This may permit researchers to examine more unambiguously the extent to which autonomy and reciprocity may complement or substitute for each other in principal-agent interactions and, therefore, the extent to which extrinsic benefits may crowd out or in the effort of agents.

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References:

Acemoglu, D. and F. Newman, Andrew, 2002. "The labor market and corporate structure," European Economic Review, Elsevier, vol. 46(10), pages 1733-1756, December.

Alchian, Armen A & Demsetz, Harold, 1972. "Production , Information Costs, and Economic Organization," American Economic Review, American Economic Association, vol. 62(5), pages 777-95, December.

Bartling, B., Ernst Fehr, Klaus M. Schmidt, 2013. "Discretion, Productivity, and Work Satisfaction," Journal of Institutional and Theoretical Economics (JITE), Mohr Siebeck, Tübingen, vol. 169(1), pages 4-22, March.

Bartling B., Ernst Fehr & Holger Herz, 2014. "The Intrinsic Value of Decision Rights," Econometrica, Econometric Society, vol. 82, pages 2005-2039, November.

Batson, C. D., Coke, J. S., Jasnoski, M. L., and Hanson, M. (1978), "Buying kindness: effect of an extrinsic incentive for helping on perceived altruism", *Personality and Social Psychology Bulletin*, 4:86–91.

Ben-Ner, A. (2013), "Preferences and Organization Structure: Towards Behavioral Economics Micro-Foundations of Organizational Analysis", Journal of Socio-Economics, 46 (2013) 87-96.

Bowles, S. and S. Polania (2012), "Economic Incentives and Social Preferences: Substitutes or Complements?", *Journal of Economic Literature*, American Economic Association, vol. 50(2), pages 368-425, June.

Charness, G., Cobo-Reyes, R., Jinénez, N., Lacomba, J. A, Lagos, F. (2012), "The Hidden Advantage of Delegation: Pareto-improvements in a Gift-exchange Game", American Economic Review, American Economic Association, vol. 102(5), pages 2358-79, August.

Chirkov, V. I., R. M. Ryan and K.M. Sheldon (2010) "Human Autonomy in Cross-Cultural Context", Perspectives on the Psychology of Agency, Freedom, and Well-Being. Cross-Cultural Advancements in Positive Psychology, Vol 1. Springer.

Deci, E. L. and R. M. Ryan (1985), *Intrinsic Motivation and Self-Determination in Human Behavior*, New York: Plenum Press.

Fabes, R. A., Fultz, J., Eisenberg, N., May-Plumlee, T., and Christopher, F. S. (1989), "Effects of rewards on children's prosocial motivation: a socialization study", *Developmental Psychology*, 25:509–515.

Fafchamps, M. and Måns Söderbom, 2006. "Wages and Labor Management in African Manufacturing," Journal of Human Resources, University of Wisconsin Press, vol. 41(2).

Falk, A. and Fischbacher, U., 2006. "A theory of reciprocity." *Games and Economic Behavior* 54, 293–315.

Falk, A. and M. Kosfeld (2006), "The Hidden Costs of Control", *American Economic Review*, 96(5): 1611-1630.

Fehr, Ernest, and Simon Gächter. 2000. "Fairness and Retaliation: The Economics of Reciprocity." Journal of Economic Perspectives 14(3): 159–181.

Fehr, Ernst, Holger Herz, and Tom Wilkening. 2013. "The Lure of Authority: Motivation and Incentive Effects of Power." *American Economic Review*, 103(4): 1325-59.

Fischbacher, U., (2007), "z-Tree: Zurich toolbox for ready-made economic experiments", *Experimental Economics*, 10(2): 171-178

Frey, B. S. and R. Jegen (2000), "Motivation Crowding Theory: A Survey of Empirical Evidence", CESifo Working Paper No. 245

Gagné, M. (2003), "The role of autonomy support and autonomy orientation in the engagement of prosocial behavior", *Motivation and Emotion*, 27:199–223.

Gagné, M. and E.L. Deci (2005), "Self-determination Theory and Work Motivation", *Journal of Organizational Behavior*, 26:331-362

Greiner, B., (2004), "An Online Recruitment System for Economic Experiments," In: Kurt Kremer, Volker Macho (Hrsg.): Forschung und wissenschaftliches Rechnen. GWDG Bericht 63. Ges. für

Wiss. Datenverarbeitung, Göttingen, 79-93.

Greene-Demers, I., Pelletier, L. G., and Ménard, S. (1997), "The impact of behavioral difficult on the saliency of the association between self-determined motivation and environmental behaviors", *Canadian Journal of Behavioural Science*, 29:157–166.

Jayadev, Arjun and Bowles, Samuel, 2006. "Guard labor," Journal of Development Economics, Elsevier, vol. 79(2), 328-348, April.

Kunda, Z., and Schwartz, S. H. (1983), "Undermining intrinsic moral motivation: external reward and self-presentation", *Journal of Personality and Social Psychology*, 45:763–771

Owens Jr. D., Zachary Grossman Jr., and Ryan Fackler Jr., 2014. "The Control Premium: A Preference for Payoff Autonomy," American Economic Journal: Microeconomics, American Economic Association, vol. 6(4), 138-61, November.

Nikiforakis, Nikos, Oechssler, Jörg and Shah, Anwar, 2014. "Hierarchy, coercion, and exploitation: An experimental analysis," Journal of Economic Behavior & Organization, Elsevier, vol. 97(C), 155-168.

Pelletier, L. G., Tuson, K. M., Greene-Demers, I., Noels, K., and Beaton, A. M. (1998), "Why are you doing things for the environment? The Motivation Toward the Environmental Scale (MTES)", *Journal of Applied Social Psychology*, 28:437–468.

Ryan, R.M. and Deci, E. L. (2000), "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being", *American Psychologist*, 55(1):68-78

Schnedler, W. and Radovan Vadovic, 2011. "Legitimacy of Control," Journal of Economics & Management Strategy, Wiley Blackwell, vol. 20(4), 985-1009, December.

Sobus, M. S. (1995), "Mandating community service: psychological implications of requiring prosocial behaviour", *Law and Psychology Review*, 19:153–182.

Upton, W. E. III. (1974), "Altruism, attribution and intrinsic motivation in the recruitment of blood donors", in Selected readings in donor recruitment (Vol. 2, pp. 7–38). Washington, DC: American National Red Cross.

Von Siemens, F. 2013, "Intention-based reciprocity and the hidden costs of control." Journal of Economic Behavior and Organization, 92, 55-56

Ziegelmeyer, A, Schmelz, K., and. Ploner, M., (2012), "Hidden Costs of Control: Four Repetitions and an Extension", *Experimental Economics*, Springer, vol. 15(2), 323-340, June.

Table 1 Experimental Conditions

Experiment 1	Number of Sessions	4
	Number of Subjects	76
	Gender (% Female)	44%*
	Average age	21.02 (2.34)*
	Agents' Average Earnings	20.14 (2.9486)
	Principals' Average Earnings	7.73 (5.8972)
Experiment 2	Number of Sessions	7
	Number of Subjects	159
	Gender (% Female)	54%*
	Average age	20.75 (4.2)*
	Agents' Average Earnings	20.66 (2.5930)
	Principals' Average Earnings	6.69 (5.1860)
	Third Party's Average Earnings	0

Notes: Earnings are stated in dollars net of the show-up fee with standard deviations in parentheses. Third parties were simply paid the show-up fee and therefore would have no payoff net of the show-up fee.

Table 2: Agents' Transfers as a function of the principal's decision

	Control Condition	No-control condition	$x^{NC} - x^{C}$
Experiment 1	17.47	21.24	3.76
	(11.76, 10, 10, 20)	(19.03, 0, 18.5, 40)	[-.71, 8.24]
Experiment 2	18	12.87	-5.13
	(11.62, 10, 10, 25)	(15.50, 0, 5, 30)	[-6.53, -3.73]

Table 3: Agents' behavioral reactions to control, n = 38 in Experiment 1 and n = 53 in Experiment 2; Expected Payoff to P is calculated as an weighted average where the mean transfer in each condition is multiplied by the proportion of each type

		Positive	Neutral	Negative	Expected Payoff to P
Experiment 1	Relative Share	36.84%	21.05%	42.11%	
	Mean Control Transfer	11.64 (4.40)	25.13 (19.16)	18.75 (9.40)	17.38
	Mean no-control Transfer	1.93 (5.09)	25.13 (19.16)	36.19 (10.23)	21.22
Experiment 2	Relative Share	54.72%	41.51%	3.77%	
	Mean Control Transfer	10.76 (2.21)	27.36 (12.67)	20 (7.07)	18.05
	Mean no-control Transfer	1.14 (2.70)	27.36 (12.67)	23.5 (9.19)	16.07

Table 4: Regressions on Differences between transfers and reactions to control

	(1)	(2)	(3)	(4)
VARIABLES	$x^{NC} - x^{C}$	Positive	Neutral	Negative
D: = 1 for our TP10	-8.895***	0.178*	0.203*	-0.383***
	(2.448)	(0.107)	(0.111)	(0.0448)
D: = 1 for FK Exp	1.695	-0.126	-0.0331	0.136
	(2.729)	(0.0914)	(0.0844)	(0.0961)
D: = 1 for ZSP Exp 1	-4.591	0.218*	-0.0808	-0.124
	(3.351)	(0.123)	(0.0924)	(0.0886)
D: = 1 for ZSP Exp 2	-6.730**	0.231*	-0.0481	-0.160**
	(2.870)	(0.121)	(0.0984)	(0.0814)
D: = 1 for ZSP Exp 3	-1.612	0.0258	-0.0654	0.0299
	(3.053)	(0.118)	(0.0926)	(0.108)
D: = 1 for ZSP Exp 4	3.447	-0.170*	0.124	0.0313
	(3.436)	(0.0903)	(0.104)	(0.0944)
D: = 1 for ZSP Exp 5	-3.585	0.0605	0.0418	-0.0859
	(3.056)	(0.125)	(0.116)	(0.0960)
Constant	3.763	-	-	-
	(2.337)			
Observations	340	340	340	340
R-squared	0.107	-	-	-
Log Likelihood	-	-212.4	-180.7	-196.6
TP10 Dummy = FK Dummy	$p < 0.01$	$p < 0.01$	$P < 0.01$	$p < 0.01$
TP10 Dummy = ZSP E1 Dummy	$p = 0.09$	$p = 0.734$	$p = 0.0142$	$p < 0.01$
TP10 Dummy = ZSP E2 Dummy	$p = 0.234$	$p = 0.642$	$p = 0.0249$	$p < 0.01$
TP10 Dummy = ZSP E3 Dummy	$p < 0.01$	$p = 0.169$	$p = 0.0139$	$p < 0.01$
TP10 Dummy = ZSP E4 Dummy	$p < 0.01$	$p < 0.01$	$p = 0.377$	$p < 0.01$
TP10 Dummy = ZSP E5 Dummy	$p = 0.0118$	$p = 0.312$	$p = 0.145$	$p < 0.01$

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Data from Ziegelmeyer et al and F&K used with permission of the authors.

Table 5: Pooled Data Multinomial Logit Regressions of Agents' Responses to Control (n=340)

	(1)	(2)	(3)
VARIABLES	Positive	Neutral	Negative
D: = 1 for our Exp 2 (TP10)	0.179	0.212*	-0.390***
	(0.118)	(0.117)	(0.0457)
D: = 1 for FK Exp	-0.118	-0.0191	0.137
	(0.0977)	(0.0939)	(0.0968)
D: = 1 for ZSP Exp 1	0.218*	-0.0974	-0.121
	(0.121)	(0.0990)	(0.0918)
D: = 1 for ZSP Exp 2	0.223*	-0.0638	-0.159*
	(0.121)	(0.105)	(0.0842)
D: = 1 for ZSP Exp 3	0.0381	-0.0709	0.0328
	(0.122)	(0.102)	(0.109)
D: = 1 for ZSP Exp 4	-0.185*	0.149	0.0361
	(0.0965)	(0.111)	(0.0970)
D: = 1 for ZSP Exp 5	0.0501	0.0372	-0.0873
	(0.129)	(0.123)	(0.0978)
Observations	340	340	340

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

Table 6: Summary of General Causality Orientation Scale Indexes

	Experiment 1	**Experiment 2**	**t-stat/ (Mann-Whitney z)**
GCOS: Autonomy Scale	71.80	70.52	1.150075
	(6.23)	(8.74)	(0.495)
GCOS: Impersonal Scale	43.42	45.41	-1.349482
	(10.83)	(10.43)	(-1.487)
GCOS: Control Scale	58.43	58.93	-.4760745
	(6.97)	(7.71)	(-0.758)
Observations	76	159	235

Table 7: Regressions from our Subject Pool Only (n=91) with GCOS variables

	(1)	(2)	(3)	(4)
VARIABLES	x^{NC} - x^{C}	Positive	Neutral	Negative
D: TP10 Treatment = 1	-8.864***	0.193*	0.216**	-0.403***
	(2.444)	(0.111)	(0.0961)	(0.0830)
Standardized Autonomy Scale	1.198	-0.105	0.0800	0.00241
	(1.363)	(0.0676)	(0.0615)	(0.0320)
Standardized Impersonal Scale	-0.611	-0.0465	0.0343	0.0149
	(1.259)	(0.0644)	(0.0533)	(0.0294)
Standardized Control Scale	-2.177*	0.166**	-0.0675	-0.0641**
	(1.303)	(0.0701)	(0.0514)	(0.0299)
Constant	3.551	-	-	-
	(2.324)			
Observations	91	91	91	91
R-squared	0.212	-	-	-
Log Likelihood	-	-57.47	-54.16	-32.22

Notes: Standard errors in parentheses.*** p<0.01, ** p<0.05, * p<0.1

Table 8: Multinomial Logit Regressions of Agents' Responses to Control with GCOS variables (n=91)

	(1)	(2)	(3)
VARIABLES	Positive	Neutral	Negative
D: TP10 Treatment = 1	0.202*	0.209**	-0.411***
	(0.113)	(0.0972)	(0.0846)
Standardized Autonomy Scale	-0.105	0.102	0.00292
	(0.0700)	(0.0672)	(0.0330)
Standardized Impersonal Scale	-0.0492	0.0328	0.0163
	(0.0646)	(0.0585)	(0.0314)
Standardized Control Scale	0.163**	-0.0926	-0.0699**
	(0.0715)	(0.0623)	(0.0336)
Observations	91	91	91
Log Likelihood	-78.85	-78.85	-78.85

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

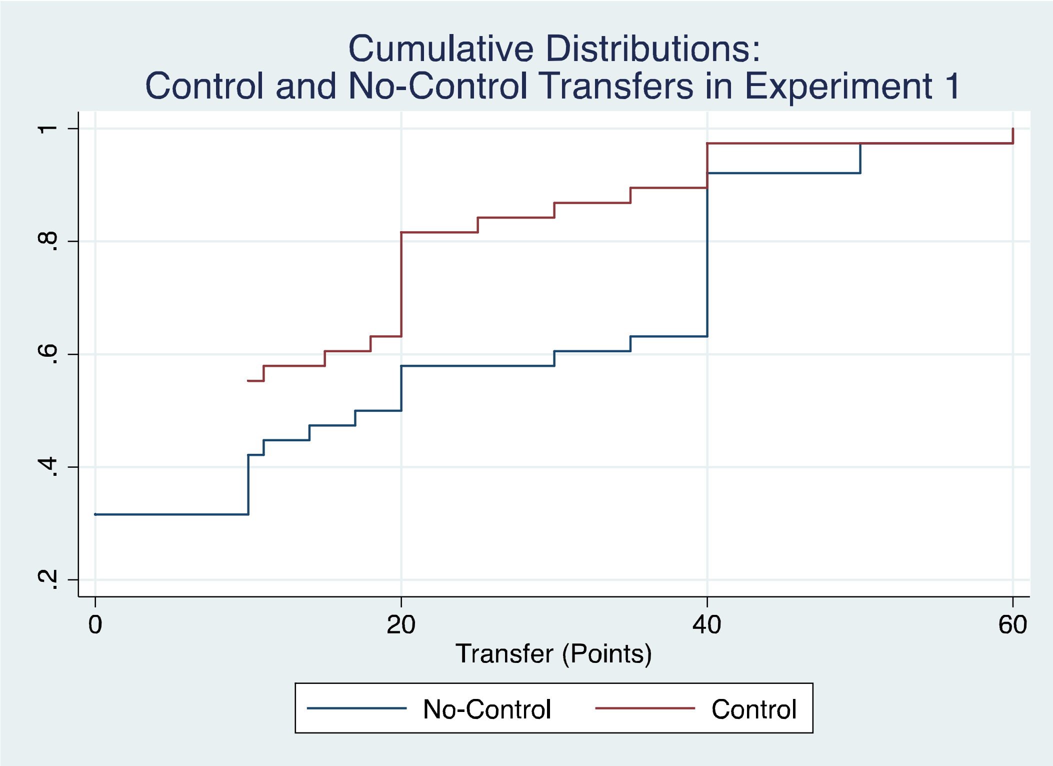

Figure 1: Cumulative Distributions of Transfers from Experiment 1 (C10), n = 38 Agents

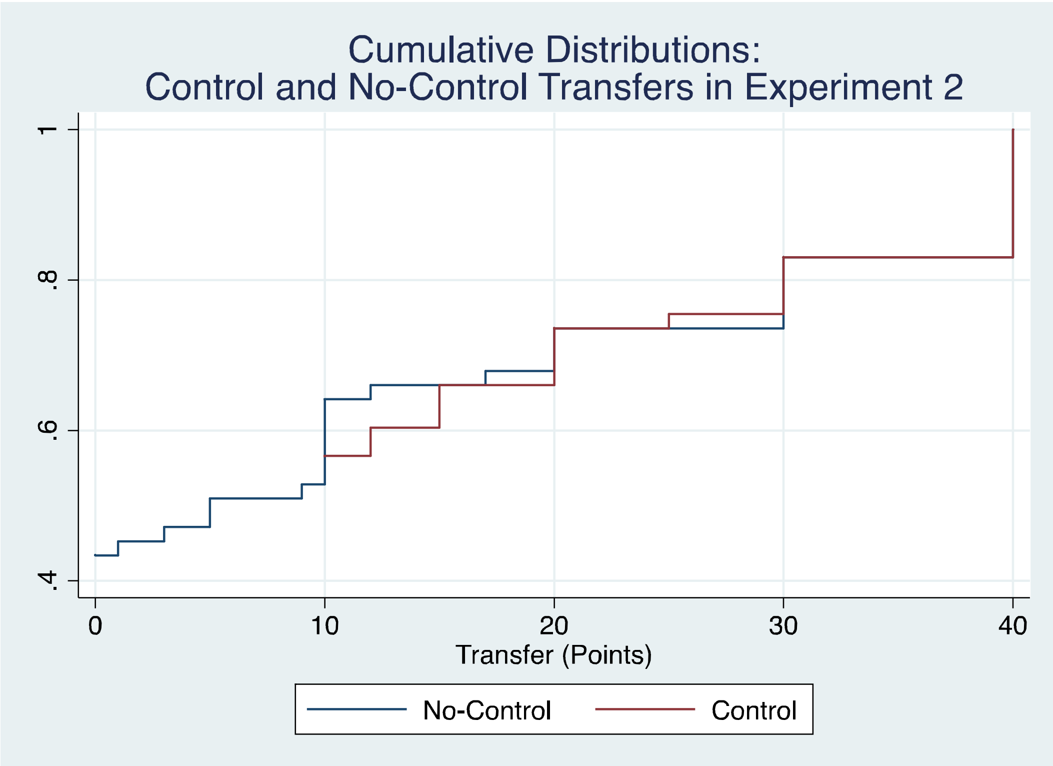

Figure 2: Cumulative Distributions of Transfers from Experiment 2 (TP10), n = 53 Agents

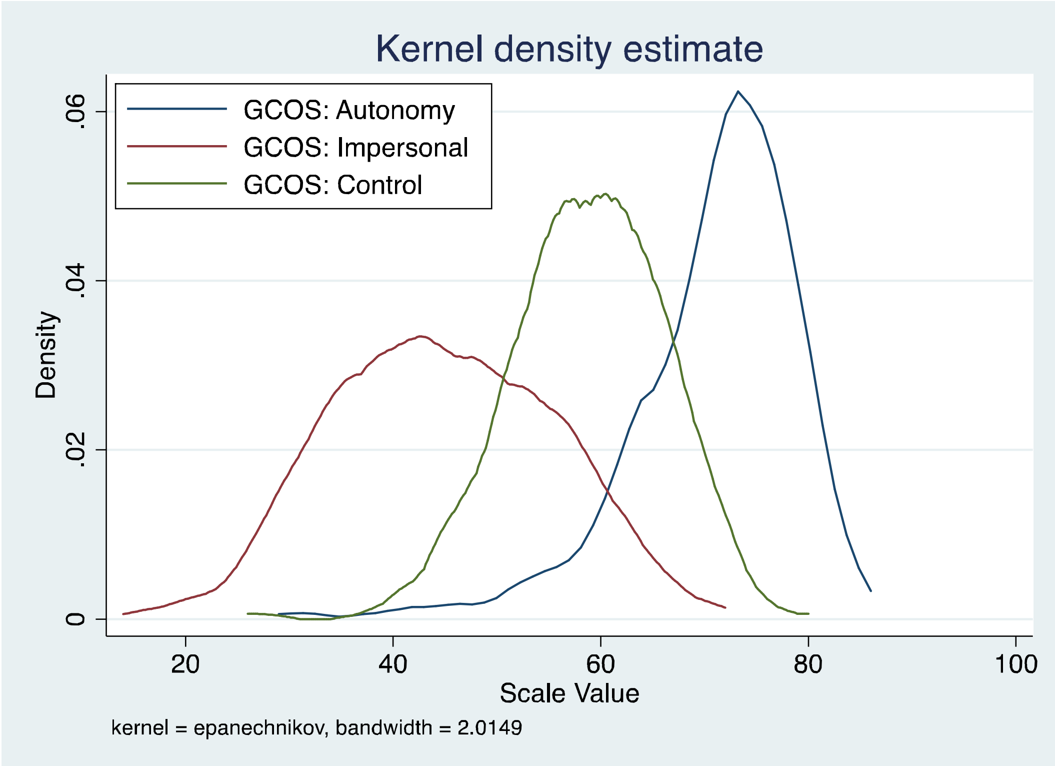

Figure 3: Kernel Density Estimates of the General Causality Orientation Scale Surveys, n=91 agents