Barcelona School of Economics

Master Degree in Economics and Finance

"Heavy is the Head": The Effect of Responsibility on Delegation

Authors:
Max Lanjouw
Yuan Lee
Vincent Pallud
Fritz Stern
Christoph Ziegler

Director:
Rodrigo Carril

3 June 2022

ABSTRACT IN ENGLISH:

When deciding for themselves whether to keep or delegate a decision-making right, individuals often fail to delegate even when doing so would yield a higher expected return. However, beyond the individual decision-making context, such decisions are frequently made by parties on behalf of themselves and others. Using an innovative experimental design we identify the effects of responsibility on delegation decisions. We find that being responsible for others leads to increased delegation in the face of both losses and gains. We further investigate the channels through which the responsibility effect operates and find fear of guilt/regret to be a more powerful motivator than the desire for power. Fear of social punishment is more powerful than both of these, however.

ABSTRACT IN SPANISH:

A la hora de decidir si mantener o delegar un derecho de decisión, los individuos suelen no delegar, incluso cuando hacerlo les reportaría un mayor rendimiento esperado. Sin embargo, más allá del contexto de la toma de decisiones individual, estas decisiones suelen ser tomadas por las partes en nombre de sí mismas y de otros. Utilizando un diseño experimental innovador, identificamos los efectos de la responsabilidad en las decisiones de delegación. Descubrimos que ser responsable de otros lleva a una mayor delegación tanto ante las pérdidas como ante las ganancias. Además, investigamos los canales a través de los cuales opera el efecto de la responsabilidad y descubrimos que el miedo a la culpa/el arrepentimiento es un motivador más poderoso que el deseo de poder. Sin embargo, el miedo al castigo social es más poderoso que ambos.

KEYWORDS IN ENGLISH: Responsibility, Control premium, Delegation, Agency, Decision rights

KEYWORDS IN CATALAN/ SPANISH: Responsabilidad, Prima de control, Delegación, Derechos de decisión

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Abstract

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Keywords: Responsibility, Control premium, Delegation, Agency, Decision rights

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Chapter 1

Introduction

1.1 Delegation

Both in professional environments and in daily life, people often encounter a choice between making their own decisions and delegating the decision-making authority to someone else. In other words, they can rely on their own judgement or on another agent to make a decision on their behalf. Typical examples of such choices include personal investment decisions – which many people delegate to financial advisors or index funds – and executives managing their subordinates.

According to standard economic theory, people should delegate such a decision whenever the expected payoff from deciding themselves is smaller than the expected payoff from delegating. These expected payoffs could differ for various reasons: people pass on the cost of making the decision, if any, to the agent, and may also delegate to agents who are better informed.

However, recent literature has found that people do not behave according to the predictions of standard economic theory. Fehr, Herz & Wilkening (2013) find that in an authority delegation game, individuals often retain authority even when delegating improves their expected income. Using a novel experimental design, Bartling, Fehr & Herz (2014) show that subjects value decision rights beyond their instrumental benefit. Other studies (Owens, Grossman & Fackler 2014, Bobadilla-Suarez, Sunstein & Sharot 2017) also report that people are willing to forgo a considerable amount of money in order to retain control and make decisions themselves. This value forgone is known as the *control premium*.

Hence, people often fail to delegate even though the expected payoff from delegating is higher than that from not delegating – they *under-delegate*. When individuals with

decision-making authority in organizations under-delegate, the organization performs less efficiently. The economic cost of under-delegation is not limited to sub-optimal decision-making: the inefficiency is exacerbated by the effect under-delegation has on motivation. Several studies suggest that principals retaining too much control leads to reduced effort provision from agents in response (Falk & Kosfeld 2006, Fehr, Herz & Wilkening 2013, Burdin, Halliday & Landini 2018).

1.2 Responsibility

Although all of these studies confirm the economic relevance of under-delegation, they ignore the fact that in the real world, people do not only make decisions for themselves – they also make decisions for others. For example, family heads make financial decisions on behalf of their family members, and executives make organizational decisions on behalf of shareholders. More generally, there are two types of group decision-making: *cooperative decision-making*, in which a group comes to a consensus before making a decision, and *dictatorial decision-making*, in which one person (or a small sub-group) is responsible for the group's decisions and outcomes. Cooperative decision-making has already been studied in Buffat, Praxmarer & Sutter (2020), but to our knowledge, the delegation of decision-making rights has not been studied in the context of dictatorial decision-making. The latter is what we set out to quantify using our experimental approach.

There is reason to believe that responsibility might have a considerable effect on how decision-making rights are valued. Edelson et al. (2018) found that, in group decision contexts in which subjects could decide between leading and following a group decision, individuals demonstrate responsibility aversion. In other words, they are less willing to decide for the group than they are for themselves. There is also a growing literature documenting the effects of responsibility on related behavioral domains. For instance, studies have found that responsibility makes people more risk-averse (Pahlke, Strasser & Vieider 2015, Atanasov 2015, Wang et al. 2018).

There are a number of channels through which responsibility might affect delegation decisions. One potential channel is the desire to avoid the guilt and regret associated with making the wrong decision which has been shown to be a powerful motive for delegating decision-making rights (Steffel & Williams 2018, El Zein, Bahrami & Hertwig 2019). Likewise, Mistry & Liljeholm (2018) identify a perceived cost associated with going against group consensus, even when the decision is inconsequential and the group is not made

aware of the dissenting opinion. Both the fear of regret and the desire for conformity may increase the cost of making a decision on behalf of a group, leading to more delegation.

On the other hand, individuals demonstrate a strong desire to remain self-reliant (Ferreira, Hanaki & Tarroux 2020) and experience considerable disutility from being overruled (Fehr, Herz & Wilkening 2013), which may increase the cost of delegating decision-rights and thereby reduce delegation. This effect may be further amplified by a desire for control: Wagner, Baumann & Hank (2016) find that some individuals value having control over others.

In addition to these inward-looking motivations, another avenue through which responsibility might have an effect on delegation decisions is that of extrinsic social image considerations. Often, the decision-maker is not anonymous and their dependents are aware of their identity. Consequently, the decision-maker's behavior may in part be determined by expectations regarding the social consequences of their decisions. Fear of social punishment for making sub-optimal decisions may be a particularly strong driver of delegation (Duch, Przepiorka & Stevenson 2015, Oexl & Grossman 2013, Bartling & Fischbacher 2012). Indeed, Nagatsuka, Nanba & Okada (2020) find that in contexts of reciprocity, control premia are significantly lower when partners are aware of each other's delegation decisions.

1.3 Our contribution

In this paper, we study the effects of responsibility on the choice to delegate decision-making rights to an outside agent. We distinguish between two channels: social visibility effects and inward-looking motives. To the best of our knowledge, we are the first to study the effect of responsibility on delegation decisions in such a context, as well as to make the distinction between the aforementioned channels.

We do so by extending the experimental design of Bobadilla-Suarez, Sunstein & Sharot (2017) to include two novel treatments which allowed us to determine, firstly, how responsibility for others changes how people delegate decision-making rights, and secondly, whether these changes are driven primarily by social image considerations or by inward-looking motives.

We observe a clear trend that suggests both the social visibility and inward-looking channels decrease the control premia, i.e. the amount of money people are willing to forego in

order to retain control over a decision, of individuals who are responsible for the outcomes of others. In general, inference on our results is limited by large standard errors, because resource constraints capped the size of our sample. Nevertheless, we find a statistically significant effect on control premia at the 5% level when the two responsibility channels are combined.

The paper proceeds as follows: Chapter 2 describes the experimental design in detail; Chapter 3 presents our main results; Chapter 4 discusses the validity of our study and potential extensions; and Chapter 5 concludes.

Chapter 2

Methods

We first discuss the overarching structure of our experiment, before describing the details of how the experiment was carried out and explaining some features of our experimental design.

2.1 Overview of experiment

Participants in our study were asked to make decisions, which they can do themselves or delegate to an external advisor with a known expected payoff. Participants were paid based on the outcomes of their decisions. They were able to directly calculate the expected returns from delegating to an advisor and their own true expected returns were held fixed by design. This allowed us to calculate the frequency with which they deviated from value-maximizing behavior, either by failing to delegate when optimal (*under-delegation*) or by delegating when doing so was sub-optimal (*over-delegation*), as well as calculate their respective control premia. To control for the participants' over- or under-confidence in their own decision-making ability, we also elicited the participants' self-perceived accuracy, enabling us to determine whether individuals made rational delegation decisions given their beliefs.

We divide participants ($N = 43$) into three groups at random.

Participants assigned to the *control* group made decisions only for themselves. They serve as our baseline comparison group. The control group also allows us to replicate the findings of prior literature, such as Bartling, Fehr & Herz (2014) and Bobadilla-Suarez, Sunstein & Sharot (2017).

In the anonymous responsibility treatment group (also known simply as the *responsibility* treatment), participants made decisions which determined the payoffs of each group member without their identity being revealed, thus shielding them from social image

consequences.

In the visible responsibility treatment group (also known simply as the *responsibility-with-identity* treatment), participants made decisions which determined the payoffs of each group member, but their identity was also revealed. Therefore, the responsible party under the responsibility-with-identity treatment should experience social image consequences.

Differences in delegation behavior between the control and the responsibility treatment measure the effect of responsibility through the inward-looking channel. Comparing the two treatments captures the effect of responsibility through the social visibility channel. The combined effect of responsibility through both channels is captured by the difference between the control and the responsibility-with-identity treatment.

2.2 Experiment procedure

Participants under the responsibility and responsibility-with-identity treatments were placed in groups of four. Everyone in each group was told that, after everyone in their group completed the decision-making tasks, one of them would be selected uniformly at random to be the responsible party for their group. Therefore, their choices in the decision-making tasks would affect their group's payoff with a probability of 1/4. In the responsibility treatment, participants were told that the identity of the responsible party for their group would not be revealed, but in the responsibility-with-identity treatment, they were told that the identity of the responsible party would be announced to everyone in the group. Participants in the control group were not placed in groups, and were told that their choices would only affect their own payoffs.

In every other aspect, the experiment looked identical to all participants.

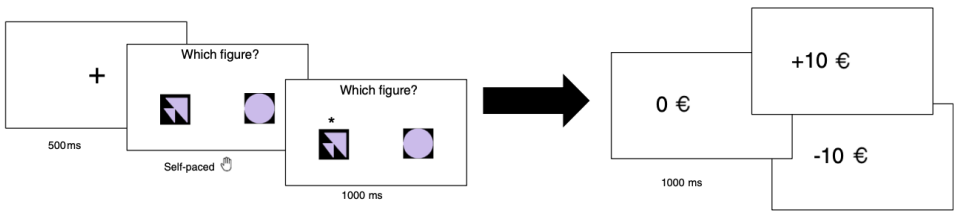


Figure 1: Choice between geometric figures.

2.2.1 Learning phase

In the first phase of the experiment, participants were introduced to the decision-making task. This learning phase had forty trials divided between two blocks: twenty trials in which participants could gain additional payments, and twenty trials in which participants stood to lose payments. In each trial, two geometric figures differing in color and/or shape were presented, as shown in Figure 1. There was one correct figure in each trial, and none of the trials presented a previously-seen figure. In the gain block, selecting the correct figure would earn them 10 euros per trial, and selecting the incorrect figure would earn them 0 euros. In the loss block, selecting the correct figure would lose them 0 euros per trial, but selecting the incorrect figure would lose them 10 euros.

Participants were instructed to select the correct figure each time and to look for a pattern if it existed. They were provided with immediate feedback: after each trial, they were informed whether they had selected the correct figure.

Crucially, the correct figure was determined at random, with no underlying rules or patterns. The expected value of a trial is $+5$ in the gain block and -5 in the loss block. This feature of the experiment controls for the objective skill of the participants: every participant is equally accurate at the decision-making task.

2.2.2 Delegation phase

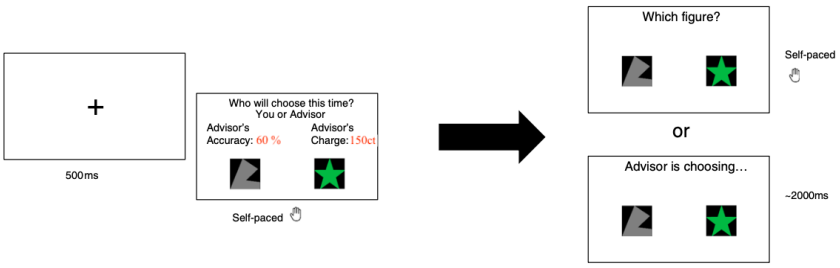


Figure 2: Choice to delegate to an external advisor or make the decision themselves.

After subjects gain familiarity with the task and can assess their own performance, a new feature was introduced. In the second phase of the experiment, participants were given the option to delegate the decision to an external advisor, as shown in Figure 2. If they did not delegate, they made the decision as in the learning phase. Otherwise, the advisor chose a figure for them. Like in the learning phase, the delegation phase had forty trials, with twenty each in the gain block and the loss block.

The participants were informed that the advisors were computer algorithms, each with a pre-determined accuracy, that charged a fee in the event of success. In each trial, the participants were shown the accuracy and fee of the advisor when they were asked to choose between delegating and not delegating. The accuracy and fee varied between trials. Participants were also informed that ten trials from each block would be selected at random to contribute to their final payoffs.

Feedback was not provided in the delegation phase. As participants were not told whether they or the advisor had selected the correct figure, they were unable to update their perceptions of their own skill or that of the advisors.

Upon finishing the delegation stage of the experiment, participant's were asked how accurate they were at predicting the correct shape on a scale from 1% to 99%. In this way we elicited their self-perceived accuracy.

2.2.3 Lottery phase

In the third and final phase of the experiment, participants completed a gambling task that was adapted from Charpentier et al. (2016). We used the gambling task to estimate their risk and loss aversion in the appropriate responsibility context. Risk attitudes may influence delegation choices because the probability that the advisor selects the correct figure differs from the participant's own probability (objective or self-perceived) of doing so. In particular, a more risk-averse individual may be willing to delegate to an advisor with a high fee as long as it has a high accuracy, whereas a less risk-averse individual with the same self-perceived accuracy may not be willing to do so.

The gambling task comprised sixty decisions between a 50-50 gamble and a safe option. Some of the gambles were gain-only and the remaining had both gain and loss outcomes. The participants were informed that ten trials from the gambling task would contribute to their final payoffs.

Charpentier et al. (2016) used a sophisticated procedure to generate gambles, so as to obtain better parameter estimates. We fit the data for each participant to a logit model to obtain the following parameters:

- the loss aversion parameter λ, which describes the participant's relative sensitivity of losses with respect to gains;
- the risk aversion parameter ρ, which describes the curvature of the participant's

utility function; and

- the logit sensitivity μ, which depends on how consistent the participant's choices are across trials.

In the logit model, the probability the participant accepted a gamble is taken to be

$$\mathbb{P}(\text{gamble accepted}) = \left[1 + \exp\left(-\mu\left(\frac{u(g_1) + u(g_2)}{2} - u(s)\right)\right)\right]^{-1}, \tag{2.1}$$

where $u(\cdot)$ is the participant's subjective utility function, g_1, g_2 are the two potential outcomes in the 50-50 gamble, and s is the outcome of the competing safe option.

The subjective utility of each option is given by

$$u(x) = \begin{cases} |x|^\rho & \text{if } x \geq 0, \\ -\lambda|x|^\rho & \text{if } x < 0. \end{cases} \tag{2.2}$$

We use the estimated parameters to control for risk and loss aversion when estimating participants' control premia.

2.3 Rational delegation

When is it rational to delegate the decision to the external advisor? For simplicity, we analyze this question in terms of expected values, but a similar analysis follows when we explicitly account for risk and loss aversion by using expected utilities.

Given the external advisor's accuracy and fee, the expected value from delegating is

$$\text{EV}_{\text{delegation}} = \begin{cases} \text{accuracy} \times (10 - \text{fee}) & \text{if gain block}, \\ \text{accuracy} \times (10 - \text{fee}) - 10 & \text{if loss block}. \end{cases} \tag{2.3}$$

For example, if the advisor's accuracy and fee are 60% and 150 cents respectively, the expected value from delegating is $0.6 \times (10 - 1.5) = 5.1$ in the gain block and -4.9 in the loss block.

As we established earlier, the participant should delegate when the expected value from delegating exceeds the expected payoff from deciding themselves. As participants have a

50% accuracy when deciding themselves,

$$\mathrm{EV}_{\text{self}}^{\text{objective}} = \begin{cases} 5 & \text{if gain block,} \\ -5 & \text{if loss block.} \end{cases} \tag{2.4}$$

Comparing $\mathrm{EV}_{\text{delegation}}$ and $\mathrm{EV}_{\text{self}}^{\text{objective}}$ gives the objectively rational delegation decision.

From the participant's perspective, however, they may perceive their own accuracy to be different from 50%. The subjective expected value from keeping the decision-making right would then be different from the objective expected value. We can compute the subjective expected value using the elicited self-perceived accuracy (SPA):

$$\mathrm{EV}_{\text{self}}^{\text{subjective}} = \begin{cases} \text{SPA} \times 10 & \text{if gain block,} \\ \text{SPA} \times 10 - 10 & \text{if loss block.} \end{cases}$$

The subjectively rational delegation decision is to delegate when $\mathrm{EV}_{\text{delegation}} > \mathrm{EV}_{\text{self}}^{\text{subjective}}$ and to decide themselves otherwise.

We check for robustness in our results by using both definitions of rational delegation.

2.4 Data analysis

We analyze the effect of responsibility on delegation in two ways.

2.4.1 Delegation rates

We test whether responsibility affected delegation rates using a randomization test. We prefer the non-parametric randomization test over parametric tests like the standard two-sample t-test, because the non-parametric test does not rely on distributional assumptions and is robust in small samples (Siegel 1957, Craig & Fisher 2019).

2.4.2 Control premia

We also estimate the control premium for each individual and treatment condition, because the control premium is an interpretable quantity that provides some insight into the extent to which participants deviate from rational delegation.

To do so, we first calculate each participant's indifference point, which is defined to be

the expected value of delegation: $\mathrm{EV}_{\mathrm{delegation}}$ at which the participant delegates with 50% probability. When the external advisor provides this expected value, the participant is said to be indifferent between delegating and keeping the decision-making right.

Then, the control premium is computed by subtracting the expected value of deciding themselves $\mathrm{EV}_{\mathrm{self}}$ from the participant's indifference point. This procedure gives us the expected value that the participant is willing to forgo to keep the decision-making right.

To calculate a participant's indifference point, we follow Bobadilla-Suarez, Sunstein & Sharot (2017) and estimate the following mixed-effects model: participant i under treatment condition c delegates to the external advisor in trial number t with probability $(1 + \exp(d_{ict}))^{-1}$, where

$$d_{ict} = u_{ic} + \mu_{ic} \left(\mathrm{EV}_{\mathrm{delegation}}\right)_{ict} + a_{ic}t + Z'_{ic}\gamma_c. \tag{2.5}$$

In the equation above, d_{ict} can be interpreted as the log odds ratio of delegation and Z_{ic} is a vector containing participant i's risk and loss aversion. The intercept u_{ic} consists of a fixed, treatment-specific component, as well as an individual random component drawn from a common Gaussian distribution for all participants. Likewise, the slope parameters for the advisor's expected value μ_{ic} and the trial number a_{ic} also comprise a fixed, treatment-specific component and an individual random component. The coefficients γ_c for risk and loss aversion only have a treatment-specific component.

Including the random intercept captures heterogeneity in the baseline inclination of participants to delegate decision-making rights. Similarly, the random slopes capture heterogeneity in the participants' sensitivity to changes in the advisor's expected value (in μ_{ic}) and their response to boredom or fatigue (in a_{ic}). As risk and loss aversion remain constant across all trials for each individual, we do not include random effects for risk and loss aversion (i.e. in γ_c).

Using the individual parameter estimates from our model, we can predict each participant's indifference points in the face of losses and gains separately. We then compute the control premium for this participant in a specific treatment condition.

We take the mean of these control premia across the participants in each treatment condition to estimate the condition-specific control premia. A positive control premium leads to under-delegation, whereas a negative control premium leads to over-delegation.

To be more consistent with the expected utility model of decision-making that we used to

estimate risk attitudes, i.e. equations (2.1) and (2.2), we can also estimate a mixed effects model but with expected utilities as regressors instead of expected values. In particular, we model the log odds ratio of delegation d_{ict} as a linear function of the excess expected utility that would be derived from delegating to the external advisor rather than keeping the decision-making right:

$$(\text{excess expected utility})_{ict} = \begin{cases} \text{accuracy}_{ict} \times u(10 - \text{fee}_{ict}) - 0.5 \times u(10) \\ \qquad\qquad \text{if gain block,} \\ \text{accuracy}_{ict} \times u(-\text{fee}_{ict}) + (1 - \text{accuracy}_{ict}) \times u(-10) \\ \qquad -0.5 \times u(-10) \quad \text{if loss block,} \end{cases} \tag{2.6}$$

$$d_{ict} = u_{ic} + \mu_{ic}\,(\text{excess expected utility})_{ict} + a_{ic}t + Z'_{ic}\gamma_c. \tag{2.7}$$

We recover the *utility-induced control premium* in monetary terms by defining it as the additional expected payoff we must give the participant when they choose correctly in order to make them indifferent between deciding themselves and delegating to the external advisor.

We focus on estimating control premia using the expected-values specification (i.e. the former specification), because the estimated control premia are easier to interpret and are consistent with the definition of Bobadilla-Suarez, Sunstein & Sharot (2017). For completeness, we also estimate utility-induced control premia (using the latter specification), but we expect the two specifications to give different numerical values since the risk aversion enters into the latter non-linearly.

In both specifications, we test whether the control premium is non-zero under a given treatment condition using the Wilcoxon signed-rank test. Finding a positive control premium for participants in the control group would replicate the results of Bobadilla-Suarez, Sunstein & Sharot (2017). We also test whether responsibility affected control premia using a randomization test.

Chapter 3

Results

3.1 Summary statistics

We recruited $N = 43$ master's students from the Barcelona School of Economics, and rewarded them for their participation in our experiment. The experiment lasted for about 25 minutes.

Summary statistics for our cohort of participants are shown in Table 1. About half of our participants are male, and they range in age from 21 to 32.

We find that most participants report a self-perceived accuracy close to the true accuracy (50%). However, this does not necessarily mean that the participants had a precise sense of their expected value from keeping the decision-making right because 50% is a typical heuristic people use when they are unsure of a probability.

Furthermore, we find that, on average, the estimated risk aversion parameter ρ is $0.9 < 1$, which indicates that our participants are slightly risk-averse. The distribution of ρ is highly concentrated around 1, but is more heavily weighted below 1 than above 1. This means that using expected values instead of expected utilities to determine rational delegation and indifference points should not have a big effect on the results.

We also check for balance in the pre-treatment variables, i.e. gender and age. We find no statistically significant differences between the control and treatment groups, suggesting that randomization between groups was successful.

3.2 Delegation rates

We now compare under- and over-delegation rates in the gain block and the loss block separately (Figure 3). In the discussion that follows, we define under- and over-delegation

Table 1: Summary statistics for each treatment group, and for the full sample.

	Min	Max	Mean	N
Group: Control				
Male	–	–	0.45	11
Age	22.00	32.00	24.82	11
SPA $\times 100$	15.00	90.00	48.73	11
λ	1.01	3.82	2.01	11
ρ	0.45	1.48	0.90	11
μ	0.19	3.77	1.39	11
Group: Responsibility				
Male	–	–	0.62	16
Age	21.00	31.00	24.81	16
SPA $\times 100$	0.00	70.00	51.44	16
λ	1.07	8.29	2.45	16
ρ	0.23	1.58	0.90	16
μ	0.12	4.24	1.42	16
Group: Resp. w/ ident.				
Male	–	–	0.62	16
Age	22.00	30.00	25.62	16
SPA $\times 100$	3.00	75.00	49.25	16
λ	1.06	5.37	2.47	16
ρ	0.43	1.34	0.91	16
μ	0.35	5.07	1.45	16
All subjects				
Male	–	–	0.58	43
Age	21.00	32.00	25.12	43
SPA $\times 100$	0.00	90.00	49.93	43
λ	1.01	8.29	2.34	43
ρ	0.23	1.58	0.90	43
μ	0.12	5.07	1.42	43

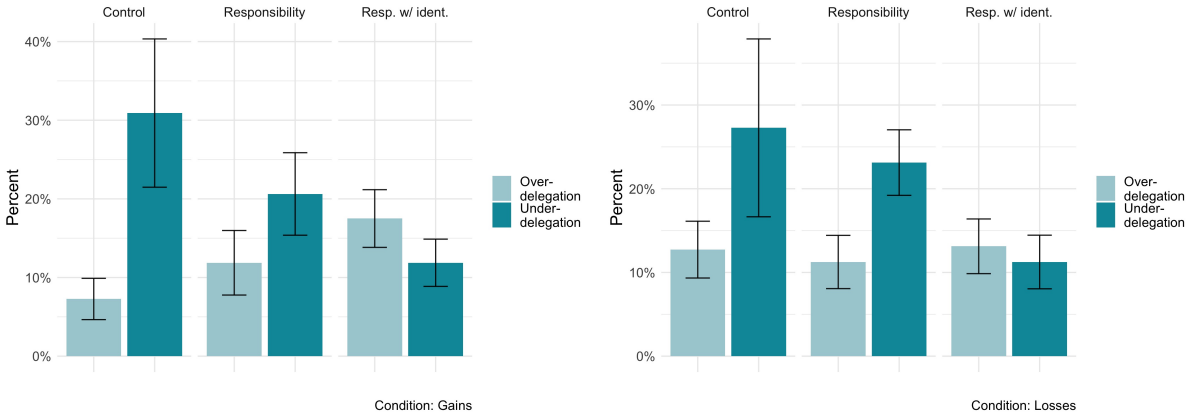
Table 2: Pairwise tests for balance between control and treatment groups. Differences in means from two-sample t tests are reported.

	Control v. Resp.	Control v. Resp. w/ ident.	Resp. v. Resp. w/ ident.
Male	-0.170	-0.170	0
	(-0.85)	(-0.85)	(0.00)
Age	0.00568	-0.807	-0.812
	(0.01)	(-0.72)	(-0.91)
Observations	27	27	32

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

with respect to the objectively rational delegation decision. All of our results are qualitatively similar when we use the subjective rational delegation standard, which controls for self-perceived accuracy.



(a) Gain block. *(b)* Loss block.

Figure 3: Mean under- and over-delegation across treatments. Error bars are bootstrapped standard errors, which are numerically similar to the analytical standard error of the mean.

We observe more under- than over-delegation in the control group across gains and losses, which is consistent with prior literature (Bartling, Fehr & Herz 2014, Bobadilla-Suarez, Sunstein & Sharot 2017). In particular, there are systematic patterns in the deviations from rational delegation committed by participants: they appear to value keeping the decision-making right much more than delegating to the external advisor. This would explain the high share of missed opportunities to delegate when it was rational to do so, and the low share of delegations when it was rational not to.

In the gain block, under-delegation decreases from the control group to the anonymous treatment group, then to the visible treatment group. Conversely, over-delegation increases from the control group to the anonymous treatment group, then to the visible treatment group, which is the opposite trend to under-delegation. However, the differences in over-delegation are smaller than the corresponding differences in under-delegation.

In summary, we observe that the introduction of responsibility is associated with increased delegation, and the effects are stronger for the visible than for the anonymous treatment.

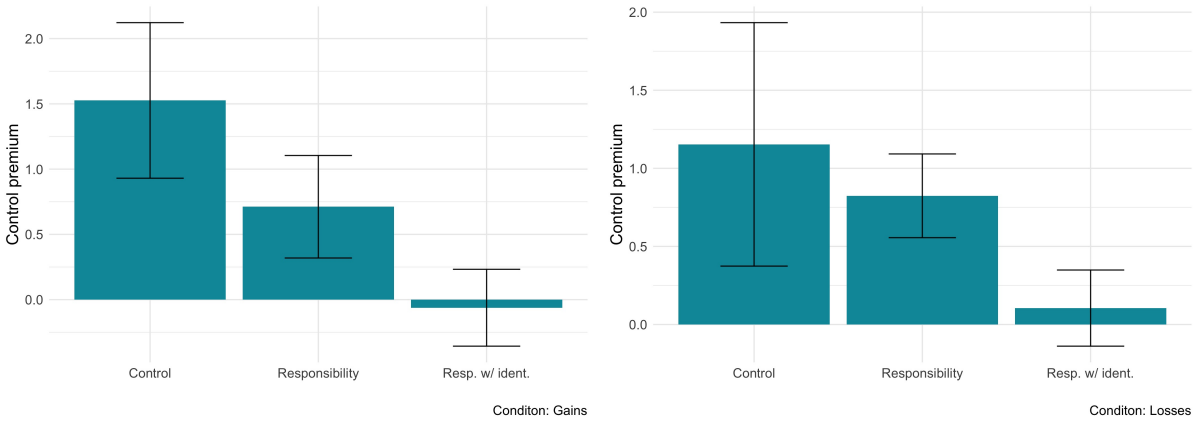
In the loss block, we generally observe the same pattern as for gains, except that over-delegation varies even less across treatments. The general interpretation that responsibility induces more delegation still holds.

We can test for statistically significant differences in delegation rates between groups, but our experiment has limited statistical power due to its small sample size. Nevertheless,

Figure 3 provides compelling evidence for the effect of responsibility on delegation, even with the statistical uncertainty that results from small sample sizes.

Notably, we still found statistically significant differences when comparing mean under- and over-delegation rates across treatments. In particular, we found that for the gain block, under-delegation rates in the control group and the visible treatment group are significantly different at the 5% level (two-sided randomization p-value $= 0.02$). The corresponding difference in the loss block is significantly different at the 10% level (two-sided randomization p-value $= 0.07$). As the differences between the control and anonymous treatment groups are smaller in magnitude, we do not observe statistically significant effects in over- or under-delegation rates in this case.

3.3 Control premia



(a) Gain block. *(b)* Loss block.

Figure 4: Mean control premia across treatments. Error bars are bootstrapped standard errors, which are numerically similar to the analytical standard error of the mean.

We estimate control premia using the expected-values specification in the gain block and the loss block separately (Figure 4). All of our results are qualitatively similar when we use the expected-utilities specification of the mixed effects model. They are also robust to controlling for self-perceived accuracy.

In general, we observe positive control premia for the control group and the anonymous treatment group in both the gain and loss blocks. Individuals seem to be willing to forego value in order to keep a decision-making right, instead of delegating it to the external advisor.

The mean control premium in the gain block is highest in the control group (1.53 euros),

second highest in the anonymous treatment group (0.71 euros) and negligible in the visible treatment group (−0.06 euros). We observe the same patten for the loss block. These results are consistent with evidence from over- and under-delegation rates.

Therefore, responsibility appears to decrease the control premia of individuals. This trend in control premia suggests that the additional power endowed by responsibility has a weaker effect than guilt or regret: the desire to have power over others should drive up control premia when responsibility is introduced, whereas the potential for guilt or regret should have the opposite effect.

We also observe that the decrease in control premia is stronger for visible responsibility than for anonymous responsibility, suggesting that the fear of social punishment is a strong motive for delegating decisions.

Quantitatively, our experiment is still limited by low statistical power due to its small sample size. Nevertheless, we find that the average control premium is significantly different from zero at the 10% level in the gain block of the control and anonymous responsibility groups. (Wilcoxon p-values = 0.05 and 0.08 respectively.)

Furthermore, in the gain block, we find significant differences between the mean control premium of the control group and the visible responsibility group at the 5% level (two-sided randomization p-value = 0.02). However, we do not observe significant effects in the loss block due to the large statistical uncertainty of our estimated control premia.

Chapter 4

Discussion

In our experiment, we have to contend with low statistical power due to the small sample size of our experiment. Accordingly, our results have only limited statistical significance.

In addition to small sample concerns, there may be other limitations to our experimental design which have implications for the interpretation and generalizability of our results. Although random assignment to treatment conditions in theory provides the necessary identifying variation, we examine whether other common threats to inference apply to our experimental design and implementation.

Given that we conducted the study over multiple days and our participants were peers, we might observe stronger experimental effects (e.g. due to the Hawthorne effect) than usual. To combat this, we followed the same procedure for the administration of treatments so as to hold experimental conditions constant across sessions and urged participants not to discuss the experiment between sessions. Including session dummies in our analysis does not alter our results, seemingly indicating that these measures were successful.

The results cannot be explained by overconfidence on the part of the participant, as controlling for self-perceived accuracy does not meaningfully change the results. Nor can they be attributed to uncertainty over the expected value of the advisor, as the advisor's accuracy and fee were explicitly given. Furthermore, the advisor was referred to as an algorithm with pre-determined selections to account for potential moral hazard concerns on the part of the participants.

We acknowledge that our measure of self-perceived accuracy is not perfect. Firstly, the frequency with which 50% was selected as a participant's self perceived accuracy may be the result of a commonly observed heuristic in the face of uncertainty, rather than a reflection of accurately-perceived skill. Secondly, for those not stating 50% but actually making an estimate, it could be a concern that subjects are impacted by a social norm

according to which they might negatively judge a very high self perceived accuracy and therefore state a lower accuracy than they truly perceived. Consistent under-reporting of self perceived accuracy relative to true perceptions of accuracy would lead to considerably higher under-delegation rates when controlling for self perceived accuracy. Given the nature of the visible responsibility treatment, concerns over perception might be particularly salient for participants in this group. Subsequently, we would expect a particular increase in under-delegation in this treatment group when controlling for self perceived accuracy. Indeed, we find under-delegation increases when controlling for self perceived accuracy, and particularly so in the visible responsibility treatment group, raising concerns of potential under-reporting. Nevertheless, the trend of lower rates of under-delegation in the responsibility treatments persists.

Another possible concern is that our results are driven by an inability to properly estimate expected values. If individuals in the responsibility treatment concentrate more and as a result delegate more optimally, then the results we observe in the individual context may not be reflective of preferences but simply a lack of effort. There are two reasons to discount this possibility. Firstly, there is no significant difference in reaction times across treatments (two-sample Wilcoxon p-values > 0.09 for both blocks and all combinations of groups), which indicates that those in the responsibility contexts did not spend more time working out their decisions. Secondly, if a lack of skill were driving the sub-optimal delegation behavior we observe in the individual context, we would expect no significant divergence between over- and under-delegation. Instead, we observe consistently higher under-delegation rates, indicating that sub-optimal delegation is not the result of a lack of skill or effort, but of individual preference.

A more concerning experimental design issue could be that the effect which we attribute to responsibility is being driven solely by social image concerns that are not related to responsibility. For instance, if participants in the visible responsibility treatment put more effort into making a correct delegation decision only because they knew the results would be visible to others, this would threaten our interpretation of the effect of responsibility on delegation decisions. Given our limited power it is unsurprising that we find no significant difference between our control and anonymous responsibility treatments, but this result means that we cannot statistically rule out the aforementioned possibility. However, there are two reasons to believe that this is not the case. Firstly, as stated previously, we observe no significant differences in mean reaction times between either of the three groups, which suggests that there are no effort differences between groups. (Admittedly,

our limited power makes this argument less convincing.) Secondly, if social visibility causes closer-to-rational delegation behavior, we would not expect the observed rise in over-delegation. Neither of these arguments rule out the possibility that social visibility simply leads to increased delegation, and that this is the effect driving our results. To cleanly test this alternative hypothesis, we would encourage future researchers to include an individual decision treatment, without responsibility, but for which results are made visible to all. Such a treatment was not feasible in our setting, given our already small sample size.

The sample of participants may also be a source of concern, both for the validity and generalizability of our results. Regarding generalizability, all participants were graduate students enrolled at the Barcelona School of Economics. While they are culturally diverse, the shared educational background may have implications for our results. In general, economics students have been shown to behave more in accordance with economic standards of rationality than the general population (Carter & Irons 1991), which implies that our results may underestimate the true extent of under-delegation in both individual decision-making and responsibility contexts. The lower levels of under-delegation we observe relative to those observed by Bobadilla-Suarez, Sunstein & Sharot (2017) would seem to support this hypothesis. The limited age range of participants further limits the external validity of our results. It is possible that the responsibility effect differs across age groups. Young people, for example, may be particularly sensitive to social image concerns.

An even more significant concern relating to our subject pool is the recruitment strategy. Since we could not use a prefabricated subject pool, we personally recruited a sample of our peers. This approach could have significant implications for our results, as individuals with higher social image concerns were possibly less likely to reject our invitation to the experiment. Consequently our findings might overestimate the effects of social visibility relative to the general population. Moreover, it is possible that participants, given their status as our peers and the manner in which they were approached, may have deemed the possibility of losing money a non-credible threat. If this were the case, it may have diminished the effect of the loss block across all treatments. Given that fear of social punishment is strongly related to negative outcomes, this may have been particularly salient for the visible responsibility treatment group. If anything, however, this would have biased our observed social visibility effect downwards, leading us to underestimate the true social visibility effect. Both of these possible sampling effects point towards the

importance of replicating our findings with a different recruitment method and subject pool.

Finally, the relatively small number of trials we run in both the gains and loss blocks (twenty) may be of concern. A larger number of trials would have allowed for more effective calibration of our mixed effects model, thereby improving the accuracy of our control premium estimates. While this may reduce the credibility of the control premia level estimates, it affects all treatment groups and is therefore unlikely to explain the observed trends. The validity of the observed trend in control premia is further supported by the fact that we observed similar trends in over- and under-delegation rates, and these trends did not require estimation using the mixed effects model.

Our study raises several avenues for further research. Firstly, extending our study across age groups and educational backgrounds could provide additional insight into the effect of responsibility on delegation decisions in the general population. Another extension with potential is the analysis of heterogeneity across genders, which we explore further in a forthcoming co-study. Alternative formulations of responsibility may also be a fruitful subject of research. While we take two extreme cases, in reality the degree of visibility and share of responsibility varies considerably, with possible implications for delegation decisions. Finally, we further the literature on responsibility and decision-making by studying responsibility and delegation outcomes, but there are many other outcomes which may conceivably be affected by the addition of responsibility.

Chapter 5

Conclusion

In conclusion, we find that introducing responsibility causes individuals to under-delegate less often and decreases their control premia.

Our experimental design allows us to check whether these effects are driven by social image considerations. We indeed find that these seem to matter. The decrease in both under-delegation rates and control premia is less pronounced when we allow the responsible party to remain anonymous. Qualitatively, however, the effects remain the same: individuals delegate more rationally when they are responsible for the payoffs of their group members.

In this study, we have focused on delegation decisions. Other literature on decision-making predominantly focuses on individuals affecting solely their own payoffs. It would be interesting to study whether our results generalize to other settings beyond delegation decisions.

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