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ABSTRACT

Locus of Control and the Preference for Agency*

We conduct a laboratory experiment to study how locus of control operates through people's preferences and beliefs to influence their decisions. Using the principal-agent setting of the delegation game, we test four key channels that conceptually link locus of control to decision-making: (i) preference for agency; (ii) optimism and (iii) confidence regarding the return to effort; and (iv) illusion of control. Knowing the return and cost of stated effort, principals either retain or delegate the right to make an investment decision that generates payoffs for themselves and their agents. Extending the game to the context in which the return to stated effort is unknown allows us to explicitly study the relationship between locus of control and beliefs about the return to effort. We find that internal locus of control is linked to the preference for agency, an effect that is driven by women. We find no evidence that locus of control influences optimism and confidence about the return to stated effort, or that it operates through an illusion of control.

JEL Classification: D83, D87, D91

Keywords: locus of control, preference for agency, decision-making, beliefs, optimism, confidence, illusion of control

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1 Introduction

Locus of control emerged as a psychological construct more than 60 years ago. At the time, clinical psychologists were striving to understand why some people change their behavior more than others in response to new experiences (Marks, 1998). In his seminal work, Rotter (1954, 1966) offered an explanation rooted in social learning theory. He argued that people's anticipation of future reinforcement (i.e., punishment or reward) is heightened if they believe that reinforcement is contingent upon their own behavior than if they do not. Because their previous experience with reinforcement varies, people will differ in their "generalized attitude, belief or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences" (Rotter, 1966, p. 2). Those with an internal locus of control believe that reinforcements are the result of their own effort; those with an external locus of control believe that reinforcements are attributable to forces (e.g., luck, powerful others) outside of their personal control.[1]

People's beliefs about the controllability of what happens to them is at the heart of human agency (Bandura, 1989). The motivation to exert effort, pursue goals, and persevere in the face of obstacles rests on the belief that one's actions have the potential to lead to the desired result (see Atkinson, 1964; Bandura, 1986, 1989; Goldsmith et al., 2000; Skinner, 1996). Similarly, "before a person applies any specific self-controlling skill, he must believe that he can control his own behavior without outside help" (Rosenbaum, 1980, p. 111). Motivation, therefore, is a key mechanism through which external control perceptions may dampen people's responsiveness to incentives. In short, there is little reason to respond to incentives by exerting effort if there is no belief that it will have meaningful consequences.

Seen in this light, it is not surprising that locus of control has been linked to life outcomes. Economists have linked an internal locus of control to increased investments in education, on-the-job training, job search, savings, health, internal migration, prosocial behavior, technology adoption, insurance, and parenting.[2] Similarly, management studies have shown that those with an internal locus of control approach leadership roles differently. They are less

[1] Psychologists point to the link between children's locus of control and the parenting they receive (Crandall & Crandall, 1983; Krampen, 1989; Nowicki et al., 2018), while recent evidence suggests there may be a neuroanatomical basis for the belief that one's efforts are rewarded (Hashimoto et al., 2015).

[2] See the following: education (Barón & Cobb-Clark, 2010; Coleman & DeLeire, 2003; Piatek & Pinger, 2016); on-the-job training (Caliendo et al., 2022); job search (Caliendo et al., 2015; McGee, 2015); savings (Cobb-Clark et al., 2016; Salamanca et al., 2020); health (Cobb-Clark et al., 2014); migration (Caliendo et al., 2019); prosocial behavior (Andor et al. 2021); technology adoption (Abay et al., 2017); insurance (Bonsang et al., 2021); and parenting (Lekfuangfu et al., 2018). Cobb-Clark (2015) and Ng et al. (2006) provide overviews of the role of locus of control in the labor market. While an internal locus of control is usually associated with more favorable outcomes, this is not always the case. Internals are more likely to search for patterns in random data and make inconsistent investment choices (Pinger et al., 2018).

likely to rely on statistical models rather than their own judgment—unless they have been involved personally in model development (Kaplan et al., 2001)—and to consult others when making decisions (Selart, 2005). Internals are also more likely to be chosen as leaders (Anderson & Schneier, 1978; Popper et al., 2004). They lead more effective and productive work units (Johnson et al., 1984); have more transformational, flexible, and innovative leadership styles (Howell & Avolio, 1993; McCann & Sparks, 2019; Miller & Toulouse, 1986; Miller et al., 1982); and may be better able to adapt to rapid environmental changes (Anderson et al., 1977).

Less is known about the behavioral mechanisms linking locus of control to these outcomes. Economists relate locus of control to decision-making through its role in shaping expectations about the returns to effort (Caliendo et al., 2015; Coleman & DeLeire, 2003; McGee, 2015; McGee & McGee, 2016). However, the reliance on observational data makes it challenging to definitively rule out confounding factors and investigate other possible channels that can only be measured in a controlled environment. In particular, the fact that "not only do internals perceive greater control, but they will actually seek out situations in which control is possible" (Spector, 1982, p. 483) suggests that locus of control may also operate through a preference for agency. There is also a potential for locus of control to drive outcomes through perceived investment risk (Salamanca et al., 2020), the desire to perform well (Borghans et al., 2008) or behavioral biases, such as an illusion of control (Pinger et al., 2018).

Understanding how locus of control affects decision-making is important. The optimal design of the incentive structures, contracts, and policies used to motivate behavior is contingent on the specific mechanisms linking agents' sensitivity to incentives to their locus of control.[3]

We conduct a laboratory experiment to study how locus of control operates through people's preferences and beliefs to influence their decisions. Our setting is the delegation game, introduced by Bartling et al. (2014), in which the principal may either retain—or delegate to an agent—an investment decision that generates payoffs for both. The delegation game employs a stated-effort design, involving the choice of a numerical level of effort associated with clear costs and payoffs that are independent of individual characteristics. Stated-effort designs are useful for testing theory, even though real-effort designs, in which performance on a task determines outcomes, may more closely match the study of psychological traits in a field environment (Charness et al., 2018). In our study, a stated-effort design allows us to effectively eliminate the potential for locus of control to operate through differences in the cost or productivity of effort so that we can clearly examine other mechanisms. As unobserved heterogeneity in effort cost and productivity is arguably the most important

[3]See Cobb-Clark (2015) for a discussion in the context of self-control.

confounding factor in observational studies, our research adds considerable clarity to the existing empirical evidence on the behavioral consequences of locus of control.

Our primary contribution is to shed light on several key channels that conceptually link locus of control to decision-making under uncertainty. These are: (i) the preference for agency; (ii) optimism and (iii) confidence regarding the return to effort; and (iv) illusion of control. Reflecting the conceptual origins of locus of control, each can be precisely measured in the laboratory (Bartling et al., 2014; McGee & McGee, 2016).

Our study is the first to investigate whether those who believe that their life outcomes are shaped by their actions have a stronger preference for agency, that is, whether they place a higher intrinsic value on making their own decisions. Our finding that having an internal locus of control is associated with a stronger preference for agency leads us to conclude that locus of control operates, at least in part, as a preference parameter. This represents a new channel linking locus of control to decision-making which has not previously been considered in the economics literature.

Locus of control may also drive behavior through the beliefs that people have about the return to effort. In particular, psychologists argue that those with an internal locus of control are more optimistic about the chances that their own effort will be positively reinforced. In observational settings involving real effort, locus of control is often linked to expectations about the return to effort (Caliendo et al., 2015, 2019, 2022; Coleman & DeLeire, 2003; Lekfuangfu et al., 2018). In a laboratory experiment, however, McGee and McGee (2011) find evidence of a relationship between locus of control and experimental outcomes only when using a real-effort study design; they find no relationship in a stated-effort setting. Consequently, they conclude that "locus of control appears to strongly influence search behavior only when uncertainty surrounds the role of real effort" (McGee & McGee, 2011, p. 18). We reexamine this important proposition in the context of the delegation game. Specifically, we introduce a delegation game with unknown return to effort, requiring the principal to form beliefs about the return to the effort. This brings our laboratory environment closer to more realistic decision environments which are often characterized by considerable uncertainty about the payoff from exerting effort.

Importantly, we take a broad perspective in examining expectations about the return to effort. We extend the literature by testing whether those with an internal locus of control are more optimistic and/or more confident in their expectations about the return to effort. There appear to be no studies linking locus of control to optimism, and we are aware of only one study investigating the potential for locus of control to operate through expectations about the variability of investment return, that is, confidence. Specifically, Salamanca et al. (2020) find that those who are internal perceive less risk, but higher returns, in the context

of financial investments. We also test whether an illusion of control—manifested as biased beliefs about the importance of one's actions in driving outcomes—provides an explanation for differences in the decision-making of those with an internal versus external locus of control. Recent experimental evidence supports this hypothesis by demonstrating that those with an internal locus of control are more likely than their external counterparts to attribute a succession of favorable random events to their own actions (Pinger et al., 2018).

Our findings paint a consistent picture. There is no evidence that locus of control operates through the expectations that people form about the return to stated effort. Locus of control is not related to either optimism or confidence about the return to effort; nor does it stem from an illusion of control. This may explain why we, like McGee and McGee (2011), find that uncertainty about the return to stated effort also does not appear to drive behavioral outcomes. In fact, locus of control has a weaker, not stronger, relationship with investments in effort when the returns are unknown rather than known. Other evidence that locus of control is linked to expectations about the return to real effort in both laboratory (McGee & McGee, 2016) and real-world settings (Caliendo et al., 2015, 2019, 2022; Coleman & DeLeire, 2003; Lekfuangfu et al., 2018) indicates that there is a pressing need to understand why locus of control is much more salient in one context than the other.

As a final step, we extend the contribution our research makes by explicitly considering whether the relationship between locus of control, on the one hand, and preference for agency, beliefs about effort, and effort decisions, on the other, is gendered. Our motivation stems from two observations. First, many previous studies of the role that locus of control has in decision-making do not explicitly consider gender. Those that do, however, often conclude that the extent to which one is internal shapes key human capital investments and employment outcomes for men, but not women.[4] Given this, there is little reason to believe that gender will be irrelevant in our setting. Second, men and women often differ in their risk attitudes and desire to compete (e.g., Croson & Gneezy, 2009; Eckel & Grossman, 2008; Niederle, Vesterlund, et al., 2011) which has the potential to also translate into a gender gap in the preference for retaining rather than delegating decision-making control. Very few studies measuring the intrinsic value of decision-making account for gender, however. The single exception is Ferreira et al. (2020) who find no gender differences in the preference for agency among Japanese and French laboratory participants.

Our results, in contrast, indicate that women have a stronger preference for agency than do men. This constitutes a new finding in the literature, opening the door for future research

[4]This includes: (i) education (Coleman & DeLeire, 2003; Findley & Cooper, 1983; Nowicki & Strickland, 1973); (ii) internal migration (Caliendo et al., 2019); (iii) job search (Caliendo et al., 2015); (iv) occupational attainment (Cobb-Clark & Tan, 2011); and (v) entrepreneurial skills (Hansemark, 2003).

on the role of gender in the decision to delegate. Moreover, women's preference for retaining control is significantly higher the more internal they are, while the intrinsic value that men place on retaining control over decision-making is unrelated to their locus of control. Interestingly, there are no gender differences in the relationship between locus of control and beliefs about the return to effort; locus of control does not seem to operate through optimism, confidence, or an illusion of control for either men or women. Finally, the association between locus of control and effort investments is stronger for both men and women when the return to stated effort is known than when it is unknown. Among women, an internal locus of control and investment in effort are positively related when the return is known, but are unrelated when the return is unknown. Men's locus of control is not related to their investment in effort when the return is known, though there is a negative relationship when the return to effort is unknown.

Our research adds weight to other studies that use laboratory settings with well-structured economic incentives to examine the role of personality traits in economic choice (see Bruttel & Fischbacher, 2013; McGee & McGee, 2016; Pinger et al., 2018). This emerging experimental literature is an important advance over studies that traditionally have paid little attention to the way that personality traits shape responses to incentives (Engelmann et al., 2019). More broadly, our research findings contribute to a deeper understanding of the ways that key personality traits, like locus of control, may be expressed through people's preferences and beliefs to shape decision-making.

2 Conceptual Framework

2.1 Model

We begin by developing a stylized model to characterize the decision-making environment in our experiment. This allows us to illustrate the various channels through which locus of control might influence decision-making and to formulate our hypotheses. In the model, a principal (*she*) faces the choice between retaining control over an investment decision and delegating the decision to the agent (*he*). When the principal retains control, her decisions determine her payoff. When she delegates, the decisions of the agent determine the principal's payoff.

The principal chooses two parameters. The first is the minimum level of effort ($\underline{e}$) the agent must invest in his project so that the principal delegates the investment decision. Let us denote x_s^A as the payoff for the principal in the case of success of the project chosen by the agent and x_f her payoff in the case of failure. The level of effort invested in the project

fully determines the chance of success, p. Skill or any other personal characteristics do not influence the chance of success. The principal's choice of $\underline{e}$ indicates the minimum expected payoff she requires for delegation, defined as follows:

$$p(\underline{e}) \cdot x_s^A + (1 - p(\underline{e})) \cdot x_f. \tag{1}$$

The second parameter chosen by the principal is the level of effort (e) she will invest in her project if she retains control. Let us denote x_s^P as the payoff for the principal if her project is successful. The principal's payoff in case of failure of her project is identical to her payoff in case of failure of the agent's project, denoted x_f. When the principal retains control over the investment decision, however, she bears the cost of effort $c(e)$.[5] The principal's choice of e determines her total expected payoff if she retains control over the investment decision, defined as follows:

$$p(e) \cdot x_s^P + (1 - p(e)) \cdot x_f - c(e). \tag{2}$$

The difference between the minimum expected payoff the principal needs to delegate (equation 1) and her total expected payoff if she retains control (equation 2), indicates the extent to which the principal requires compensation to delegate the decision. We denote this difference v_d, which represents the intrinsic value of making decisions:

$$v_d = p(\underline{e}) \cdot x_s^A + (1 - p(\underline{e})) \cdot x_f - [p(e) \cdot x_s^P + (1 - p(e)) \cdot x_f - c(e)]. \tag{3}$$

The parameter v_d will be positive if the principal attaches value to being in control of her outcomes, and negative if she dislikes being in control of her outcomes. For example, consider a principal who expects a total payoff of 100 monetary units if she retains control of the decision and is willing to delegate if she expects a payoff of at least 110 monetary units. In this case v_d equals 10. This indicates that the principal intrinsically values retaining control of the investment decision. Alternatively, if the principal is willing to delegate if she expects a payoff of at least 95 units, v_d equals -5. This indicates that the principal dislikes retaining control of the investment decision.

[5]The cost of effort $c(e)$ is increasing with the level of effort ($c' > 0$ and $c'' > 0$).

We assume that the principal's utility depends on two arguments. The first is the principal's intrinsic value of making the investment decision (v_d). The second is the return of the investment decision (R), determined by whether the principal gets a high payoff in the case of success (x_s) or a low payoff in the case of failure (x_f), and the chance of success (p). The principal chooses her own level of effort (e) and the minimum level of effort ($\underline{e}$) required for her to delegate (which jointly determine v_d) to maximize the following utility function:

$$U\left(v_d, R\left(x_s,\ x_f,\ p\right)\right) = p(e) \cdot u(v_d + x_s - c(e)) + (1 - p(e)) \cdot u(v_d + x_f - c(e)). \tag{4}$$

2.2 Hypotheses

Locus of Control and Preference for Agency

Conceptually, there is a logical link between having an internal locus of control and preferring to make one's own decisions. After all, internals tend to believe their life chances result from the choices they make or the actions they take. Moreover, psychologists argue that there is a relationship between locus of control and self-efficacy, i.e., the belief that one can produce a desired result in a specific context. Those with an internal locus of control may be more likely than their external counterparts to believe that they can achieve better outcomes by retaining rather than relinquishing control.[6] For both reasons, locus of control may go hand in hand with an intrinsic preference for making the decisions that influence one's own life chances (see Spector, 1982). While we know that many people exhibit a preference for agency, the role of personality traits in general, and locus of control in particular, in explaining this preference has not been previously examined. We test the following hypothesis:

Hypothesis 1. Internals attach a greater intrinsic value to retaining control of their investment decisions relative to externals.

In our model, this would imply that v_d is increasing with internal locus of control (loc), as follows:

[6]Locus of control is conceptually different from self-efficacy (Bandura, 1986). While locus of control is a general personality trait, self-efficacy (i.e., the belief in one's capacity to achieve goals) is task-specific. This implies that, for example, someone who is internal may have the expectation that obtaining excellent grades grants admission to medical school and, consequently, a high income and social status, but they may lack self-efficacy—that is, they do not believe it is possible for them to personally achieve these necessary grades (Bandura, 1986).

$$v_d'(loc) > 0. \tag{5}$$

Locus of Control and Beliefs about the Return to Effort

Internals may also expect a different return on their effort than externals. People who believe that success largely depends on their own actions may, in turn, expect a different return to the choices they make and the effort they expend than do those who attribute life's outcomes to luck or external factors. Coleman and DeLeire (2003) were the first to formalize this idea in the context of human capital investments, demonstrating that locus of control drives educational attainment by influencing adolescents' beliefs about the return to education. Since then, locus of control has been empirically linked to numerous positive life outcomes through expectations about the return to effort (Caliendo et al., 2015, 2019, 2022; Coleman & DeLeire, 2003; Lekfuangfu et al., 2018; McGee & McGee, 2011).

When decision-makers are not certain about the return effort, they must form beliefs (p^*) about the relationship between effort (e) and the chance of success (p), and act based on those beliefs. If our stated-effort delegation game mimics a real-effort setting, then we expect that those who are internal will form more optimistic beliefs about the return to effort than those who are external when the return to effort is unknown. This leads us to test the following hypothesis:

Hypothesis 2. When the return to effort is unknown, internals will form more optimistic beliefs about the return to effort than externals.

In our model, this would imply that p^*, e and consequently p, are increasing with loc, as follows:

$$\frac{\partial p^*(e, loc)}{\partial e \, \partial loc} > 0, \; e'(loc) > 0, \;\; \text{and} \;\; p'(loc) > 0. \tag{6}$$

Confidence in one's beliefs is another possible channel linking locus of control to effort choices in the face of unknown returns. Specifically, greater confidence in one's beliefs implies that the decision-maker has a narrower confidence interval (CI) around their subjective beliefs about the relationship between e and p, or simply p^*. The positive relationship between locus of control and human capital investments is consistent with internals having greater confidence in their beliefs. Therefore, we test the following hypothesis:

Hypothesis 3. When the return to effort is unknown, internals have greater confidence in their beliefs about the return to effort relative to externals.

In our model, this would imply the following:

$$\frac{\partial CI_{p^*}(p^*, loc)}{\partial loc} < 0,\ e'(loc) > 0,\ \text{ and }\ p'(loc) > 0. \tag{7}$$

Locus of Control and Illusion of Control

Illusion of control is a psychological concept that is defined as an unjustified belief in one's ability to control events that cannot be influenced. Many gamblers, for example, exhibit an illusion of control by preferring to roll their own dice or choose their own lottery numbers because they believe that this gives them more control over the outcome (see Pinger et al., 2018, for a review). An illusion of control results in biased beliefs about the chances of success (p). Specifically, a decision-maker with an illusion of control may believe that p is higher if they are personally involved in the realization of the payoff. This implies that an illusion of control can influence choices both when the return to effort is known as well as when it is unknown. For this reason, an illusion of control may contribute to any positive relationship between locus of control, on the one hand, and the preference for agency, optimism, and confidence, on the other. Given prior evidence that internally oriented individuals may tend to react (or overreact) to random outcomes (Pinger et al., 2018), we will test the following hypothesis:

Hypothesis 4. Internals' stronger preference for agency and more optimistic and confident beliefs about the return to effort is due to an illusion of control.

In our model, this would imply that the relationship between v_d, p^*, CI_{p^*} and loc is partly driven by an illusion of control (ioc), as follows:

$$\frac{\partial^2 v_d(loc, ioc)}{\partial loc\, \partial ioc} > 0, \tag{8}$$

$$\frac{\partial^2 p^*(e, loc, ioc)}{\partial loc\, \partial ioc} > 0, \tag{9}$$

$$\frac{\partial^2 CI_{p^*}(p^*, loc, ioc)}{\partial loc\, \partial ioc} < 0. \tag{10}$$

Locus of Control and Investment in Effort

Previous studies document a positive relationship between internal locus of control and investment in effort in settings where the decision-maker cannot be certain about the return to effort and makes decisions about real effort (McGee & McGee, 2016). It has also been shown that those with a more internal locus of control are intrinsically motivated to invest in effort in order to perform well (Borghans et al., 2008).

Our experiment involves effort decisions in which the return to effort is either known or unknown. Importantly, in both cases, investment decisions are based on stated effort, implying that effort has no other cost than a monetary cost. If locus of control influences choices involving stated effort similarly to when effort is real, then we expect a positive relationship between internal locus of control and effort driven by an achievement motivation. Additionally, if having an internal locus of control is associated with greater optimism and confidence about the return to effort, we expect an even stronger relationship between internal locus of control and investment in effort when the return to effort is unknown rather than known. This leads us to the following hypotheses:

Hypothesis 5. If internals have a stronger motivation to perform well, there will be a positive relationship between internal locus of control and investment in effort.

Hypothesis 6. If locus of control influences beliefs about the return to stated effort, the relationship between internal locus of control and investment in effort is stronger when there is uncertainty about the return to effort.

3 Experimental Design

We begin by describing the delegation game introduced by Bartling et al. (2014) which provides a framework for measuring preference for agency and illusion of control in the context of known return to effort (Section 3.1). We then describe the delegation game with unknown returns which allows us to measure people's optimism about and confidence in their beliefs about the return to effort (Section 3.2). Following this we describe our experimental procedures (Section 3.3) and present descriptive statistics for our main variables of interest

(Section 3.4).

3.1 Delegation Game with Known Return to Effort

Following Bartling et al. (2014), we measure the intrinsic value of making decisions using a two-stage procedure involving a delegation game followed by a lottery-based valuation task. In this delegation game, participants are fully aware of the cost and the return to effort. We refer to this game as the "known-return" treatment.

3.1.1 The Game

Participants play ten delegation games in pairs in a principal-agent setting. In each game participants see two projects, A and B, which can either succeed or fail. In most games the principal *(she)* prefers project A because its success results in a larger payoff for her than the success of project B. While, in most games, the agent *(he)* prefers project B because its success results in a larger payoff for him than the success of project A.

Each participant privately opts for one of the projects and chooses the level of effort they intend to invest in their project, knowing that their effort will determine the project's percentage chance of success. The level of effort can vary between 0 and 100 and its cost, given by a quadratic function, is known to participants. In this setting, the success of the project is uncertain (unless the effort invested is 0 or 100), but the return to effort is precisely known.

The investment decisions of only one of the participants in each dyad are implemented. At the start of each game, the principal always holds the right to choose the project (A or B) and her level of effort (0–100). She can either retain the right to decide or delegate the investment decision to the agent. The principal makes this choice by establishing the minimum threshold level of effort the agent must intend to invest in his project in order for her to agree to delegate. When the principal sets the minimum effort threshold, she is unaware of and cannot influence the level of effort chosen by the agent. If the agent's selected effort level meets (or exceeds) the minimum threshold effort level required by the principal, the decision is delegated. In this case, the agent's project and effort choice are implemented, and he pays for the effort invested. Alternatively, if the agent's selected effort level is below the principal's minimum effort threshold, the principal retains control over the decision. In this case, the principal's project and effort choice are implemented and she pays for the effort invested. Figure 1 illustrates the experimental design.

Participants remain in their assigned role of principal or agent throughout all ten games (see Appendix A.1 for the details of the games). In every game, the principal is paired with

a new agent. Participants do not learn about the choices of their partners or the outcomes of the games before the end of the experiment.

3.1.2 Lottery Valuations

After playing ten delegation games, the principal is shown the ten uncertain payoffs associated with the decision to retain control of the investment decision (referred to as "control lotteries") as well as the ten uncertain payoffs associated with the decision to delegate (referred to as "delegation lotteries"). Each of these twenty uncertain payoffs are presented to the principal in a random order as exogenous lotteries, meaning that she does not know that they are determined by her previous decisions in the delegation game.

As an example, let us suppose that in Game 1 the principal chooses: (a) Project A which has a payoff of 220 for the principal if the project succeeds (100 if it fails); and (b) an effort level of 60 (at a cost of 36) for her own project. The "control lottery" is defined as follows:

> Control Lottery: Principal receives $220 - 36 = 184$ points with a probability of 60 percent *(successful outcome)* and $100 - 36 = 64$ points with a probability of 40 percent *(failure)*.

Then, suppose that the principal chooses a minimum effort threshold for delegation of 40 and that the agent always chooses Project B. In Game 1, Project B yields a payoff of 190 for the principal if it succeeds (100 if it fails).[7] The "delegation lottery" is defined as follows:

> Delegation Lottery: Principal receives 190 points with a probability of 40 percent *(successful outcome)* and 100 points with a probability of 60 percent *(failure)*.

For each control and delegation lottery across all ten games, the principal is asked to indicate the smallest payoff she would be willing to accept with certainty to forgo playing the lottery. This is referred to as the lottery's "certainty equivalent"; it corresponds to the principal's valuation of the lottery. In other words, the certainty equivalent provides a measure of the principal's subjective valuation of the expected payoff in each of the twenty lotteries presented in the delegation game, *without* the delegation game framing.

[7] Each lottery is associated with an uncertain payoff for the principal and for another participant, to ensure comparability with the decision situation in the delegation game which involves a payoff for another participant (the agent). In the control lottery, another participant receives 190 points with a 60 percent chance and 100 points with a 40 percent chance. In the delegation lottery, another participant receives $220 - 16 = 104$ with a 40 percent chance and $100 - 16 = 84$ with a 60 percent chance, where 16 corresponds to the cost to the agent of investing a level of effort of 40.

3.1.3 Measuring the Preference for Agency

Following Bartling et al. (2014), we measure the preference for agency as the amount (in points) that leaves the principal indifferent between retaining and delegating the decision to their agent. Specifically, if the principal intrinsically values the right to make decisions then following must hold at the point where she is indifferent between retaining and delegating control:

$$ce(control\ lottery) + Intrinsic\ Value = ce(delegation\ lottery) \tag{11}$$

where $ce(control\ lottery)$ and $ce(delegation\ lottery)$ capture the value (i.e., certainty equivalent) that the principal places on the control and delegation lotteries, respectively. When the principal has a preference for agency she may retain control even though the certainty equivalent of the control lottery may be lower than that of the delegation lottery. This "control premium" is measured by the difference between the principal's subjective valuation (the certainty equivalent [*ce*]) of the delegation and the control lotteries (Bartling et al., 2014). If the principal dislikes making decisions, the intrinsic value of decision-making will be negative, while it will be zero if the principal does not attach any value to making decisions.

3.1.4 Earnings and Illusion of Control task

At the end of the experiment, the delegation games and lotteries relevant for payment are randomly selected by the computer. In the selected delegation games, unless the relevant level of effort is 0 or 100 (in which case the project's outcome is certain), the success or failure of the project is determined by chance. Specifically, the participant making the relevant investment decision rolls two ten-sided dice (one for the tens and another for the units), which yields a number between 0 and 99. If this number is below or equal to the level of effort invested in the project, the project is successful; otherwise, the project fails.

For each selected lottery, the computer randomly draws the certain payoff, a value between the smaller and the larger possible payoffs for the principal in the lottery. If the certainty equivalent is equal to or below the certain payoff, the principal receives the certain payoff and does not play the lottery.[8] Otherwise, she rolls the dice to determine the outcome of the lottery.

Before learning if they would need to roll the dice to determine their earnings in the experiment (for the delegation game, the lottery valuation task or both), participants received

[8] In the example, the bounds of the certain payoff for the principal would be {64, 184} in the first lottery and {100, 190} in the second one. The certain payoff for the other participant is 100 (when lotteries are based on games 1–5) or 200 (when lotteries are based on games 6–10).

an endowment of 30 points and stated how many points they were willing to pay to roll the dice themselves, rather than allowing a research assistant roll the dice on their behalf. Their willingness to pay to roll the dice gives us a measure of illusion of control (as in Charness & Gneezy, 2010).

3.2 Delegation Game with Unknown Return to Effort

We introduce a delegation game in which the principal makes the same decisions as previously described, but without knowing the return to effort. We refer to this game as the "unknown-return" treatment. In this treatment, decision-makers play the delegation game knowing that the level of effort they invest in their project may or may not affect its chance of success. They know that the success of the project can be determined by effort only, by luck only, or by a combination of effort and luck. In this environment, we elicit optimism about the return to effort and confidence in the accuracy of beliefs. In each game, after the principal has made her decisions about project selection and effort levels, she is asked to complete the following sentences:

> *My best guess is that my project will be successful with . . . % chance.*
>
> *I think it is very likely (a 9-in-10 chance) that the chance of success of my project is between . . . % and . . . %.*

Conditional on the effort decision, the first statement allows us to measure optimism about the return to effort. The second statement allows us to measure confidence in the beliefs (as in Ben-David et al., 2013; Moore & Healy, 2008; Ren & Croson, 2013).[9] Specifically, confidence is measured by the narrowness of the stated interval for the estimated chance of success. Following previous studies, we do not incentivize participants' beliefs. Instead, we tell participants that this information is important to us and we compensate them with 30 points for their effort in answering the questions truthfully. The lottery valuation task proceeds as it does when the return to effort is known, except that probabilities associated with success and failure of the project are now given by the stated beliefs of the principal.

[9] We also ask participants to indicate how sure they are about their estimated chance of success on an scale between 0 (very unsure) and 10 (very sure). Participants answer all three questions for their own project and for the project of the agent, assuming the agent chooses project B and invests a level of effort equal to the minimum effort threshold for delegation.

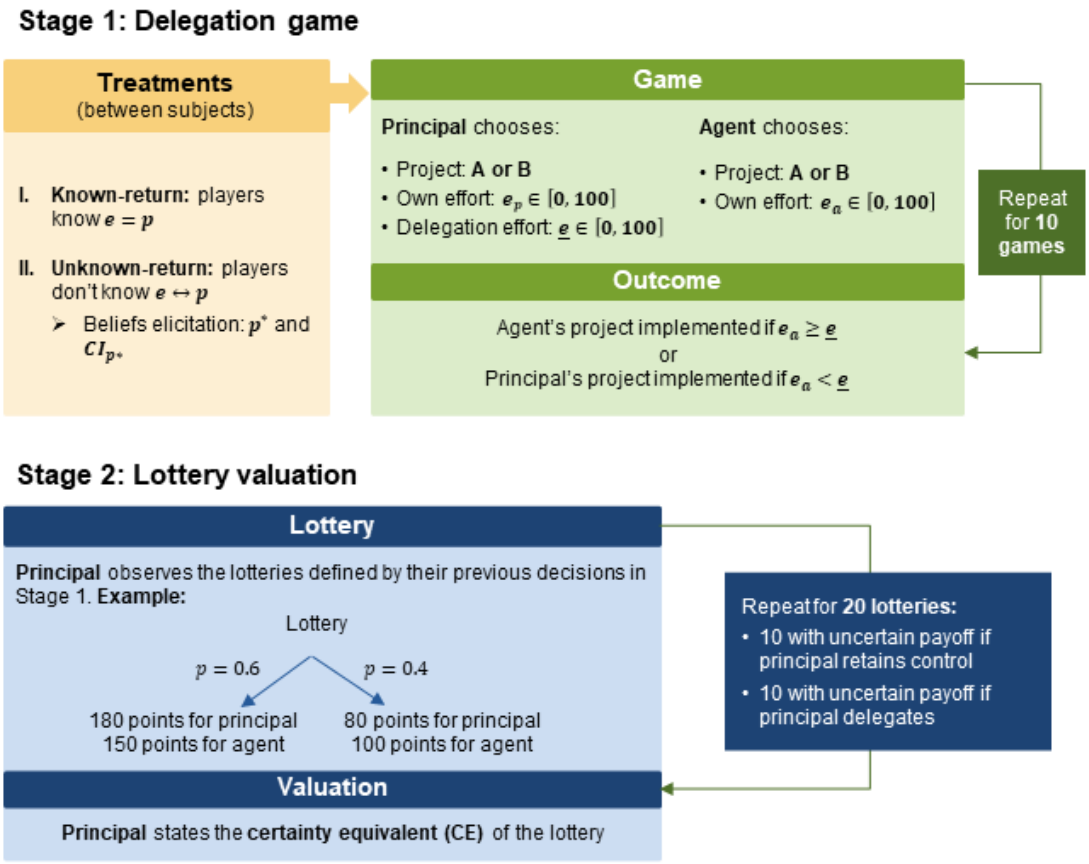


Figure 1: Illustration of the experimental design.

3.3 Experimental Procedures

Our participants are Australian university students who were recruited using a standard research participant pool management software for economic experiments. Each participant took part in the experiment only once, either in the known- or the unknown-return treatment. Each session lasted about 1 hour and 40 minutes and participants earned A$40 on average (including a A$10 participation fee). Upon entering the laboratory, participants were assigned to computer desks and read general information about the experiment. They then responded to items from standard psychometric scales commonly used to measure locus of control and the big five personality traits, and proceeded with playing the delegation games and lottery valuations task.[10] At the end of the experiment, we experimentally elicited loss

[10]Responses to the locus of control items were used to assign participants to the role of principal and agent in the experiment in order to obtain a balanced representation of participants with internal and external locus of control in the role of principal (see Appendix A.2.1 for details). The big five personality traits include openness to experience, conscientiousness, extraversion, agreeableness and neuroticism (McCrae & Costa, 1987).

and ambiguity aversion, measured self-reported general risk attitudes and self-confidence, and assessed cognitive ability (see Appendix A.2.2 for details on the instructions and questionnaires).[11]

Throughout the experiment participants received instructions that were relevant for each part of the experiment just before it started. They were required to answer several questions to check their understanding of the instructions and were encouraged to ask for help in answering them. To avoid framing effects, in the experimental instructions, we refer to the principal as "Participant A" and to the agent as "Participant B".

Across 27 experimental sessions, we collected data on 144 principals in the known-return treatment and 152 principals in unknown-return treatment. We exclude from our sample 9 participants who took less than 20 seconds to answer the seven questions of the locus of control survey, since this strongly suggests they did not read the questions and that their answers are not reflective of their locus of control. Therefore, our analysis sample includes 140 principals in known-return treatment and 147 principals in the unknown-return treatment. Among them, 62 percent are women, the average age is 23 years, and 64 percent have an international student status.[12] Overall, our participants are representative of university students in economics and business degrees in large research-intensive universities in Australia.

3.4 Descriptive Statistics

Below we present descriptive statistics for our main variables of interest which include locus of control, preference for agency, beliefs about the return to effort, illusion of control, and effort decisions.

3.4.1 Locus of Control

Our measure of locus of control is based on the Psychological Coping Resources component of the Mastery Module developed by Pearlin and Schooler (1978). Several studies using the Household, Income and Labour Dynamics in Australia (HILDA) representative panel survey

[11] Our experimental software was programmed using oTree (Chen et al., 2016). We pre-registered our design and analysis plan in the AEA's RCT registry. Our preregistration is accessible here: https://www.socialscienceregistry.org/trials/7317.

[12] Participant characteristics are similar across the two treatments, except for the share of international students, which is higher in the unknown-return treatment, by 21 percentage points, relative to the known-return treatment. This gap is due to the Australian international border rules which reduced international student migration in 2021, during the COVID-19 pandemic. Most of our sessions for the known-return treatment were conducted in 2021, whereas most of our sessions for the unknown-return treatment were conducted in 2022. We control for student international student status in our analysis to take into account that this might affect their decisions in the experiment.

have demonstrated the predictive power of this measure for important life outcomes (Cobb-Clark et al., 2014, 2016; Lee & McKinnish, 2019; Xue et al., 2020). Participants answer seven survey items (Table 1) on a 7-point Likert scale, where 1 indicates strong disagreement and 7 indicates strong agreement.[13] We create a locus of control index by reversing the responses to the first five items (that are increasing in external locus of control), and then summing these reversed responses and the responses to the last two items, such that our measure increases with internality and ranges between 7 and 49. The average locus of control value in our analysis sample is 34, with no statistically significant difference across treatments. The standard deviation is large [6.6, 7.7], indicating there is substantial heterogeneity in locus of control in our sample, which is important for our study.[14] In line with findings using HILDA, we observe a greater tendency for our participants to be internal rather than external.[15]

Table 1: Locus of Control Item Scores and Index by Treatment

Items:	Known-return		Unknown-return	
(1) I have little control over the things that happen to me.	3.45	[1.48]	3.44	[1.37]
(2) There is really no way I can solve some of the problems I have.	3.03	[1.61]	3.00	[1.56]
(3) There is little I can do to change many of the important things in my life.	2.78	[1.59]	2.96	[1.59]
(4) I often feel helpless in dealing with the problems of life.	3.44	[1.74]	3.36	[1.65]
(5) Sometimes I feel that I'm being pushed around in life.	3.70	[1.71]	3.69	[1.62]
(6) What happens to me in the future mostly depends on me.	5.46	[1.42]	5.31	[1.44]
(7) I can do just about anything I really set my mind to do.	5.06	[1.59]	4.94	[1.40]
Locus of control index (internality)	34.13	[7.71]	33.80	[6.57]
N	140		147	

Notes: Items used to construct the locus of control index. Mean of responses and their standard deviation in square brackets. None of the differences between treatments are statistically significant. Items (1) to (5) were reversed in the calculation of the locus of control index.

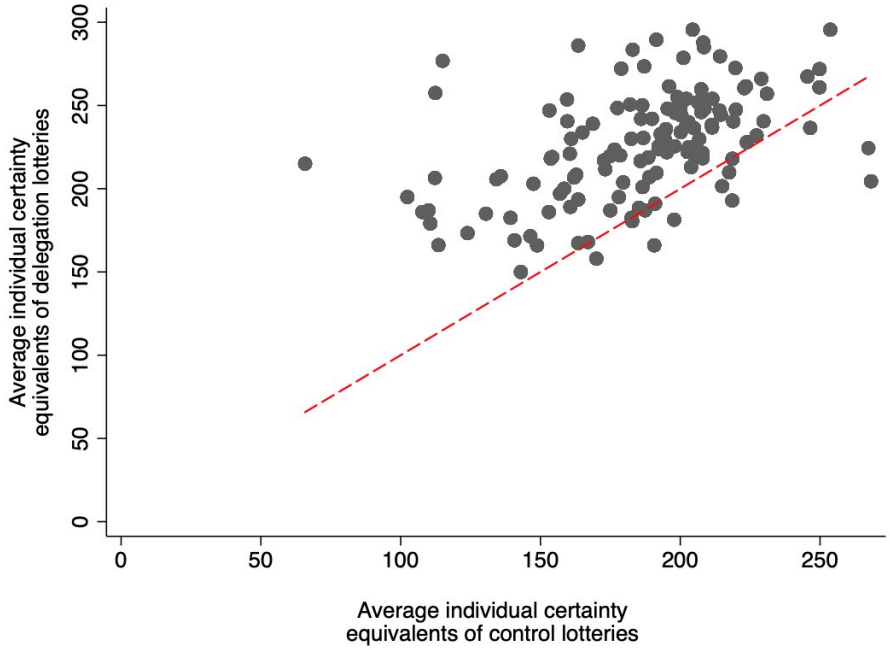
[13] A factor analysis reveals that items (1–5) load on one factor that reflects external locus of control and items (6–7) load on a second factor that reflects internal locus of control. The locus of control index has a Cronbach's α reliability coefficient of 0.77 in our full sample (including all participants in the role of principal or agent, $N = 433$); this indicates good internal consistency (Nunnally & Bernstein, 1994).

[14] In Figure A.1 in the Appendix we show the distribution of the locus of control index, by treatment. The distributions in the two samples are similar (p-value of a ranksum test is 0.70). We find no statistically significant difference in the locus of control index between men versus women or participants with international versus domestic student status.

[15] In our full sample, the average value of the locus of control index is 35.6. Based on our calculations, in the HILDA sample (wave 15) the average value of the locus of control index is 38.5 for respondents aged 18–25 ($N = 2,132$) and 37.9 in the full sample ($N = 15,253$).

3.4.2 Preference for Agency

The preference for agency is measured by the difference in the certainty equivalent of the delegation and the control lotteries in the known-return treatment.[16] We show in Figure 2 each participant's average certainty equivalent for the delegation lotteries on the vertical axis and their average certainty equivalent for the control lotteries on the horizontal axis. Each dot above the 45-degree line (dashed line) represents a participant who, on average, assigns a greater value to the delegation lotteries compared to the control lotteries, displaying a preference for agency. Each dot below the 45-degree line represents a participant who, on average, assigns a greater value to the control lotteries.[17]



Note: Each dot represents one participant. The dashed line is the 45-degree line.

Figure 2: Average Certainty Equivalents of Control and Delegation Lotteries (in experimental points)

Ninety percent of our participants are represented above the 45-degree line, meaning

[16]The measure of preference for agency obtained in the unknown-return treatment is conflated with the decision-maker's beliefs about the return to effort. We discuss this measure in Appendix A.3.

[17]Our analysis includes a total of 1307 out of 1400 participant decisions. We exclude a total of 93 decisions from our analysis. These are decisions where principals either choose a safe payoff that was strictly below the guaranteed payoff of the lottery (72 decisions) or above the maximum payoff of the lottery (21 decisions), since these decisions indicate confusion. By applying this rule, all decisions made by one principal in the lottery valuations are excluded. As a result our analysis on the preference for agency is based on the decisions of 139 participants.

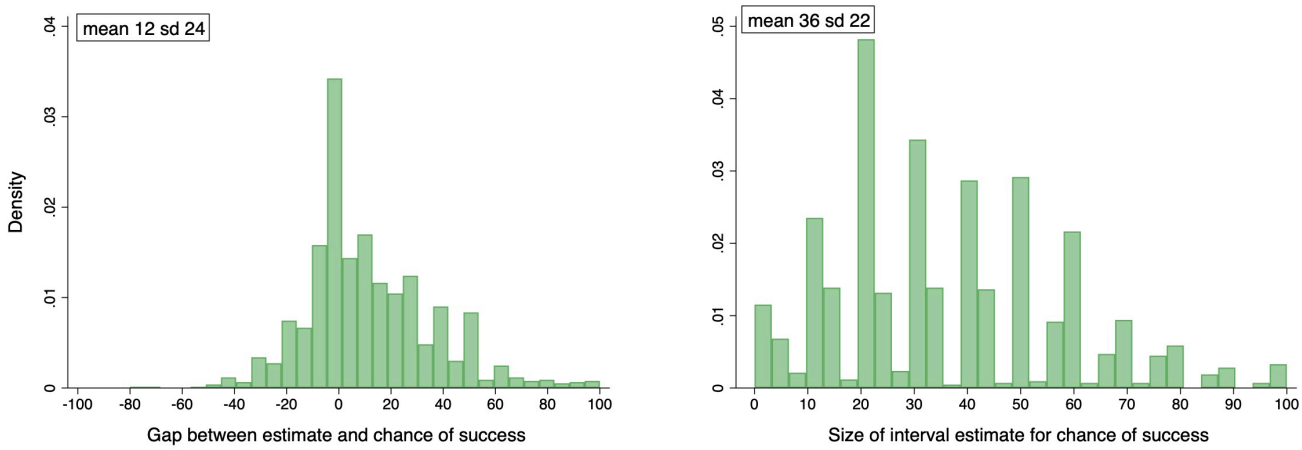
that, on average, they value the delegation lotteries more than the control lotteries and have a preference for agency. The average gap in the valuation of the delegation and control lotteries is large. Participants' valuation of the delegation lotteries is, on average, 31 percent larger than the valuation of the control lotteries. These results are aligned with Bartling et al. (2014) and Ferreira et al. (2020) who also find that most people have a preference for agency.[18] The similarity in the behavioral responses of the participants in our experiment and experimental participants in other countries and cultural contexts is evidence of the validity of the preference for agency measure.

3.4.3 Beliefs about the Return to Effort and Illusion of Control

In the unknown-return treatment, participants state their estimated chance of success of the project and the interval which they are 90 percent confident contains the actual chance of success of the project. Conditional on the effort decision, the estimate of the chance of success gives us a measure of optimism. The size of the interval gives us a measure of confidence, with a smaller interval indicating greater confidence in the accuracy of one's beliefs.[19] Figure 3(a) depicts the distribution of the gap between a participant's estimate of the chance of success of their project and the effort they invested (*actual* chance of success), and Figure 3(b) depicts the distribution of the size of the estimated interval (upper bound−lower bound).

[18] In Bartling et al. (2014), 83 percent of participants value the delegation lotteries more than the control lotteries on average. The average gap in the valuation of the delegation and control lotteries is 14.1 percent, which is smaller than in our sample, but nonetheless large and statistically significant.

[19] For beliefs on the participant's own project, our analysis includes 1327 out of a total of 1470 participant decisions. We exclude 76 decisions where the upper bound of the confidence interval is lower than the lower bound and 67 decisions where the estimate of the chance of success is not within the confidence interval.



(a) Optimism (b) Confidence

Note: sd means standard deviation.

Figure 3: Beliefs of Chance of Success (own project)

Across both measures, we observe substantial heterogeneity in our sample. On average, participants' estimate of the chance of success of their project exceeds the actual chance of success by 12 percentage points (with a standard deviation of 24) and the average size of the confidence interval is 36 percentage points (with a standard deviation of 22). The correlation between the measure of optimism and confidence indicates that people who are more optimistic about the chance of success (relative to effort invested) tend to be less confident in their estimate (correlation coefficient is 0.15, $p<0.01$).[20]

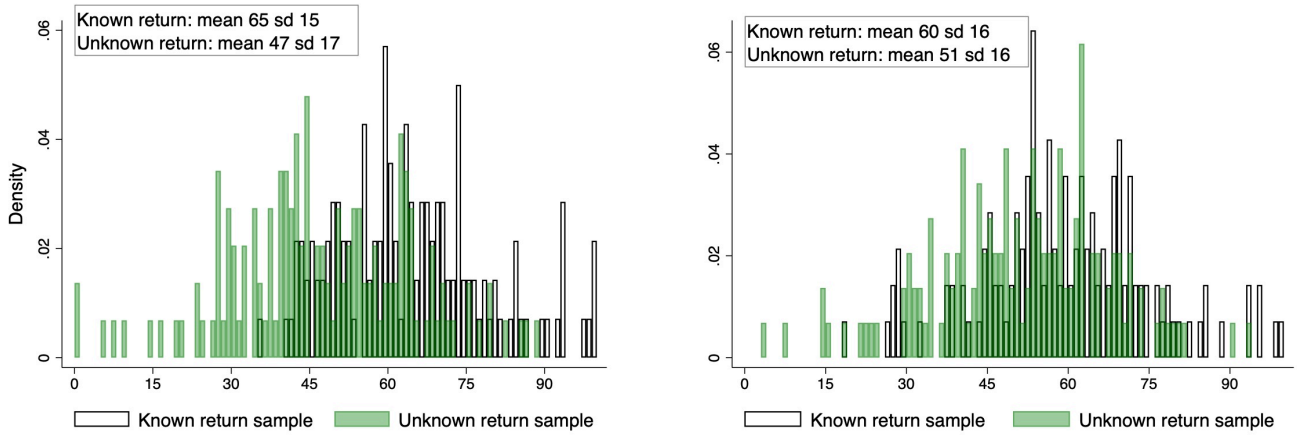
Our measure of illusion of control is given by participants' willingness to pay to roll the dice themselves, of which the outcome determines their payoff in the experiment. A large share of participants, 60 percent in the known-return treatment and 56 percent in the unknown-return treatment, have no willingness to pay to roll the dice. On average, participants are willing to pay 5 to 6 points out of 30 (depending on the treatment) to roll the dice.

3.4.4 Effort Decisions

In both treatments, participants decide on the level of effort they invest in their project and the minimum level of effort they require for delegation. In Figure 4(a) we show the distribution of the average effort investment in the known-return treatment (white bars) and in the unknown-return treatment (green bars). When participants know the return to effort, on average they invest 65 units of effort; when returns are unknown, effort levels are 18 units

[20]In Appendix A.4 we report participants' estimates of the chance of success of the agent's project.

lower (p<0.00). In Figure 4(b) we show the distribution of the average effort threshold for delegation. When participants know the return to effort, on average they require the agent to invest a minimum of 60 units of effort to accept delegating; when returns are unknown the effort threshold is 9 units lower (p<0.00). On average, participants invest more effort themselves and set a higher effort threshold to accept delegating the decision when they know the return to effort compared to when the returns are ambiguous and they have to rely on their beliefs.



(a) Own effort (b) Minimum effort threshold

Note: sd means standard deviation.

Figure 4: Effort Decisions by Treatment

4 Results

We analyse the link between locus of control and the key channels that conceptually link it to decision-making using OLS regression models. We present the results obtained with three model specifications. In each model, the dependent variables include: preference for agency, beliefs about the return to effort, illusion of control, and effort decisions. In model 1, the independent variables include the (standardized) locus of control index, session effects and features of the delegation games.[21] In model 2, we also control for illusion of control to test if it explains the link between locus of control and the dependent variable.[22] In model 3,

[21] We control for whether the game is high versus low stake (based on the payoff for the principal in the case of success of her project), and for the strength of the principal's preference for her project over the agent's project (which in a game is defined by the gap in the payoff for the principal of the two alternative projects in the case of success). We standardize the locus of control index based on its distribution in our full sample.

[22] We do not examine effort decisions using model 2; it does not affect our results.

we additionally control for sociodemographic characteristics, IQ, economic preferences and beliefs, and the big five personality traits.[23]

This section proceeds as follows. In Sections 4.1 to 4.3, we discuss the link between locus of control and decision-making focusing on results obtained from the analysis sample. Gender differences are discussed in Section 4.4, while a summary of our results is provided in Section 4.5.

4.1 Locus of Control and the Preference for Agency

Our results confirm that internals have a preference for agency (Hypothesis 1). We find that a one standard deviation increase in internal locus of control increases the gap between the certainty equivalent of the delegation lotteries and the certainty equivalent of the control lotteries by 5.1 percentage points (Table 2, column 1, $p<0.05$). This shows that internals attach a greater intrinsic value to retaining control over decisions. The effect is large, it corresponds to an increase in the intrinsic value of making decisions by 10 percent for each standard deviation increase in internal locus of control.

Internal's greater preference for agency is not explained by an illusion of control (Hypothesis 4). Controlling for illusion of control still yields a statistically significant estimate for locus of control of 4.4 percentage points, which is similar in magnitude and not statistically different from the previous estimate (column 2, $p=0.258$). We find that illusion of control is positively linked with preference for agency. A one unit increase in the willingness to pay to roll the dice increases the gap in the certainty equivalent of the delegation versus control lotteries by 1 percentage point (columns 2–3, $p<0.05$). Controlling for sociodemographic characteristics, IQ, self-reported confidence and risk attitudes, loss aversion and the big five personality traits (column 3) does not change these conclusions.[24]

[23] In our sample, locus of control is correlated with the big five personality traits, in particular conscientiousness and neuroticism (see Table A.2 in the Appendix).

[24] For brevity, the coefficient estimates of the control variables are not reported in Table 2, and can be made available by the authors upon request.

Table 2: Locus of Control and the Preference for Agency

	(1)	(2)	(3)
Locus of control (*loc*)	0.051**	0.044**	0.052**
	(0.022)	(0.022)	(0.026)
Illusion of control		0.011***	0.009**
		(0.004)	(0.004)
Constant	0.504***	0.455***	0.444
	(0.068)	(0.069)	(0.216)
Test *loc* model (1) = *loc* model (2)	$p = 0.258$		
N	1307	1307	1307
Clusters	139	139	139
Session & game dummies	Yes	Yes	Yes
Individual characteristics			Yes

Notes: Locus of control index is standardized. All specifications control for project choice in the delegation game. Column (3) controls for gender, age, international student status, IQ, self-reported confidence and risk attitudes, loss aversion and the big five. Standard errors are clustered by participant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.2 Locus of Control and Beliefs about the Return to Effort

Our next set of results concerns the link between locus of control and beliefs about the return to effort, namely optimism and confidence. To analyse the extent to which internal locus of control is associated with greater optimism about the return to effort (Hypothesis 2), we include an interaction term between the locus of control index and the level of effort invested in own project in our model. A positive coefficient estimate of the interaction term would imply that participants who are more internal are more optimistic about the return to effort than those who are more external.

Contrary to Hypothesis 2, the results show that locus of control does not influence the relationship between effort invested and optimism about the chance of success (Table 3, columns 1–3). The interaction term between the locus of control index and effort is not statistically different from zero. Similarly, we find no support for Hypothesis 3, as there is no evidence of a link between locus of control and confidence in beliefs about the return to effort (columns 4–6). In terms of other characteristics, we find that greater investment in effort is positively linked with optimism (columns 1–3). We also find that effort is positively linked with confidence in beliefs (resulting in a smaller confidence interval), while optimism about the chance of success is negatively linked with confidence (columns 4–6).

Table 3: Locus of Control and Beliefs about the Return to Effort

	Optimism			*(Lower) Confidence*		
	Estimate of chance of success			Size of confidence interval		
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of control (*loc*)	0.605	0.886	0.322	-0.447	-0.449	0.382
	(1.493)	(1.498)	(1.499)	(1.232)	(1.233)	(1.653)
loc × Effort invested	-0.003	-0.008	-0.006			
	(0.025)	(0.025)	(0.027)			
Effort invested	0.307***	0.305***	0.319***	-0.118**	-0.118**	-0.124***
	(0.032)	(0.031)	(0.032)	(0.046)	(0.046)	(0.046)
Estimate of chance of success				0.275***	0.275***	0.280***
				(0.063)	(0.062)	(0.060)
Illusion of control		-0.145	-0.187*		0.019	0.048
		(0.102)	(0.102)		(0.200)	(0.207)
Constant	47.121***	47.617***	46.047***	26.897***	26.824***	30.208**
	(2.604)	(2.625)	(7.544)	(8.122)	(8.040)	(12.695)
N	1327	1327	1327	1327	1327	1327
Clusters	147	147	147	147	147	147
Session & game dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual characteristics			Yes			Yes

Notes: A smaller confidence interval indicates greater confidence. Locus of control index is standardized. All specifications control for project choice in the delegation game. Columns (3) and (6) control for gender, age, international student status, IQ, ambiguity attitudes, and the big five. Standard errors are clustered by participant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.3 Locus of Control and Effort Decisions

Our next set of results concerns the link between locus of control and investment in effort. We examine the influence of locus of control on effort decisions when the decision-maker knows the return to effort, and when they do not. To directly compare the influence of locus of control on effort decisions in the two treatments, we include an interaction term between the locus of control index and the treatment dummy (*R unknown*) in our regression model. If Hypothesis 6 holds, the coefficient on this interaction term will be positive.

Our results confirm that, when the return to effort is known, having an internal locus of control is positively related to higher investments in effort (Hypothesis 5). Each standard deviation increase in internal locus of control is associated with an increase of 2.5 units of effort invested in one's own project, an effect that is statistically significant at the 5 percent level (Table 4, column 1). This effect, however, is no longer statistically significant when

controlling for the big five personality traits (column 2).

When the return to effort is unknown, there is no relationship between locus of control and effort choices. We find a significant negative interaction between locus of control and our unknown-return treatment dummy. As a result, when the return to effort is unknown, the amount of stated effort that people invest in the project is not related to their locus of control (see panel 2 of Table 4 for the total marginal effect.) Thus, contrary to Hypothesis 6, the relationship between locus of control and stated-effort investments is weaker—not stronger—when the return to effort is unknown rather than known.

Table 4: Locus of Control and Effort Decisions

	Effort invested in own project	
	(1)	(2)
Panel 1		
Locus of control (*loc*) [(a)]	2.511**	2.381
	(1.218)	(1.444)
loc × *R unknown* [(b)]	-3.341*	-3.352*
	(1.985)	(1.941)
R unknown	-19.759***	-18.027***
	(4.403)	(4.550)
Constant	66.891***	67.563***
	(3.541)	(10.602)
Panel 2		
Effect of *loc* on *effort* when *Return is unknown*		
Coefficient $(a)+(b)$	-0.831	-0.972
Standard error	(1.568)	(1.542)
N	2870	2870
Clusters	287	287
Session & game dummies	Yes	Yes
Individual characteristics		Yes

Notes: Locus of control index is standardized. All specifications control for project choice in the delegation game. Column (2) controls for gender, age, international student status, IQ, self-reported risk, ambiguity attitudes and the big five. Standard errors are clustered by participant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.4 Locus of Control and Decision-Making by Gender

Our final set of results compares the relationships between locus of control, the preference for agency, beliefs and the effort investments of women and men. Our focus on gender is motivated by previous evidence that the relationship between locus of control and individual

behavior is often gendered (Caliendo et al., 2015; Cobb-Clark, 2015; Cobb-Clark et al., 2014; Kesavayuth et al., 2018). Our analysis of gender is exploratory. The previous literature does not provide a conceptual explanation for any differential impact of locus of control on men's and women's decision-making. Consequently, we have not formulated any formal hypotheses.

The relationship between locus of control and each outcome of interest are reported separately by gender in Table 5. These results come from an estimation model that includes an interaction term between locus of control and being female. We find that women have a preference for agency that is approximately 10–11 percentage points higher than do men (see columns 1–2). Moreover, although there is no relationship between men's locus of control and their preference for agency, the intrinsic value that women place on retaining control of decision-making increases by between 6.4 and 8.6 percentage points for each standard deviation increase in the extent to which they are internal (see panel 2). Thus, both the preference for agency—and its relationship with control perceptions—differs between men and women.

In contrast, we find that gender is not related to optimism about the role that effort plays in investment success; nor does it influence the relationship between locus of control and optimism (columns 3–4).[25] Women are significantly less confident than men, however. On average, women estimate confidence intervals that are about 8 percentage points ($p<0.01$) wider than those estimated by men. Moreover, men's confidence in the accuracy of their beliefs about returns to effort increases the more internal they are, though the same is not true for women (column 5). Specifically, an increase of one standard deviation in men's internal locus of control is associated with a decrease (3.4 percentage points, $p<0.1$) in the size of the confidence interval around men's beliefs about the chances of success. This effect becomes smaller and no longer statistically significant when controlling for the big five personality traits (see column 6).

Finally, we consider the role of gender in the decision to invest effort. There are no gender disparities in overall investment levels; however, there are important gender disparities in the relationship between locus of control and investments in effort. There is a positive relationship between women's locus of control and their investment in stated effort when the return is known (columns 7–8). Specifically, each one standard deviation increase in internal locus of control is associated with an increase of approximately 4 units of effort. This effect is statistically significant even when controlling for the big five personality traits ($p<0.05$).

[25]For simplicity, in the case of optimism we report the estimates of a model that does not include the interaction term between locus of control and the level of effort invested. This is because we previously found no relationship between locus of control and optimism (see Table 3). The results by gender obtained using the specification presented in Table 3 confirm the absence of a link between locus of control and optimism for both men and women (results are available from the authors upon request).

In contrast, we find no evidence that locus of control is linked to women's effort investments when the return to effort is unknown. On the other hand, men's locus of control does not influence their effort decisions when the return to effort is known. When the return to effort is unknown, however, each standard deviation increase in their degree of internality reduces investment in effort by about 4.5 units ($p<0.05$).

Table 5: Locus of Control and Decision-Making by Gender

	Agency		Optimism		*(Lower)* Confidence		Effort	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel 1								
Female	0.112**	0.103*	-1.183	-1.521	8.171***	7.743***	1.341	1.573
	(0.055)	(0.055)	(2.015)	(2.076)	(2.879)	(2.917)	(2.722)	(2.883)
Female × *loc* [a]	0.056	0.089**	-0.166	-1.782	4.855*	4.422	3.704	5.174*
	(0.039)	(0.040)	(1.556)	(1.651)	(2.496)	(2.946)	(2.307)	(2.685)
R unknown × Female							-3.072	-3.169
							(4.163)	(4.085)
R unknown × Female × *loc* [b]							1.829	0.732
							(3.730)	(3.946)
Effort invested			0.306***	0.325***	-0.124***	-0.136***		
			(0.032)	(0.032)	(0.043)	(0.046)		
Estimate of chance of success					0.282***	0.286***		
					(0.058)	(0.059)		
R unknown							-17.449***	-15.454***
							(5.506)	(5.572)
R unknown × *loc* [c]							-4.413	-3.762
							(2.708)	(2.800)
loc [d]	0.008	-0.003	0.565	1.210	-3.420*	-2.453	0.022	-0.908
	(0.032)	(0.032)	(1.083)	(1.392)	(1.789)	(2.419)	(1.857)	(2.164)
Illusion of control	0.010***	0.009**	-0.141	-0.184*	0.010	0.048		
	(0.003)	(0.004)	(0.103)	(0.101)	(0.202)	(0.208)		
Constant	0.384***	0.377	48.162***	46.718***	23.114***	28.856**	65.895***	64.798***
	(0.085)	(0.214)	(2.949)	(7.617)	(7.950)	(12.158)	(4.022)	(10.571)
Panel 2								
Effect of *loc* on *agency* for women								
Coefficient $(a)+(d)$	0.064**	0.086***						
Standard error	(0.026)	(0.031)						
Effect of *loc* on *optimism* for women								
Coefficient $(a)+(d)$			0.399	-0.572				
Standard error			(1.157)	(1.151)				
Effect of *loc* on *confidence* for women								
Coefficient $(a)+(d)$					1.435	1.969		
Standard error					(1.616)	(2.021)		
Effect of *loc* on *effort* for women when *return known*								
Coefficient $(a)+(d)$							3.726**	4.266**
Standard error							(1.494)	(1.789)
Effect of *loc* on *effort* for women when *return unknown*								
Coefficient $(a)+(b)+(c)+(d)$							1.142	1.237
Standard error							(2.126)	(2.041)
Effect of *loc* on *effort* for men when *return unknown*								
Coefficient $(c)+(d)$							-4.391**	-4.670**
Standard error							(1.967)	(1.978)
N	1307	1307	1327	1327	1327	1327	2870	2870
Clusters	139	139	147	147	147	147	287	287
Session & game dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual characteristics		Yes		Yes		Yes		Yes

Notes: Locus of control index (*loc*) is standardized. Standard errors are clustered by participant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.5 Summary: Channels Linking Locus of Control to Decision-Making

Consistent with Hypothesis 1, we find a positive link between being internal and the preference for agency. A one standard deviation increase in internal locus of control is associated with an average increase in the gap between the certainty equivalent of the delegation lotteries relative to the control lotteries of about 5 percentage points. Our analysis by gender reveals that this effect is large among women (6–8 percentage points) and basically null among men. Therefore, our analysis reveals that internal locus of control is strongly positively linked with the preference for agency among women, but not among men. (We provide a summary of our hypotheses and findings in Table 6.)

Optimism, confidence and illusion of control are not linked to locus of control. We find no evidence to support Hypothesis 2 concerning the positive link between locus of control and optimism, or Hypothesis 3 on the positive link between locus of control and confidence about the return to effort. Moreover, contrary to Hypothesis 4, we find no evidence that an illusion of control plays a role in explaining our results on the link between locus of control, preference for agency and beliefs about the return to effort.

The link between locus of control and effort decisions differs by gender and depends on whether the return to effort is known or unknown. Among women, we find support for Hypothesis 5, since we find a positive link between locus of control and women's investments in effort when the return is known. Specifically, a one standard deviation increase in internal locus of control is linked to an increase in effort investment of about 4 units. In contrast, we find no support for Hypothesis 6, as we find no link between locus of control and women's investments in effort when the return is unknown. For the full sample and among women, we find that the relationship between locus of control and investment in effort is weaker, not stronger, when the return is unknown rather than known. This result is consistent with our finding that internal individuals are not more optimistic and confident about the return to effort than externals. Among men, we find no support for Hypothesis 5 as we find no link between locus of control and investment in effort when the return is known. In contrast, we find a negative link between locus of control and investment in effort when the return is unknown. In this setting, among men, a one standard deviation increase in internal locus of control is linked with a decrease in effort investment by about 4.5 units.

Table 6: Summary of Hypotheses and Results

Hypotheses:	**Results**		
	Full sample	Women	Men
1. Preference for agency increases with internal locus of control.	yes	yes	no
2. Optimism about the return to effort increases with internal locus of control.	no	no	no
3. Confidence in beliefs about the return to effort increases with internal locus of control.	no	no	no
4. Relationship between locus of control, preference for agency and beliefs about the return to effort is due to illusion of control.	no	no	no
5. Investment in effort increases with internal locus of control when the return is known.	no	yes	no
6. Relationship between investment in effort and locus of control is stronger when return is unknown.	no	no	no

Notes: In relation to hypothesis 6, in the full sample and among women only, we find that the relationship between locus of control and investment in effort is weaker when the return to effort is unknown rather than known; among men, we find that the relationship between locus of control and investment in effort is negative when the return to effort is unknown.

5 Conclusion

People's motivation to work hard and invest in the future fundamentally rests on the degree to which they believe that what they do has consequences. "Unless people believe that they can produce desired effects and forestall undesired ones by their actions, they have little incentive to act" (Bandura, 2012, p. 179). It is not surprising, therefore, that there is extensive empirical evidence that those with an internal locus of control not only make greater investments in both human and financial capital, but also approach both their leadership and parenting roles differently. Isolating the underlying behavioral mechanisms has been challenging, however, as almost everything we know about role of people's locus of control in their life outcomes is based on observational studies. Knowing more about the specific mechanisms linking agents' locus of control to their responsiveness to incentives would be useful in designing the incentive structures, contracts, and policies used to motivate their behavior.

We extend the literature by using a laboratory experiment to study how locus of control operates through people's preferences and beliefs to influence the choices they make.

Experimental studies, such as ours, complement observational approaches by allowing the underlying behavioral mechanisms to be disentangled (Engelmann et al., 2019; McGee & McGee, 2016). Specifically, we use the delegation game introduced by Bartling et al. (2014) to test four key channels—preference for agency, optimism and confidence regarding the return to effort, and illusion of control—that conceptually link locus of control to decision-making. Importantly, the stated-effort design we employ allows us to directly control for the costs (productivity) of effort, effectively shutting down what is arguably the most important confounder in observational studies of locus of control. The result is a deeper understanding of the behavioral foundations of locus of control and a key contribution to the emerging experimental literature that seeks to understand how people's responses to incentives are shaped by their personality traits, beliefs, and preferences.

Our results lead us to several conclusions. First, locus of control operates, at least in part, as a preference parameter. Those who are internal have a stronger preference for agency. The desire for retaining rather than relinquishing control is positively related to how strongly a person believes that what happens to them in the future is the result of their own efforts rather than external forces. This is a new insight into the behavioral foundations of perceived control. The implication is that the preference for agency may mediate the relationship between locus of control and life outcomes. In addition, we offer a new perspective on the factors that motivate one person to intrinsically value decision rights more than another. Previous researchers have speculated that utility may depend on whether an active choice was made and, if so, by whom (Bartling et al., 2014) or that self-reliance (Ferreira et al., 2020) and a sense of control (Benjamin et al., 2012) may contribute to subjective well-being. Our results suggest that decision rights may also be more intrinsically valuable for those who believe those decisions to be more consequential.

At the same time, both the intrinsic value of decision-making, and its relationship with control perceptions, are gendered. Women not only have a stronger preference for agency, the value they place on retaining control of decision-making increases the more internal they are. Men's preferences for agency, in contrast, are unrelated to their locus of control. These new results contribute to efforts over the past two decades to establish whether, and if so why, differences in men's and women's personality traits and preferences contribute to gender disparities in social and economic status, particularly in respect of the labor market (Bertrand, 2011; Lundberg, 2023). People's preferences for, and perceptions of, control are at the heart of many of the decisions they make, leaving locus of control and the preference for agency potential avenues through which gender disparities in many of life's outcomes may be occurring.

Finally, locus of control does not operate through the expectations that people form about

stated effort. In particular, locus of control is not related to either optimism or confidence about the return to stated effort; nor is the relationship between locus of control and the preference for agency due to an illusion of control. Importantly, we find no evidence that uncertainty about returns to effort intensifies the role of locus of control in the allocation of stated effort. In fact, the relationship between locus of control and investments in stated effort is weaker—not stronger—for both men and women when the return to stated effort is unknown rather than known.

These results are consistent with those reported by McGee and McGee (2011) in their stated-effort setting. They stand in contrast, however, to those that emerge when they utilize a real-effort experiment to examine the link between locus of control and expectations about the return to effort (McGee & McGee, 2011, 2016). They also contrast with an extensive observational literature examining the consequences of locus of control in real-effort environments (Caliendo et al., 2015, 2019, 2022; Coleman & DeLeire, 2003; Lekfuangfu et al., 2018). Stated- and real-effort tasks differ on a number of dimensions (e.g., timing, choices over money vs. effort, etc.), of course. Whether, and if so why, these differences affect results remain open questions in the literature (Charness et al., 2018). Answers will no doubt come with future research. In the case of locus of control, we believe that the answers likely lie in the link between people's control perceptions and their cost (productivity) of effort which is suppressed when effort is stated, but matters when effort is real.

More generally, there is a pressing need to understand the process through which control perceptions are formed and subsequently give rise to a preference for agency. People update their beliefs in response to new signals (e.g., information, experiences, etc.) in idiosyncratic ways. Belief updating processes may be "motivated" in the sense that many people do not equally weight signals that contradict rather than support the conclusions they prefer, affecting decision-making (Epley & Gilovich, 2016). How people's control perceptions are colored by the outcomes of the decisions they do and do not control remains another open, but important, question.

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A Appendix

A.1 Parameters of the Delegation Games

The ten games differ in the payoff in case of success (high versus low stakes), cost of effort and the strength of the principal's preference for her project over the agent's project (defined by the gap in the payoff for the principal of the two alternative projects in the case of success). The order of the games is random for each session.

Table A.1: Parameters of the Games

	Payoffs in case of Success				Payoffs in	Cost of effort*
	Project A		Project B		case of Failure*	
	Principal	Agent	Principal	Agent		
Game 1	220	190	190	220	100	0.01 e^2
Game 2	280	235	235	280	100	0.01 e^2
Game 3	180	140	140	180	100	0.01 e^2
Game 4	220	160	160	220	100	0.01 e^2
Game 5	260	260	260	260	100	0.01 e^2
Game 6	440	380	380	440	200	0.02 e^2
Game 7	560	470	470	560	200	0.02 e^2
Game 8	360	280	280	360	200	0.02 e^2
Game 9	440	320	320	440	200	0.02 e^2
Game 10	520	520	520	520	200	0.02 e^2

Notes: Payoffs are given in experimental points. All game parameters are the same as in Bartling et al. (2014). * Payoffs in case of failure and the cost of effort are identical for both players.

A.2 Experimental procedures

A.2.1 Role Assignment

Our experimental software calculated the locus of control index for each participant based on their answers in the psychometric scale and assigned participants to the role of principal and agent according to this index. One-third of participants—including the most external (or the least internal) in the session—were assigned to the role of principal. Among the remaining participants, half were randomly assigned to the role of principal and the other half were assigned to the role of agent.

We opted for this unbalanced assignment, with two-thirds of participants in the role of principal and one-third in the role of agent, because we only examine the decisions of the

principal. We combined a fixed and random assignment because locus of control tends to follow a skewed distribution in representative samples of the population with a large cluster of internal people and a small cluster of external people (Cobb-Clark & Schurer, 2013). Our assignment procedure allows us to increase the share of external participants in the role of principal compared to a fully random assignment. This is to ensure we obtain a sufficient number of principals who are external in a reasonable sample size for a laboratory experiment.

Participants were not aware that their answers to the locus of control questionnaire would influence their role in the experiment and were informed that their answers did not influence their earnings. This was to encourage truthfull answers in the locus of control questionnaire. We defined the earnings schedule carefully so that (on average) a principal and an agent are expected to earn the same. Specifically, while principals played each of the ten delegation games once (in rounds 1–10), each agent played the ten games twice—they played the ten games in rounds 1–10; then played again the same games in rounds 11–20 (in a different, random order). After all participants played the delegation games, the decisions of half of the principals (in rounds 1–10) were matched with the decisions of the agents in rounds 1–10, while the decisions of the remaining principals were matched to the decisions of the agents in rounds 11–20. At the end of the experiment, the earnings of the principal in the delegation game was determined by the outcome of one randomly selected game, and the earnings of the agent was determined by the outcome of two randomly selected games (one played in rounds 1–10, and another played in rounds 11–20).

The earnings of the principal in the lottery valuation task were determined according to the outcome of two randomly chosen lotteries. Each principal was also assigned the role of the "other participant" in a lottery played by another principal and received an additional payment according to the outcome of that lottery. Each agent was assigned the role of the "other participant" in two lotteries (played by two principals) and received two payments according to the outcome of those lotteries.

Therefore, across the delegation game and lottery valuation task, every participant received four payments (for the principal, one payment from the delegation game and three payments from the lottery valuation task; for the agent, two payments from the delegation game as well as from the lottery valuation task) with same expected value. The principal and the agent completed all remaining parts of the experiment and expected the same earnings in these parts. In our sample, the difference in average earnings between principals and agents is about \$1 (not statistically different from zero, p-value$>$0.1).

A.2.2 Post-Experimental Tasks

There are potential confounders in our analysis that we aim to rule out. The intrinsic value of decision-making could be confounded with loss aversion if the principal primarily dislikes losing her right to make her own decisions, while ambiguity aversion could influence participants' effort decisions in the delegation game with unknown return to effort, as they are made under ambiguity.[26] Individual differences in cognitive ability may also contribute to heterogeneity in decisions in the experiment. Previous studies have shown a link between cognitive ability and economic preferences (see, for example, Dohmen et al., 2010). Moreover, our experiment requires participants to focus on cognitively demanding tasks. Cognitive ability and general self-confidence may also mediate the link between locus of control and decisions in the experiment (Cebi, 2007). At the end of the experiment, we experimentally elicit loss and ambiguity aversion, measure self-reported general risk attitudes and self-confidence, and assess cognitive ability, to rule them out as potential confounders.[27]

We elicit loss aversion by asking participants to opt between playing a lottery which results in a positive or a negative payoff with equal probability and not playing the lottery (as in Bartling et al., 2014; Ferreira et al., 2020). We elicit ambiguity aversion by asking participants to opt between risky lotteries in which probabilities for the favorable and unfavorable outcome are known, and ambiguous lotteries in which probabilities are not known to participants (as in Kocher et al., 2018). We measure cognitive ability using a matrix reasoning test (provided by the International Cognitive Ability Resource, Condon & Revelle, 2014).

[26] The studies by Bartling et al. (2014) and Ferreira et al. (2020) show no support for the hypothesis that the intrinsic value of decision-making is driven by loss aversion. Nonetheless, we control for loss aversion in our analysis.

[27] As noted by Bartling et al. (2014), risk attitudes cannot influence the intrinsic value of decision-making because it is measured by the difference in the valuation of lotteries.

A.3 Descriptive Statistics

A.3.1 Distribution of Locus of Control Index

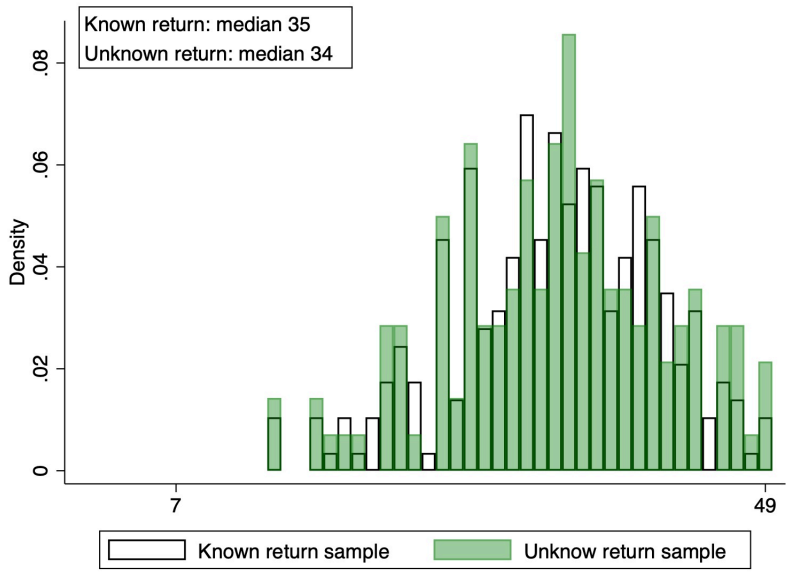


Figure A.1: Distribution of the Locus of Control Index by Treatment.

A.3.2 Locus of Control and Big Five Personality Traits Correlations

In line with previous research, we find that locus of control is positively correlated with conscientiousness and negatively correlated with neuroticism (Almlund et al., 2011; Borghans et al., 2008). We also find that locus of control is positively correlated with extraversion and agreeableness. In the case of the known return to effort sample only, locus of control is also positively correlated with openness. These patterns are consistent with previous findings using the HILDA dataset (Cobb-Clark et al., 2016).

Table A.2: Correlation between Locus of Control (*loc*) and Big Five Personality Traits, by Treatment

	Open	Conscientious	Extravert	Agreeable	Neurotic
loc–Known return	0.20^{**}	0.40^{***}	0.35^{***}	0.25^{***}	-0.37^{***}
loc–Unknown return	0.04	0.50^{***}	0.31^{***}	0.08^{**}	-0.39^{***}

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A.3.3 Principal's Project Choices in the Delegation Game

In 8 of the 10 games, the principal's payoff in case of success is larger in project A than project B. In the remaining 2 games (games 5 and 10), the principal's payoff in case of success is the same in project A and B. Table A.3 shows the share of project A choices by principals in the two treatments. As expected, a large majority of principals choose project A when its payoff in the case of success exceeds the payoff of project B. A smaller share, but still a majority of principals choose project A when both projects yield the same payoffs in the case of success.

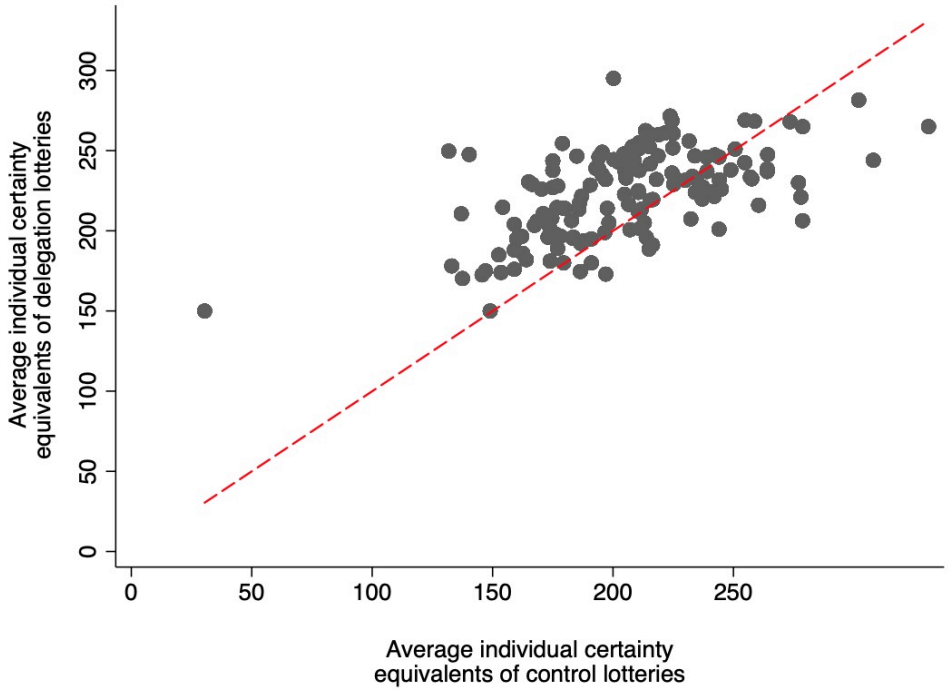
Table A.3: Share of Principals that choose Project A, by Treatment

Payoff for success in:	Known return	Unknown return
Project A > B	89%	84%
Project A = B	73%	65%

A.3.4 Lottery Valuations in the Unknown-Return Treatment

A clean measure of preference for agency can only be obtained in the delegation game with known return to effort, which was carefully designed to capture the extent to which people value making their own decisions and remove any possible confounding effects. In contrast, in the delegation game with unknown return to effort, beliefs will influence the "preference for agency". This is because in the unknown-return treatment the probabilities associated with the two possible outcomes of the lottery correspond to the participant's beliefs about the chance of success of their own project (in control lotteries) and of the agent's project (in delegation lotteries) in the delegation games.

We show in Figure A.2 each participant's average certainty equivalents for the delegation lotteries against their average certainty equivalents for the control lotteries in the unknown-return treatment. We find that 76 percent of participants, on average, value the delegation lotteries more than the control lotteries, which is consistent with a preference for agency, while 24 percent do the opposite. Participants' valuation of the delegation lotteries is, on average, 23 percent larger than the valuation of the control lotteries. The share of participants who display a preference for agency and the average gap in the valuation of the two types of lotteries is smaller in the delegation game with unknown return to effort than in the game with known return to effort. This is explained by the fact that while the preference for agency is precisely measured in the first case, in the delegation game with unknown return to effort the preference for agency is conflated with the decision-maker's beliefs.



Note: Each dot represents one participant. The dashed line is the 45-degree line.

Figure A.2: Average Certainty Equivalents of Control and Delegation Lotteries (in experimental points) in the Unknown Return Treatment

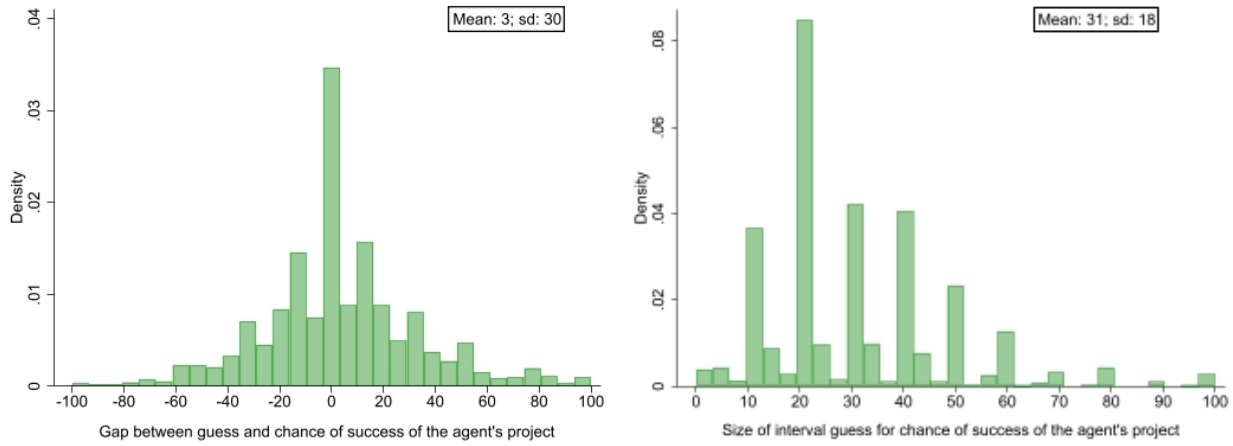
A.4 Additional Results on Beliefs and Effort Threshold for Delegation

Our results reported in Section 4 focussed on the link between the principal's locus of control and their beliefs and effort decisions for their own project. The is because the conceptual link between being internal and life outcomes concerns optimism and confidence about the return to one's own actions. In this section we explore the link between the principal's locus of control and (i) their beliefs about the chance of success of the agent's project in the unknown return treatment (Figure A.3 and Tables A.4) and (ii) their effort threshold for delegation (Table A.5).

Locus of Control and Beliefs about the Agent's Project

In the unknown-return treatment, in addition to stating their beliefs about the chance of success of their own project, principals were asked to state their beliefs about the chance of success of the agent's project, assuming the agent's level of effort was equal to the minimum effort threshold for delegation. In Figure A.3(a) we show the distribution of the gap between a principal's estimate of the chance of success of the agent's project and the minimum effort required for delegation, and in Figure A.3(b) we show the distribution of the size of the

estimated confidence interval. On average, principals' estimate of the chance of success of the agent's project exceeds—by 3 percentage points—the actual chance of success (with a standard deviation of 30) and the average size of the confidence interval is 31 percentage points (with a standard deviation of 18). Unlike in the case of beliefs for success of the principal's own project, we find no correlation between their level of optimism about the success of the agent's project and confidence.



(a) Optimism **(b)** Confidence

Figure A.3: Principals' Beliefs about Chance of Success of the Agent's Project

In Table A.4 we report the regression results on the link between the principal's locus of control and optimism and confidence about the return to effort from the agent. Our results indicate that there is no link between the principal's locus of control and their level of optimism or confidence about the chance of success of the agent's project.

Table A.4: Locus of Control and Beliefs about the Return to Effort from the Agent

	Optimism			*(Lower) Confidence*		
	Estimate of chance of success			Size of confidence interval		
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of control (*loc*)	1.683	1.637	1.651	-0.806	-0.811	-0.412
	(2.060)	(2.005)	(2.102)	(1.052)	(1.052)	(1.458)
loc × Effort threshold	-0.021	-0.020	-0.025			
	(0.040)	(0.039)	(0.039)			
Effort threshold	0.186***	0.187***	0.181***	-0.041	-0.041	-0.040
	(0.045)	(0.045)	(0.045)	(0.032)	(0.032)	(0.031)
Estimate of chance of success				-0.030	-0.030	-0.027
				(0.041)	(0.041)	(0.041)
Illusion of control		0.020	0.017		0.029	0.048
		(0.136)	(0.141)		(0.175)	(0.182)
Constant	49.141***	49.062***	32.804***	31.815***	31.736***	26.070**
	(3.106)	(3.071)	(7.888)	(5.277)	(5.415)	(10.767)
N	1402	1402	1402	1402	1402	1402
Clusters	147	147	147	147	147	147
Session & game dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual characteristics			Yes			Yes

Notes: A smaller confidence interval indicates greater confidence. Locus of control index is standardized. All specifications control for project choice. Columns (3) and (6) control for sociodemographics, IQ, ambiguity attitudes, and the big five. Standard errors are clustered by participant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Locus of Control and Effort Threshold for Delegation

In Table A.5 we report the regression results on the link between the principal's locus of control and their effort threshold for delegation, contrasting decisions in the known and unknown return treatments. We find no evidence of a link between locus of control and the effort threshold for delegation in either treatment.

Table A.5: Locus of Control and Effort Threshold for Delegation

	(1)	(2)
Locus of control (*loc*) [(a)]	0.143	-0.492
	(1.246)	(1.288)
R unknown × *loc* [(b)]	-0.100	-0.323
	(1.778)	(1.771)
R unknown	-11.369**	-11.934**
	(4.566)	(4.624)
Constant	59.131***	61.268***
	(3.292)	(9.809)
Effect of *loc* on *y* when *return unknown*		
Coefficient $(a)+(b)$	0.043	-0.815
Standard error	(1.273)	(1.426)
N	2870	2870
Clusters	287	287
Session & game dummies	Yes	Yes
Individual characteristics		Yes

Notes: Locus of control index is standardized. All columns control for project choice in the delegation game. Column (2) controls for sociodemographics, IQ, self-reported risk, ambiguity attitudes, and the big five. Standard errors are clustered by participant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.