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On the Roots of the Intrinsic Value of Decision Rights: Evidence from France and Japan*

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Abstract

Bartling et al. (2014) found that Swiss individuals attach an economically meaningful intrinsic value to make a decision by themselves rather than delegating it to another person. We refine their analysis in order to disentangle how much of such value stems from (i) a preference for independence from others, (ii) a desire for power, or (iii) a preference for self-reliance, and conduct a cross-cultural comparison between France and Japan. Our findings suggest that (i) Japanese and French individuals intrinsically value decision rights beyond their instrumental benefit, that (ii) this positive value is greater for French than Japanese individuals, and that (iii) self-reliance is the only rationale behind the intrinsic value of decision rights in both France and Japan. These results bring new insights into the roots of the preference for being in control, which can be relevant for institutional design.

Keywords: Intrinsic value; Decision rights; Independence; Power; Self-reliance; Cross-cultural experiment.

JEL classification: C91; D03; D23.

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1 Introduction

Who holds the control over decisions is an important dimension of many social interactions. In organizations, markets, or civil society, individuals interact by keeping or delegating the control over diverse decisions. In economics, the principal-agent dilemma over decision rights is the focus of a prolific literature (e.g. Simon 1951; Hart and Moore 1990; Aghion and Tirole 1997). While most authors have looked at decision rights as *instrumental* to achieve certain outcomes, holding the control over decisions may be valued for its own sake, i.e., even when it carries no advantage in terms of achieving preferred outcomes. Indeed, in a recent experimental study that separates the intrinsic and instrumental values of decision rights on the basis of subjects' revealed preferences, Bartling et al. (2014) provide experimental evidence suggesting that individuals (in their context Swiss students) attach an economically meaningful *intrinsic* value to make a decision for themselves rather than delegating it to another person.

A natural question that follows is what are the motivating *rationales* behind such an intrinsic value of decision rights. One potential underlying reason is a preference for autonomy on the process of choice. If this is the case, decision rights carry an intrinsic value beyond their instrumental value either due to a desire to implement one's decision (a sense of *self-reliance*) or a preference for *independence* from the interference of another person. An alternative reason is a preference for *power* associated with holding the decision right. In this case, the intrinsic value of holding control stems from a desire to be able to decide on behalf of someone else.

While both autonomy and power are reasonable sources of an intrinsic value of decision rights, they are considerably different in nature and implications. On the one hand, self-reliance and independence are regarded by many as basic moral and political values (e.g. Hayek 1960; Berlin 1969). They are related to the notions of personal autonomy and liberty that philosophers and social psychologists have linked to well-being and demands of social justice.[1] For instance, Rawls (1971) uses the conception of the autonomous person to formulate and justify his principles of justice; and Deci and Ryan (1985) contend that autonomy is essential for well-being. On the other hand, power as an end in itself (or what has been called the *love of domination*) is seen by many as an obstacle to freedom. For instance, Machiavelli (2003) saw the ambition of the powerful directed against the populace as the gravest and least easily neutralized danger to free governments (see Skinner 1992).

The first objective of this paper is, therefore, to measure the weight of each of these rationales in the potential intrinsic value of decision rights.

In addition, the expression of an intrinsic value of decision rights and its underlying reasons may be linked to identifiable social conditions, contextual factors, and personal characteristics.

[1] See Christman (2011) and Anderson (2013) for reviews on different conceptions of autonomy, and the role of self-reliance and independence on the constitution of personal autonomy.

In this respect, empirical evidence and casual observation suggest that the *cultural background* may have a strong influence when it comes to *core values* such as autonomy and power. There is by now a long list of cross cultural experimental studies that document significant differences in preferences and behavior across societies (e.g. Roth et al. 1991; Henrich et al. 2004; Gächter et al. 2010). Among these, several studies suggest that East Asian cultures tend to place a greater emphasis on collectivism and cooperation than Western cultures that are based on more individualistic values (e.g. Parks and Vu 1994; Wong and Hong 2005; LeBoeuf et al. 2010).

The second objective of this paper is, therefore, to test if the intrinsic value of decision rights and its rationales differ according to the cultural background.

In order to achieve these two objectives, we extend the experimental design of Bartling et al. (2014) and implement, both in France and in Japan, a series of treatments that allow us to disentangle how much of the intrinsic value of decision rights stems from (i) the aversion to be affected by the decision made by someone else (*independence*), (ii) the desire to decide on behalf of someone else (*power*), or (iii) the will to implement a decision that is the result of one's rational deliberation (*self-reliance*). The choice of these two countries allows us to test if the French (linked to Western) and Japanese (linked to Eastern) cultural backgrounds translate into different tastes for holding control, in particular in terms of the rationales (different core values) behind the potential intrinsic value of decision rights.

All treatments maintain the experimental design of Bartling et al. (2014), which consists of two parts. In the first part of the experiment, a principal has the choice between keeping a decision right or delegating it to an agent. This part is constructed in order to elicit the principal's point of indifference between keeping and delegating the decision right. In the second part, the monetary values of keeping and delegating control are elicited with a pair of lotteries that are constructed based on the choices made by the principal in the first part.

The treatments vary with respect to the nature of the agent. In the first treatment, which is a replication of the experiment by Bartling et al. (2014), the agent is a human subject. In the second treatment, a (ro)bot plays the role of the agent. Then, a principal who reveals an intrinsic value to hold control is not motivated by neither a preference for independence *nor* a desire for power. The principal cannot be neither affected by the decisions or exercise power over *another person*. This means that in the second treatment the potential intrinsic value of decision rights derives from other motives such as a preference for self-reliance. In the third treatment, a bot makes the decisions on behalf of a passive human agent. Here, an intrinsic value for holding control can be motivated by a preference for power or self-reliance but not by a preference for independence from the interference of another person. This is the case since the principal cannot be affected by a decision made by any human agent, but the principal can hold control over the decisions that affect the passive human agent. The net effects of these

treatments give us precise estimates to test the role of the different motives in the potential intrinsic value of decision rights.

We find that principals in both countries assign an economically and statistically significant intrinsic value to hold control over decisions. This suggests that the intrinsic value of decision rights may be a preference shared by individuals with Western and Eastern cultural backgrounds. It also brings support, as a cross-cultural replication, to the main finding of Bartling et al. (2014). Second, we find that on average, and taking all rationales into account, French principals attach a higher intrinsic value to decision rights than Japanese principals.

In terms of the motives for this preference, our main finding is that a preference for self-reliance is the only rationale behind the intrinsic value of decision rights in both France and Japan. This effect is economically and statistically significant, and of similar size in both countries. This means that, somewhat surprisingly, independence and power are not motivations behind the intrinsic value of being in control in our setting. In other words, the source of the intrinsic value of decision rights in our setting seems not to be linked to the will to affect or not being affected by another person.

Before proceeding, it is worth pointing out that we are well aware that holding control will not be *always* intrinsically valued. For instance, decisions may have an "unpleasant" component attached to them when they run counter to the interests of another person (Bartling and Fischbacher 2012). A similar argument can be used with relation to our main findings, that should not be interpreted as indications that power and independence are not motives for a preference for holding control and sources of value in principal-agent interactions. For instance, power may be valuable by the amenities it brings, such as status and recognition. What our results suggest is that without these additional instrumental sources of value, power and independence may be less valued than a preference for self-reliance as motivations for the intrinsic value of decision rights.

The remaining of the paper is organized as follows. We proceed with a brief relation to the literature. Section 3 is devoted to the experimental design. In Section 4 we describe the measurement of the rationales and our theoretical predictions. We report our findings in Section 5. We discuss some potential worries and limitations of the experimental design and our treatments in Section 6. Section 7 concludes.

2 Relation to the Literature

Our findings can be contrasted with the ones found by Neri and Rommeswinkel (2014), that look at the rationales behind the intrinsic value of decision rights with a different experimental design. On the one hand, our results match theirs in that a preference for power is not a

strong determinant for the intrinsic value of decision rights.[2] On the other hand, our results contrast with theirs in terms of the relative importance of independence and self-reliance; in their experiment, independence is a stronger rationale for the intrinsic value of decision rights than self-reliance. The discrepancy may be due to the differences in the elicitation of the intrinsic value of decision rights and the definition and elicitation of the rationales behind this preference.

By replicating and refining the analysis started by Bartling et al. (2014), we contribute to the literature on incomplete contracts and the delegation of authority (e.g. Aghion and Tirole 1997). In particular, we add new evidence to the emerging literature on experimental economics on the value of decision rights, autonomy, and power (e.g. Falk and Kosfeld 2006; Fehr et al. 2013; Owens et al. 2014; Neri and Rommeswinkel 2014; Burdin et al. 2015). Bartling et al. (2014) show that underdelegation of decision rights from principals to agents, a result also found in previous experimentally controlled situations (e.g. Fehr et al. 2013; Owens et al. 2014), can be the result of an intrinsic value of holding control. Our results suggest that this underdelegation is mostly driven by a preference for self-reliance, rather than a preference for independence or power.

Likewise, our results contribute to the corporate finance and governance literatures (e.g. Aghion and Bolton 1992). Among the benefits of being in control, authors have acknowledged the "psychic value" that some shareholders attribute simply to being in control (Dyck and Zingales 2004, p. 540). Our analysis provides new empirical measures to test if these benefits are due to goals such as "the pursuit of power" (Hart and Moore 1995, p. 568). In addition, our results bring new insights over the rationales and social characteristics behind decisions such as self-employment and career choice. Non-pecuniary motives seem to be an important driver of decisions such as to enter self-employment (Hamilton 2000; Pugsley and Hurst 2011), and our results point towards the potential relevance of the ability to implement one's decisions against independence and power.

Given the cross-cultural dimension of our experiment, our analysis is also related to the research on the effect of the cultural background in shaping preferences and values. In particular, we contribute to the new strand of experimental research investigating the diversity of behavior and preferences across societies (e.g. Bohnet et al. 2008; Henrich et al. 2010; Gächter et al. 2010). Our results report new evidence on how the cultural background may influence core values that are often seen as fundamental for individual well-being and social welfare. As pointed by Fehr and Hoff (2011), having more information about the interaction between culture and preferences (values) may help policy makers to shape institutions that take into account the heterogeneity in preferences (values) that are found in different societies.

[2] Their experimental measure of power is somewhat different than ours since the player with the decision right is not choosing for the other player. In fact, the decision taken by the principal only randomly determines the agent's payoff. In our view, this should be interpreted either as (i) an illusion of power or (ii) a preference for limiting the freedom of the other.

More specifically, our findings are relevant to the debate on the relationship between core values and the Eastern and Western cultural backgrounds. In previous studies, Asian-American subjects have been shown to have a higher tendency to cooperate when their Asian identity is made salient (LeBoeuf et al. 2010), and Asian-American children, contrary to Anglo-American ones, have been shown to perform better - have higher intrinsic motivation - when a simple task is chosen by their mothers than by themselves (Iyengar and Lepper 1999). Following some of these and other results, some authors have challenged the held view that autonomy is an essential component of well-being for human beings worldwide (e.g. Iyengar and DeVoe 2003).[3] Even though our analysis cannot answer this deep question, our findings support the view that it is important to distinguish between autonomy as independence from an unknown human influence and autonomy as a sense of self-reliance based on the will to implement one's decisions (see Ryan and Deci 2006).

3 Experimental Design

In what follows, we summarize the experimental design of Bartling et al. (2014), explain the new treatments, and present the strategy used for the elicitation of preferences.[4] We end this section with details about the procedures followed in the experiment, notably on the ones used to ensure the robustness of our cross-cultural comparison.

3.1 Part 1: The Delegation Game

In the first part of the experiment, subjects play several 2-player one-shot delegation games. A *principal* (she) has the possibility to keep or delegate a decision right to an *agent* (him), which grants the right to implement a risky project. The outcome of the project determines the principal's and the agent's payoffs. There are two risky projects, $\mathcal{A}$ and $\mathcal{P}$, with the payoffs summarized in Table 1 where the subscripts refer to the projects, and 0 stands for the failure of the risky projects. The projects are risky since their success depends on the effort choice (probability of success) chosen by the player that keeps/gets the decision right. Before explaining how the delegation of decision rights from the principal to the agent takes place, we describe how the principal and the agent choose the project and its success probability.

Table 1: Projects' Payoffs

Principal (P)	Agent (A)
$P_{\mathcal{P}} \geq P_{\mathcal{A}} > P_0$	$A_{\mathcal{A}} \geq A_{\mathcal{P}} > A_0$

The principal and the agent choose simultaneously a project, $\mathcal{A}$ or $\mathcal{P}$, and an *intended effort*

[3] See Ryan and Deci (2006) for a response to these critics and a defense of autonomy as a *universal value*.

[4] We refer the reader to Bartling et al. (2014) for details and the theoretical foundation of the experimental design.

level, denoted by E and e respectively, that they would like to implement in case they have the decision right. Effort can be chosen from the set $[0, 100]$ and corresponds to the probability (in percent) that the project will be successful. Effort is equally costly to the principal and the agent. The cost of effort is given by $C(E) = kE^2$ and $C(e) = ke^2$ respectively, where $k \in \{0.01, 0.02\}$ is a cost parameter.[5] Both subjects make their two choices simultaneously without knowing who is going to have the decision right, i.e., without knowing whose decision (of project and effort) will be implemented. Their choices are binding, and the ones made by the subject who ultimately holds the decision right determine the project to be implemented and its outcomes. Only this player pays the cost of effort.

In addition, and essential for the design, the principal also indicates a *minimum effort requirement* $\underline{e} \in [1, 100]$ that the agent needs to choose in order for her to be willing to delegate the decision right. That is, delegation takes place if and only if the agent's intended effort level is at least as high as the principal's minimum effort requirement, i.e., if and only if $\underline{e} \leq e$. The principal chooses this minimum requirement without knowing the e chosen by the agent; similarly, the agent chooses his intended effort level without knowing the $\underline{e}$ chosen by the principal. Then, *the minimum effort requirement should represent the principal's point of indifference between keeping the decision right and delegating it to the agent.*

In total, subjects play ten different delegation games (ten rounds) with stranger matching. The participants remain in the role of principal or agent throughout the experiment, and receive no feedback about the outcomes in a given round until the end of the experiment. The rounds differ only with respect to the projects' payoff and costs of effort. These differences allow us to test for situational determinants of a potential intrinsic value of decision rights such as the *stake size* and the *conflict of interest* between the principal and the agent. Table 2 summarizes the main parameters of the ten games.[6]

Table 2: Parameters of the Games

	Project Successful				**Project**			
	Project $\mathcal{P}$		**Project $\mathcal{A}$**		**Unsuccessful**			
	$P_{\mathcal{P}}$	$A_{\mathcal{P}}$	$P_{\mathcal{A}}$	$A_{\mathcal{A}}$	P_0	A_0	$C(E)$	$C(e)$
Game 1	220	190	190	220	100	100	$0.01E^2$	$0.01e^2$
Game 2	280	235	235	280	100	100	$0.01E^2$	$0.01e^2$
Game 3	180	140	140	180	100	100	$0.01E^2$	$0.01e^2$
Game 4	220	160	160	220	100	100	$0.01E^2$	$0.01e^2$
Game 5	260	260	260	260	100	100	$0.01E^2$	$0.01e^2$
Game 6	440	380	380	440	200	200	$0.02E^2$	$0.02e^2$
Game 7	560	470	470	560	200	200	$0.02E^2$	$0.02e^2$
Game 8	360	280	280	360	200	200	$0.02E^2$	$0.02e^2$
Game 9	440	320	320	440	200	200	$0.02E^2$	$0.02e^2$
Game 10	520	520	520	520	200	200	$0.02E^2$	$0.02e^2$

[5] The cost parameter k varies across rounds, but it is always common knowledge and identical for both players.
[6] The order of the games/rounds was randomized across sessions.

Subjects are paid at the end of the experiment according to the outcome of one randomly chosen round. Payments, that depend upon the success of the project, are based on a random number $r \in [1, 100]$ and the effort level chosen by the participant with the decision right. If the principal has the decision right, the project is successful if $r \leq E$; if instead the agent has the decision right, the project is successful if $r \leq e$. Otherwise (if neither of these cases is realized), the project fails.

3.2 Part 2: The Lottery Task

In the second part of the experiment, subjects perform an individual decision task. Each subject states their certainty equivalent for each of 20 different lotteries, i.e., the smallest certain payoff they are willing to accept instead of each one of these lotteries. Each lottery determines probabilistically the subject's own payoff and the payoff of another randomly paired participant.

Consider the subjects who played the role of the principal in Part 1 of the experiment. These are the subjects of interest, since Part 2 is an individual task, and they are the ones for which we measure their potential intrinsic value of holding control. For each of these subjects, and *without them being informed of that*, the lotteries are constructed based on their own choices in the delegation game.

In each round of the delegation game, their choice of $\mathcal{P}$, E, and $\underline{e}$ determine a pair of lotteries: (i) A principal's intended effort (with the corresponding effort cost) and the chosen project fully determine a *control lottery*; and (ii) her minimum effort requirement fully determines a *delegation lottery*.[7]

For each lottery, the subjects' certainty equivalent is elicited in an incentive compatible manner *à la* Becker et al. (1964). The lotteries consist of a low ($\underline{P}$) and a high ($\overline{P}$) payoff for the principal and a low ($\underline{p}$) and a high ($\overline{p}$) payoff for another randomly paired participant.[8] The lotteries are presented in an individually randomized order, and principals are asked to state the smallest certain payoff - the certainty equivalent (ce) - that they are willing to accept instead of the lottery.

At the end of the experiment, two of these 20 lotteries are randomly chosen to be relevant for payment. Each of these two lotteries is either played or not depending upon the ce that the principal has stated for that lottery and a randomly generated number $r \sim U[\underline{P}, \overline{P}]$. If $r \geq ce$ the principal receives r for sure and the randomly paired participant receives a certain payment equivalent to those of the projects in Part 1 in case of failure.[9] Otherwise (if $r < ce$), the lottery

[7] Condition (ii) is grounded on the assumption that the principal perceives delegation to lead to the choice of project $\mathcal{A}$ (i.e. the principal anticipates that the agent will/may choose the project that gives him the higher payoff). We discuss this assumption in Section 6.

[8] This differs from a typical experimental certainty equivalent elicitation task since lotteries and certainty equivalents involve not only payoffs for the decision maker but for two parties. This is done to ensure comparability with the lotteries in Part 1.

[9] More precisely, the randomly paired participant receives 100 points in the lotteries derived from the choices in games 1 to 5 and 200 in the ones derived from the choices in games 6 to 10.

is played. Feedback is given to participants only at the end of the experiment.

3.3 Example of Parts 1 and 2

To summarize, take the following example. Suppose that instead of ten games, there was only Game 1 in Part 1 (see Table 2), and assume that a principal chooses project $\mathcal{P}$, $E = 50$ (with a corresponding cost $C(E) = 25$), and $\underline{e} = 40$ (with an associated effort cost $C(e) = 16$ for the agent). Assume that her randomly matched agent chooses project $\mathcal{A}$ and $e = 30$ (with a corresponding cost $C(e) = 9$). According to these choices, the principal keeps the decision right; but since feedback is not yet given to the participants, Part 2 starts without the subjects being aware of the outcomes of Part 1. Two lotteries - with payoffs for the principal and another randomly paired participant - are determined from the principal's decisions taken in Part 1 without them being informed of it:

- A control lottery such that $\overline{P} = 220 - 25 = 195$ and $\overline{p} = 190$ with 50% probability (high payoff), and $\underline{P} = 100 - 25 = 75$ and $\underline{p} = 100$ with 50% probability (low payoff).
- A delegation lottery such that $\overline{P} = 190$ and $\overline{p} = 220 - 16 = 204$ with 40% probability (high payoff), and $\underline{P} = 100$ and $\underline{p} = 100 - 16 = 84$ with 60% probability (low payoff).

The principal then states her certainty equivalents (ce) for these two lotteries. Assume that the principal states a certainty equivalent for the control lottery of 140 and a certainty equivalent for the delegation lottery of 160. Payments are then calculated according to three randomly generated numbers, say r_1 (for Part 1), and r_2 and r_3 (for Part 2).[10] If $r_1 \leq E$ the principal receives $220 - 25 = 195$ points and the randomly matched agent receives 190 for Part 1. Otherwise (if $r_1 > E$), the principal and the agent receive 75 and 100 points for Part 1 respectively. For Part 2, if $r_2 \geq 140$ for the control lottery then the principal receives r_2 for sure and the randomly paired participant receives 100 points. Otherwise the control lottery is played and payments are determined according to its result. For the delegation lottery, if $r_3 \geq 160$ then the principal receives r_3 for sure and the randomly paired participant receives 100 points. Otherwise the delegation lottery is played and payments are determined according to its result.[11] In addition, the principal receives a supplementary payment for her role as a "randomly paired participant" to another subject in Part 2. Feedback is finally given to all participants.

3.4 Treatments

To examine the rationales behind a potential intrinsic value of decision rights, we implemented three treatments (T1, T2, and T3) that vary the nature of the agent. In T1, the agent is a

[10] The same holds for the full experiment, except that the game of Part 1 and the lotteries of Part 2 are chosen independently for payment.

[11] Note that the results of the control and delegation lotteries, if they are played, will be based on randomly generated numbers. We have omitted them to simplify the exposition.

human subject. In T2 a bot (computer program) plays the role of the agent.[12] And in T3 a bot makes decisions on behalf of a passive human agent. Figure 1 summarizes the organization of these treatments.

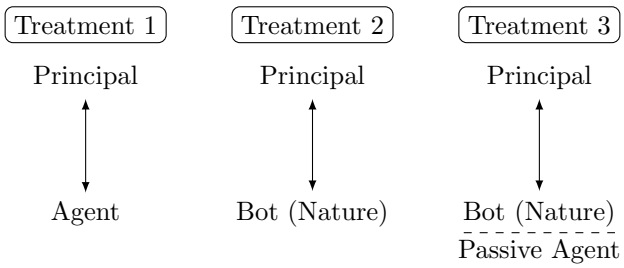

Figure 1: Treatments

In Part 1 of T2 and T3, the bot (i) always chooses the project alternative that provides it (or the passive human agent) the larger payoff (i.e., project $\mathcal{A}$), and it (ii) uniformly randomly determines its effort from $[0, 100]$. The principal (and the passive human agent) are informed of this decision making model of the bot. Condition (i) is consistent with the theoretical (self-interested) prediction for the agents' choice in Part 1. Condition (ii) is an attempt to mimic *nature*, in the sense of a chance device. This is also the interpretation given to a random device by Bohnet et al. (2008), that use a similar strategy to disentangle different rationales behind subjects' willingness to take risk. In Part 2, the bot randomly determines the certainty equivalents. This has no bearing to our design since Part 2 is an individual decision task in which agents (and the bot) are only known to the principal in the position of randomly matched "participants" that are affected by her decisions.

In T3, if the bot receives the decision right, it makes the decisions on behalf of the passive human agent. To put it another way, the passive human agent makes no relevant decision themselves.[13] This means that the passive human agent's payoff depends on the decisions taken by the principal and the bot, while the principal's payoff depends on their own decisions and the ones taken by the bot. In Section 6 we discuss the potential implications of social and risk preferences, ambiguity aversion, beliefs about the agent's behavior, and differences in beliefs regarding the agent's and bot's behavior.

3.5 Additional Experimental Measures

After Part 2 of the experiment, we ask subjects to complete a series of short tasks. As in Bartling et al. (2014), we elicit participants' loss aversion and illusion of control. In our experiment, we also elicit participants' cognitive ability. These measures allow us to control for alternative

[12] In the experiment we use the term "bot" (instead of computer program) to harmonize the instructions of the experiment with relation to T1.

[13] In order to entertain these participants, we let them perform the same decisions as agents in T1 although they are aware that these decisions will not be taken into account for payoffs.

explanations for a potential intrinsic value of decision rights.

We follow Bartling et al. (2014) and elicit the subjects' degree of loss aversion using a lottery task (a design taken from Fehr and Goette 2007). Subjects accept or reject a series of lotteries involving possible losses of different sizes X. For example, in France participants either accepted or rejected lotteries with a 50% probability of winning 5€ and 50% probability of losing X€, with X going from 1 up to 6€ (i.e., $X \in \{1, ..., 6\}$).[14] The amount X at which a participant starts rejecting the lotteries is an indicator of his or her loss aversion.[15] For instance, a participant who rejects all lotteries with a potential loss of $X > 2$ is classified as more loss averse than a participant who only rejects lotteries with a potential loss of $X > 5$.

To elicit subjects' illusion of control, we adopt a modified version of the incentive compatible elicitation method used by Charness and Gneezy (2010). We measure illusion of control as the principal's willingness to pay for the right to personally stop the roll of two ten-sided electronic dice (that determine the random outcomes in Part 1 and 2 of the experiment).[16] The key insight is that if principals are subject to an illusion of control, they should value stopping the rolling of the dice because this increases their *perceived* personal involvement in determining the final outcomes. If they opt not to personally stop the rolling dice, the dice stop automatically.

To assure the comparability between sites and for an additional control on the potential effects of bounded rationality, we elicit the subjects' cognitive ability through a *Raven's Progressive Matrices test* (RPM test). Recent experimental studies show that the scores of RPM tests are correlated with subjects' behavior in strategic games (see e.g. Burks et al., 2009; Carpenter et al., 2013; Gill and Prowse, 2016; Hanaki et al., 2016a,b). This test is widely used worldwide, and is especially suited for cross-cultural studies since it is independent of language, reading, and writing skills. The test consists of choosing among a given number of patterns the one that best fits the "blank space" of a visual geometric design. The number and difficulty of the visual geometric designs vary from one version of the test to the other. In our experiment, subjects were asked to choose among 8 patterns (8 options) and there were 16 different visual geometric designs of distinct difficulties, taken from the advanced version of the RPM test (Raven, 1998), to be answered in 10 minutes. Our measure of cognitive ability is then the score of this task computed as the number of correct answers.

[14] If they accepted, the lottery was played, otherwise they received 0€. Once all decisions are taken, one of the six lotteries is randomly selected for actual payment and, in case of acceptance, a computerized random draw determines its outcome.

[15] Remark that we might be unable to ascertain a participant's loss aversion if he or she has not a unique switching point. In our sample, there were 4 "non-consistent" subjects.

[16] We modify the task by substituting the two physical dice by two electronic dice that appear on the participants' screen. Principals are asked if they are willing to pay to personally stop the rolling dice. They are informed that the numbers change too quickly for them to be able to choose which numbers to stop on. This avoids the time consuming activity (that involves the participants and the experimenter) of rolling the physical dice.

3.6 Procedures

All subjects were students recruited at universities where we have conducted our experiments. The experiment was computerized using z-Tree (Fischbacher 2007). Payments were made for one randomly drawn round of the delegation game (Part 1), and for four randomly drawn lotteries in Part 2 (two of them in the role of the "random other participant"). Subjects received an extra endowment for the loss aversion and illusion of control tasks and were paid according to their results on these tasks. The following exchange rate applied: 100 points = 2.5€ or 300 Yen. Subjects earned a 5 € or 600 Yen show-up fee and received on average an additional 29.6€ in France and 3450 Yens in Japan in experimental sessions that lasted on average 2.5 hours.

Participants were provided with paper-based instructions for all parts of the experiment. Instructions for Part 2 of the experiment were handed out only after Part 1 was finished. Participants knew that the experimental session would consist of several parts, but they did not know the precise content of the future parts before the respective instructions were provided. To ensure that subjects understood the experimental design and the impact of their decisions on their earnings, they had to answer a series of control questions after reading the instructions of Part 1 and after reading the ones of Part 2. They were confronted with the different choices they would have to make during the experiment, and their answers were corrected and shown to them for revision.

To ensure the equivalence of experimental procedures across countries, we followed (for the most part) the methodology first used and described in Roth et al. (1991). We try to control for (i) subject-pool, (ii) language, (iii) currency, and (iv) experimenter effects. To control for *subject-pool effects*, we recruited only university students in both locations. Our subject pool is then mostly homogeneous in terms of length of educational background. In addition, we conducted a cognitive test in the end of the experiment (as explained in the previous section) to control for potential effects of differences in cognitive abilities. Finally, university students of non-western countries may be among the most "westernized" individuals of these countries. Our results can then be seen as a lower bound in terms of the effects arising from cultural differences. To minimize *language effects*, instructions in English were translated into local language by a French or Japanese native speaker, and back translated to English by another person. Translators were careful to write the instructions in neutral language, and the authors ensured compatibility with the German and English instructions of Bartling et al. (2014). In terms of *currency effects*, payoffs were expressed in "points" and the comparability of earnings was ensured by taking an average between standards of living, local hourly payments, and show-up fee practices of the laboratories.[17] To minimize *experimenter effects*, all experimenters were native speakers and were present in the first session of each treatment that were ran in France.

[17] With the exception of the loss-aversion task where outcomes were expressed in the local currency (as in Bartling et al. 2014). The conversion rate was conserved.

The experimental sessions in Japan were conducted by the second author, and the experimental sessions in France were conducted by the third. Further, most of the instructions were read individually, minimizing the subjects' interaction with the experimenter.

4 Motives and Culture: Measurement and Predictions

Regardless of the unobserved social and risk preferences of the principal, the experimental design ensures that it is optimal for the principal to choose a minimum effort requirement $\underline{e}$ such that she is indifferent between keeping and delegating the decision right at $\underline{e}$. As discussed below (Section 6), the optimal choice of $\underline{e}$ should be independent from the principal's beliefs about the agent's/bot's effort choice. Then, the intrinsic value of decision rights (IV hereafter) is measured by comparing the certainty equivalents (monetary values) of the control and delegation lotteries. The principal's utility of keeping control consists of the monetary value of the control lottery [ce(CL)] *plus* the potential IV. The principal's utility of delegating at $\underline{e}$ consists of the monetary value of the delegation lottery [ce(DL)]. As shown by Bartling et al. (2014), it is then possible to quantify the potential IV as the certain amount of points (money) that a principal demands as a compensation for the delegation of the decision right:

$$\text{IV} = ce(DL) - ce(CL)$$

We distinguish three motives that can underlay a potential intrinsic value of holding control. The first motive is the aversion to be affected by the decision made by someone else. This can be seen as a preference for *independence* (R1) and is closely connected to the concept of negative freedom. In one of its most famous formulations, Berlin (1969) defines negative freedom as the freedom from constraints that are imposed by others (as opposed to constraints such as biological impediments). For Berlin (1969, p. 8), negative freedom consists in "not being prevented from choosing as I do by other men." Similarly, R1 can be interpreted as the will not to be subordinated or to enjoy *freedom from the interference* of others.

The second motive is the desire to be able to decide on behalf of someone else. This can be interpreted as a notion of *power* (R2), when power is defined as authority exercised over others. For instance, Simon (1951, p. 294) states that "B exercises *authority* over W if W permits B to select x [a part of his/her behavior]". This rationale can be also interpreted as what has been called the *love of domination*, that Mercy Otis Warren claimed to *have prevailed among all nations and perhaps in proportion to the degrees of civilization.*

Finally, we highlight a preference for *self-reliance* (R3) as a candidate rationale for the intrinsic value of holding control. This is an important component of personal autonomy, and can be seen as the capacity of "being able to realize one's intentions and goals" (see Anderson 2013, 6). According to Raz (1986, p. 369), "[t]he ruling idea behind the ideal of personal autonomy is

that people should make their own lives". If this rationale is behind the IV in our experiment, then keeping the decision right is valued for the desire to implement one's decision. In this sense, we can distinguish between the traditional negative view of freedom/independence from others (as in R1) and a concept of "inner freedom" related to a sense of self-reliance and control (as in R3). While self-reliance has a strong internal character that our experiment is not able to grasp, the design allows us to test if a preference for personal autonomy in this sense may be a reasonable determinant of the IV.

To measure the strength of these different motives, we compare the net effects between the three treatments. R1, R2, and R3 are potential rationales for the IV in T1, R3 is the sole potential rationale behind the IV in T2, and R2 and R3 are potential rationales for the IV in T3. Taking the measured IV of our three treatments, we can construct precise estimates of the weight of each motive in the potential intrinsic value of holding control:

$$\begin{aligned}
\mathbf{R1} &= IV_{T1} - IV_{T3} = (R1 + R2 + R3) - (R2 + R3). \\
\mathbf{R2} &= IV_{T3} - IV_{T2} = (R2 + R3) - (R3). \\
\mathbf{R3} &= IV_{T2} = (R3).
\end{aligned}$$

We predict that all these rationales have a significant and positive impact on the intrinsic value of holding control. We expect independence from interference (R1) to have a positive impact given the long philosophical tradition on the value of negative freedom. For instance, this notion of freedom is endorsed as essential by most liberals, such as Hayek (1960), Nozick (1974), and Buchanan (1986). Power (R2) is expected to be a rationale behind the IV since it is seen by many as a powerful motivation for human behavior. For instance, according to McClelland's (1975) motivation theory, power is a dominant human need. Finally, self-reliance (R3) is expected to be a motive for the IV since it is often associated with increased well-being and a sense of worth. For instance, Deci and Ryan (1985) hold that self-determination/autonomy is essential for well-being, and the freedom of choice literature resonates over the idea that the process of choice itself has an intrinsic worth and that the opportunity to choose or act is essential for individuals to lead the lives they have reason to value (see e.g. Sen 1988). This can be resumed in the following hypotheses:

Hypothesis 1 $R1 > 0$.

Hypothesis 2 $R2 > 0$.

Hypothesis 3 $R3 > 0$.

In terms of cultural differences, we predict that principals in France attach a higher intrinsic value to be in control than principals in Japan. Our hypothesis is that this is driven by a higher

value of independence, i.e., that French give more relevance than Japanese to not be affected by someone else's decision. This seems to be consistent with the evidence that Western individuals are prone to endorse more individualistic values than Eastern individuals (e.g. Markus and Kitayama 1991; Parks and Vu 1994; Wong and Hong 2005; LeBoeuf et al. 2010). It is also supported by the World Values Survey (WVS) 2015 data that suggests that French give considerably more weight to *self-expression* values than Japanese.[18] This hypothesis can be written as follows:

Hypothesis 4 $R1(France) > R1(Japan)$.

Cultural differences in terms of preferences for power and self-reliance are unclear. First, to the best of our knowledge there is few theoretical analysis on the cultural/societal determinants of these preferences. Second, the empirical evidence is scarce and for the moment inconclusive. Although some authors argue that more individualistic societies may foster a higher preference for control over others (e.g. Lee 1997), for now there is no accumulated evidence on this front. With regard to self-reliance, its "inner" nature and the non-settled dispute about the worldwide value of personal autonomy favor the absence of an *a-priori* position. Accordingly, we make no prediction about the different weights of these motives between France and Japan.

5 Results

This study involved 521 subjects, from which 319 were in the position of principal. Since we are interested in potential differences due to the cultural background, we drop from the analysis 45 principals that are neither of French or Japanese Nationality nor born in France or in Japan.[19] From the remaining 274 principals (observations), 142 participated in France [94 in Rennes (28 in T1, 38 in T2, 28 in T3) and 48 participated in Nice (15 in T1, 20 in T2, 13 in T3)] and 132 participated in Japan [65 in Osaka (23 in T1, 18 in T2, 24 in T3) and 67 in Tsukuba (20 in T1, 25 in T2, 22 in T3)].[20]

In the final part of the experiment, we collected some demographic, lifestyle, and values measures that can bring some insights into the similarities and differences of the samples of the two countries. In terms of demographics, the median age in France was 20 years old and 21 in Japan. There were 67% female subjects in France and 37% in Japan. In terms of fields of study, the French sample is more homogeneous than the Japanese one. In particular, while 57% of French subjects were students in economics and management only 27% of Japanese subjects were in the most representative field in the Japanese sample (Humanities). In a self-assessed social

[18] See e.g. Inglehart and Baker (2000) for theoretical background on the WVS data and the "self-expression versus survival" measure.

[19] See Appendix E for other restrictions based on "stronger" and "weaker" definitions of link to the country or cultural background. Our results are robust to the different definitions.

[20] We ran a total of 33 sessions: 14 at Rennes (France), 8 at Nice (France), 5 at Osaka (Japan), and 6 at Tsukuba (Japan). The fewer observations in Nice are due to the nationality restriction.

class scale from 1 (Upper class) to 5 (Lower class), the average was the same in both countries and equal to 2.7. In terms of cultural dimensions, 56% in France and 81% in Japan reported not to belong to any religion or religion denomination.[21] The most representative religions were "Buddhist" (12% of total subjects) and "other" (5%) in Japan, and "Roman Catholic" (22%) and "Muslim" (15%) in France. On average, subjects in France self-positioned themselves in a political scale more to the left than subjects in Japan. On a scale of 1 (extreme left) up to 10 (extreme right), the mean position was 4.8 in France and 5.6 in Japan. Furthermore, 70% of subjects in France self-positioned themselves from 5 to the left, while only 52% did so in Japan. In addition, while only 13% in France considered themselves to belong to a political score above 7, 30% of subjects reported so in Japan. In terms of (postmaterialist) liberty aspirations, on an index from 0 (low aspirations) to 5 (high aspirations), subjects in France have on average higher aspirations (mean of 2.2 with only 11% of subjects with a score of 0) than subjects in Japan (mean of 1.5 with 30% of subjects with a score of 0).[22] Table 3 summarizes some of these characteristics.

These measures suggest that (i) the two samples – principals from France and Japan – are, with the exception of gender and the main field of study, similar in terms of non-cultural dimensions. They also suggest that (ii) the two samples may be representative of the French and Japanese cultural backgrounds. For instance, according to the World Values Survey data[23] of two representative samples of Japanese and French individuals, 58% of Japanese declared not to belong to any religion or religion denomination and 31% declared to be Buddhist, while in France 49% declared not to belong to any religion or religion denomination, 42% declared to be Catholic and 5% Muslim. These results, even though different than ours (which is expected since our sample consists only of university students), are generally aligned with ours. The results on political orientation are very similar to ours, with the mean position of 4.8 in France and 5.5 in Japan. In terms of liberty aspirations, Welzel and Inglehart (2005) report, based on the WVS of 1989-91 data, and as in our sample, higher liberty aspirations in France (around 2.6) than in Japan (around 2.15).

We also collected data on cognitive ability (Raven's score), loss aversion and illusion of control. In terms of cognitive ability, Japanese subjects seem to get a better score than French ones. There is a certain homogeneity among French and Japanese subjects concerning degree of loss aversion: On average, the mean switch occurs for 3€, i.e., subjects reject the lottery with 50% probability of winning 5€ and 50% probability of losing 3€. As for illusion of control,

[21] From the 44% remaining subjects in France, 8% declared that they did not wish to answer to this question.

[22] A subject is said to have high liberty aspirations if he or she mentions the following (national) goals - among others such as economic growth and maintaining order - as most important: "Seeing that people have more say about how things are done at their jobs and in their communities", "giving people more say in important government decisions", and "protecting freedom of speech". See Welzel and Inglehart (2005) for the theoretical justification of this index.

[23] The data reported is from the Wave 5 of the WVS, that collected data of 1096 Japanese individuals in 2005 and of 1001 French individuals in 2006.

65% of French principals and 72% of Japanese ones chose not to pay for personally stopping the roll of two ten-sided electronic dice. Among those being willing to pay for rolling the dice, they accept to pay, on average, 10.6 of their 30 additional points in France and 13.2 in Japan.

Table 3: Characteristics of Subjects

	France	Japan
Age	20.1	21.1
Female (Fraction)	66.9%	37.1%
Social class (1 High, 5 Low)	2.7	2.7
Field of study:		
Economics & management	57.8%	18.2%
Law	14.1%	7.6%
Humanities	6.3%	27.3%
Math	4.2%	2.3%
Sciences	2.1%	18.2%
Other	15.5%	26.5%
Political scale (0 Ext. left, 10 Ext. right)	4.8	5.6
Not religious (Fraction)	56.3%	81.1%
Liberty aspirations (0 Low, 5 High)	2.2	1.5
Raven's score (Max. 16)	9.7	11.5
Loss aversion (1 High, 6 Low)	3	3.2
Illusion of control:		
Fraction W.T.P. = 0	64.9%	72%
Mean W.T.P. if W.T.P. > 0 (Max. 30 points)	10.6	13.2

Notes: Mean values for "Age", "Social class", "Political scale", "Liberty aspirations", "Raven's score", and "Loss aversion". W.T.P. refers to "willingness to pay" (see Section 3.5).

Accordingly, in our analysis we control for gender, cognitive ability (Raven score), field of study, loss aversion, and illusion of control. This way we take into account the differences in gender and field of study compositions between locations and alternative explanations based on bounded rationality, loss aversion, and illusion of control.[24]

In the rest of the section, we analyze the intrinsic value of decision rights as measured by the difference in certainty equivalents of the delegation and the control lotteries: IV = $ce(DL) - ce(CL)$. Whenever not mentioned differently, we use this as our IV measure. In Appendix D we report some of our results using the percentage difference in certainty equivalents that normalizes the IV for the monetary stake of the lotteries.[25]

[24] We address the remaining alternative explanations discussed in Bartling et al. (2014) in Appendix F.

[25] We opt to report the former measure in the main text since we cannot use the latter to measure the weight of each rationale on the IV. In fact, using the percentage difference we cannot exclude that our measure of power is biased by the effect of social preferences. While our IV measure neutralizes the effect of social preferences for any treatment and comparisons between treatments, the percentage difference, given by $IV/CE = \frac{ce(DL)-ce(CL)}{(ce(DL)+ce(CL))/2}$, does not neutralize the effect when comparing a treatment with and one without social preferences, as with $T3$ and $T2$ for our measure of power.

5.1 Within Country Differences

Since we have data from two locations in each country, we can bring some support to the claim that the two samples may be representative of the French and Japanese cultural backgrounds with behavioral data. In particular, we can check if the subjects' behavior is consistent *within each country*. If we observe no significant difference between two locations of the same country, we can be more confident that there is a certain degree of homogeneity within a country. This would bring some support to the claim that we are capturing the cultural background.

Note that this argument holds for *two locations of the same country* but not for *two locations of different countries*. We have no theoretical reason (in terms of definition of cultural background) to pool the data from two locations of different countries even if we find no significant difference for the subjects' behavior between two of these locations.

5.1.1 France

Figure 2 presents the IV measure for the three treatments in the two locations in France, based on the estimated coefficients and standard errors of the treatment-location dummy of an OLS regression controlling for individual characteristics reported in Table 4.[26] As it can be seen from the figure, the values per treatment are similar for the two locations within France. Regression analyses reported in Table 4, either controlling or not for individual characteristics, do not reject the null hypothesis that the measured IVs in the two locations are the same for both T1 and T3. As for T2, we reject this hypothesis at 10% level when using the average IV and controlling for individual characteristics. However, either using nonparametric tests (see Table A7 in Appendix B) or controlling for the stake size using the percentage difference (see Table A11 in Appendix D) we do not reject the null hypothesis that the measured IVs in the two locations are the same for all treatments.

When looking at other behavioral data, in particular to the three decisions that principals made in Part 1, we find that the chosen minimum effort requirement $\underline{e}$ is very similar (specially in T1 and T2) and not statistically different for any treatment between the two locations (see Table A1 in Appendix A), that effort choices are very similar and not statistically different for T2 and T3 but different and statistically different for T1 (see Table A2 in Appendix A), and that principals chose the project that gave them the higher profit (project $\mathcal{P}$) in 87% of games in Rennes and 79% of games in Nice.

5.1.2 Japan

As for Japan, Figure 3 presents the IV measure for the three treatments in the two locations based on the OLS regression controlling for individual characteristics reported in Table 4. As

[26] All the results presented in this section are robust if we use two separate regressions for France and Japan.

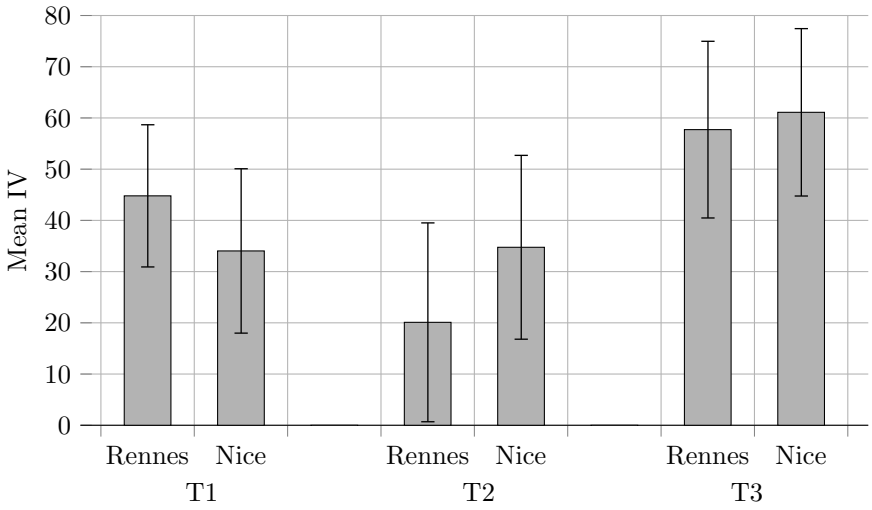

Figure 2: Mean IV, sorted by French location and treatment. The bars display one standard error of the mean.

it can be seen from the figure, the values per treatment are very similar for the two locations within Japan. Regression analyses reported in Table 4, either controlling or not for individual characteristics, do not reject the null hypothesis that the measured IVs in the two locations are the same for all treatments. This result is robust either using nonparametric tests (see Table A7 in Appendix B) or controlling for the stake size using the percentage difference (see Table A11 in Appendix D).

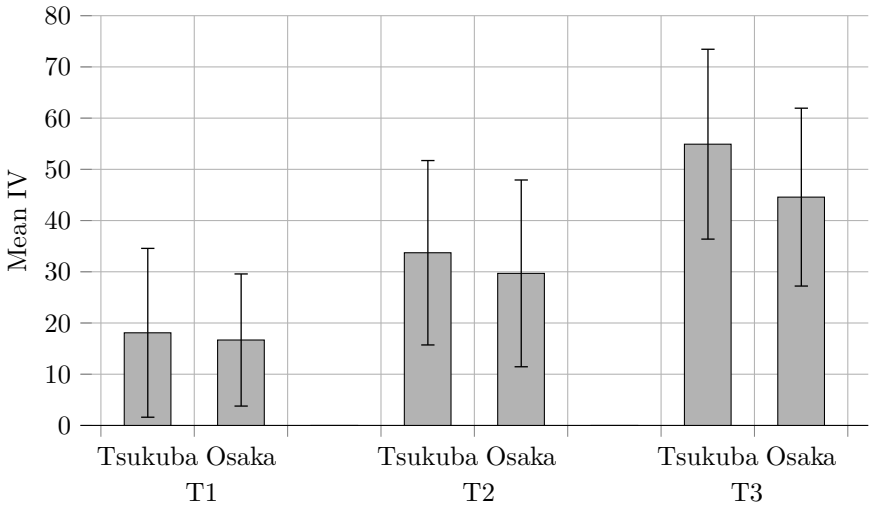

Figure 3: Mean IV, sorted by Japanese location and treatment. The bars display one standard error of the mean.

In terms of the three decisions that principals made in Part 1, we find that the chosen minimum effort requirement $\underline{e}$ is very similar (specially in T1 and T2) and not statistically different for any treatment between the two locations (see Table A1 in Appendix A), that effort

Table 4: Within Country Differences, IV

	Treatment 1		Treatment 2		Treatment 3	
Rennes	46.454***	44.792***	32.279***	20.098	41.221***	57.721***
	(5.488)	(13.880)	(5.648)	(19.413)	(5.395)	(17.248)
Nice	34.460***	34.036**	45.125***	34.749*	45.769***	61.101***
	(7.376)	(16.047)	(5.603)	(17.946)	(9.205)	(16.341)
Tsukuba	20.660***	18.086	40.440***	33.716*	33.018***	54.912***
	(7.686)	(16.482)	(4.222)	(18.001)	(5.318)	(18.535)
Osaka	17.430***	16.679	39.311***	29.689	29.762***	44.577**
	(6.058)	(12.899)	(4.935)	(18.233)	(6.353)	(17.364)
Female		−1.128		1.521		1.142
		(7.142)		(6.902)		(6.807)
Raven's Score		−0.082		0.068		−0.772
		(0.973)		(1.129)		(1.384)
Economics & Management		−3.331		4.340		−3.566
		(6.902)		(6.641)		(7.252)
Loss Aversion		0.757		1.826		−3.189*
		(1.680)		(2.499)		(1.820)
Illusion of control		0.313		0.389		0.219
		(0.424)		(0.440)		(0.405)
R^2	0.174	0.169	0.250	0.254	0.260	0.271
N	860	850	1010	990	870	860
H_0: Rennes = Nice	0.196	0.236	0.110	0.074	0.671	0.759
H_0: Tsukuba = Osaka	0.742	0.900	0.862	0.556	0.695	0.205

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

choices are not statistically different for T1 and T2 but different and statistically different for T3 (see Table A2 in Appendix A), and that principals chose the project that gave them the higher profit (project $\mathcal{P}$) in 89% of games in Tsukuba and 87% of games in Osaka.

We take these results as a suggestion that the subject-pools within each country can come from the same distribution. The lower degree of homogeneity of behavior within France when compared with the higher homogeneity within Japan may result from the more multicultural and varied setting of France and the higher social homogeneity of Japan. Taking the above values measures and these results into account, in what follows we perform the analysis with pooled data by country.

5.2 The Intrinsic Value of Decision Rights

We start our main analysis by comparing the IV between the two countries. Figure 4 presents the values of the IV measure for the three treatments in each country. These values are based on an OLS regression with individual controls reported in Table 5.

Result 1 *Decision rights have on average a positive intrinsic value for both French and Japanese principals.*

As can be seen in Figure 4, the certainty equivalents of the delegation lotteries are on average

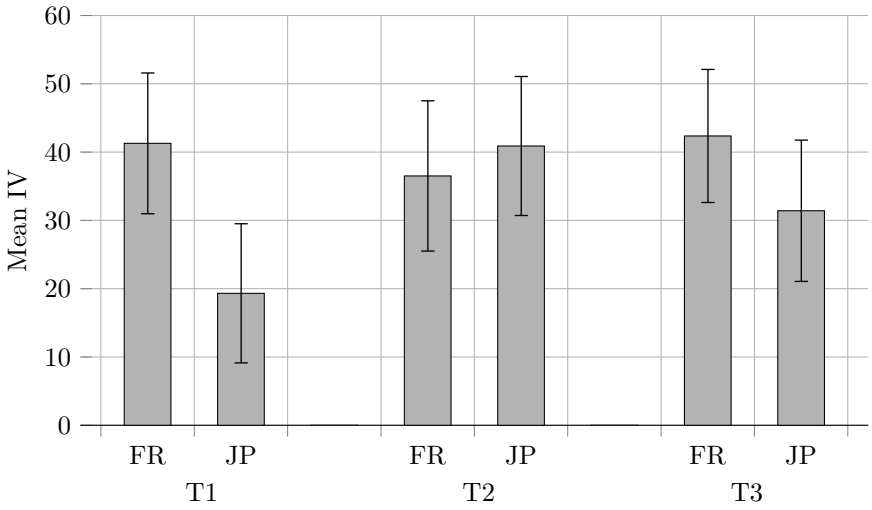

Figure 4: Mean IV, sorted by country and treatment. The bars display one standard error of the mean.

19 to 42 points higher than those of the control lotteries depending on the treatment and country. This amounts to 13% to 25% in terms of percentage differences (see Table A12 in Appendix D). Note that while principals in France attach on average a higher intrinsic value to be in control in T1 and T3 than in T2, principals in Japan attach the highest value in T2 and the lowest in T1. Table 5 shows that we reject the hypotheses that principals value the delegation lotteries and the control lotteries equally for any treatment in both countries.[27] This suggest that, on average, principals in France and Japan assign a positive intrinsic value to decision rights.

Several robustness tests bring support to Result 1. First, we observe that a large majority of principals derive a positive intrinsic value of holding control in all treatments and in both countries. In our total sample, 89% of principals value (on average) the delegation lotteries strictly more than the corresponding control lotteries. Second, a bootstrap analysis suggests that a positive and significant IV holds for all separate games (rounds) in France, and most games in Japan.[28] This suggests that a positive intrinsic value of decision rights is a robust preference across the different delegation games for most treatments. Finally, we test whether the intrinsic value of decision rights is measured *consistently* across principals in the ten delegation games.[29] To test for consistency, we follow Bartling et al. (2014) and measure the correlation of the IV across games by computing *Cronbach's alpha* (Cronbach 1951), in our case per treatment and country. The measure reports the correlation between the games, and varies between zero and

[27] Nonparametric Wilcoxon signed-rank tests also reject this hypotheses ($p < 0.001$ for all cases), and similarly with bootstrap tests ($p < 0.001$ for all cases).

[28] For principals in France, bootstrap tests reject the hypothesis that the IV is equal to zero for 10 out of 10 games in T1 ($p < 0.01$ for 7, $p < 0.05$ for 2, and $p < 0.1$ for 1), for 10 games in T2 ($p < 0.01$ for all games), and for the 10 games in T3 ($p < 0.01$ for 9 and $p < 0.05$ for 1). For principals in Japan, bootstrap tests reject this hypothesis for 7 out of 10 games in T1 ($p < 0.01$ for 2 and $p < 0.05$ for 5), for 9 games in T2 ($p < 0.01$ for 8 and $p < 0.05$ for 1), and for 8 games in T3 ($p < 0.01$ for 7 and $p < 0.1$ for 1).

[29] Consistency means that if a principal assigns a higher intrinsic value to decision rights than another principal in one game, then the former also assigns a higher value in the other games.

Table 5: The Intrinsic Value of Decision Rights, IV

T1 France	42.270***	41.284***
	(4.469)	(10.304)
T1 Japan	18.933***	19.321*
	(4.808)	(10.187)
T2 France	36.709***	36.509***
	(4.236)	(11.000)
T2 Japan	39.967***	40.893***
	(3.197)	(10.179)
T3 France	42.663***	42.363***
	(4.690)	(9.742)
T3 Japan	31.320***	31.411***
	(4.165)	(10.346)
Female		0.711
		(4.041)
Raven's Score		-0.053
		(0.678)
Economics		-0.049
& Management		(4.024)
Loss Aversion		-0.255
		(1.159)
Illusion of Control		0.268
		(0.246)
R^2	0.225	0.225
N	2740	2700

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

one. Cronbach's alphas per treatment are between 0.49 (in T1) and 0.75 (in T3) in France and between 0.47 (in T2) and 0.60 (in T1) in Japan. This suggests a moderate and positive correlation of our IV measure across principals in France and Japan in the ten delegation games and all treatments. Taken together, these results suggest that our first finding is robust for both countries and all treatments.

Result 2 *Decision rights have on average a higher intrinsic value for French than for Japanese principals.*

The positive IV that we observe in T1 for the two countries may be due, as exposed in Section 4, to any of the three rationales that we have identified. Then, the difference between countries of this measured value provides an estimation of the difference of IV taking all rationales into account. On average, the IV in T1 in France is worth 22 points more than the IV in Japan. We reject the hypothesis that principals in France and principals in Japan attach the same difference of value between the delegation lotteries and the control lotteries in T1 ($p < 0.001$, Wald test based on the regression of Table 5 with individual controls).[30]

[30] When taking the mean IV, a Mann-Whitney U test and a bootstrap test also reject this hypothesis ($p < 0.001$ and $p < 0.01$ respectively).

5.3 The Roots of the Intrinsic Value of Decision Rights

The measured IV in our three treatments and their differences provide measures of our three main variables of interest: independence, power, and self-reliance. We present the measured values of these rationales in Table 6.[31] For instance, consider independence (R1) for principals in France. On average, principals attach 1.1 points less to the delegation lottery compared to the control lottery when they interact with a human agent (T1) than when they interact with a bot that decides on behalf of a passive human agent (T3).

Table 6: The Roots of the Intrinsic Value of Decision Rights

	R1: Independence $(IV_{T1} - IV_{T3})$	R2: Power $(IV_{T3} - IV_{T2})$	R3: Self-reliance (IV_{T2})
France	-1.079	5.854	36.509^{***}
Japan	-12.090^{*}	-9.483^{*}	40.894^{***}
H_0: FR = JP	$p = 0.221$	$p = 0.066$	$p = 0.481$

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on two-sided Wald tests from OLS regression with clustered standard errors per subject and individual controls.

Result 3 *Self-reliance is a significant rationale for the intrinsic value of decision rights for French and Japanese principals.*

As shown in the table, self-reliance seems to be a significant and positive rationale behind the IV in both countries. On average, the delegation lotteries are valued 36.5 (in France) to 40.9 (in Japan) points more than the control lotteries due to a preference for self-reliance. As the Table 6 highlights, we reject the hypothesis that principals in T2 value the delegation lotteries and the control lotteries equally, both in France and Japan. Looking at the difference between the two countries, we do not reject the hypothesis that principals in France and principals in Japan attach the same difference of value between the delegation lotteries and the control lotteries in T2, i.e., we do not reject the hypothesis that $R3(France) = R3(Japan)$ ($p = 0.481$, two-tailed Wald test). This suggests that, on average, there is no significant difference in the value of self-reliance as a rationale behind the IV between France and Japan.

Result 4 *Independence is not a rationale for the intrinsic value of decision rights for French and Japanese principals.*

As it can be seen from Figure 4 and Table 6, French subjects tend to value holding control in T1 similarly than in T3, and we do not reject the null hypothesis of equality. This suggests that principals might be indifferent to independence as a rationale for the intrinsic value of decision rights in France. For Japan, independence has on average a negative impact on the IV. But as

[31] See Table A8 in Appendix B for the results of nonparametric tests and the robustness of the results.

it can be seen from Table 6, we reject the hypothesis that independence has no effect on the IV only at 10% significance level. This brings then only mild evidence that independence might be negatively valued when it comes to be a motive of the intrinsic value of holding control in our setting. When comparing the measured values for the two countries in terms of independence, we do not reject the null hypothesis that $R1(France) = R1(Japan)$ ($p = 0.221$, two-tailed Wald test). That is, though there is a slight difference in size, independence is similarly valued in France and in Japan as a rationale for the intrinsic value of holding control.

Result 5 *Power is not a rationale for the intrinsic value of decision rights for French and Japanese principals.*

As for power, principals give on average a positive value to this motive in France. However, we do not reject the hypotheses that this value is equal to zero for French principals. Then, as it is the case with independence, this suggests that French principals might be indifferent to power as a rationale for the intrinsic value of decision rights in our setting. As for principals in Japan, power is negatively valued but we reject the null hypothesis only at 10% significance level. This brings again only mild evidence that principals in Japan might see power as a negative rationale for the intrinsic value of holding control. Looking at differences between France and Japan in terms of power, we reject the hypothesis that $R2(France) = R2(Japan)$ ($p = 0.066$, two-tailed Wald test). Taken together with the size difference of independence, these results bring mild evidence of a cultural difference with respect to these motivations in our setting.

These findings bring interesting insights into the role of different motives on the control and delegation of authority. First, and contrary to **Hypothesis 1**, independence from interference is not a significant root of the intrinsic value of decision rights in both countries (Result 4). Second, our results suggest that contrary to **Hypothesis 2**, power is not a significant root of the intrinsic value of decision rights (Result 5). If anything, independence and power *per se* seem to have a negative impact in the intrinsic value of holding control in Japan. Third, and in accordance with **Hypothesis 3**, self-reliance seems to be an economically and statistically significant rationale behind the IV in both France and Japan (Result 3). In addition, its value seems to be similar in both countries. Finally, contrary to **Hypothesis 4**, we find no significant difference in terms of the value of independence between the two countries. Still, Japanese principals give on average a lower value to both independence and power (the motivations related with another person) as rationales for a preference for holding control than French principals.

Our main results are robust to different stake sizes (see Appendix C), different definitions of cultural background (see Appendix E), and alternative explanations based on reciprocity, preference reversals, or corner solutions (see Appendix F). We test for the effect of different degrees of conflict between the principal and the agent in Appendix C. Next, we discuss some of the potential worries and limitations of our experimental design.

6 Discussion

The first potential worry about the experimental design is related with the potential effects of principals' social and risk preferences. Note, however, that the indifference point between the control and the delegation lotteries is endogenously chosen based on the principals' unobserved social and risk preferences (see also Bartling et al. 2014, p. 2022). These preferences will then enter similarly into the determination of the certainty equivalents of the two lotteries in Part 2. It follows that the measured IV, since it is based on the *difference* between the certainty equivalents of the two lotteries, is computed *after* these preferences have been taken into account. This means that even though there is no potential effect of social preferences in T2 (contrary to T1 and T3), such preferences should not *a priori* bias our results.[32]

A second worry is related with the potential effects of the beliefs about the agents' or bots' behaviors. For example, the delegation mechanism in the experiment where agents choose an effort could cue principals for more familiar "real-world" setups in which principals expect their agents to shirk after delegation (see also Bartling et al. 2014, footnote 36). This could lead principals to increase the minimum effort requirements beyond their optimal indifference point to avoid that delegation occurs. Another possibility would be that principals could believe that an altruistic agent would choose a higher effort level if the agent would be less constrained from the minimum effort requirement (see Falk and Kosfeld 2006). This could lead principals to decrease the minimum effort requirements below their optimal indifference point to favor altruism from agents. Since these two phenomena go in opposite directions, it seems difficult to test if they are present. But in our data they seem to either cancel each other or to not be present. In France, the average minimum effort requirement per treatment was 62.155 (T1), 65.171 (T2), and 64.878 (T3). We find no statistically significant difference between treatments based on an OLS regression controlling for individual characteristics (see Tables A3 and A4 in Appendix A). In Japan, the average minimum effort requirement per treatment was 53.663 (T1), 63.606 (T2), and 56.103 (T3), and we find that the value in T2 is statistically significantly greater than in T1 and T3 but not statistically significantly different between T1 and T3 (see again Tables A3 and A4 in Appendix A).

Note, however, that for any of these last explanations to be valid principals should have misunderstood the delegation mechanism. In fact, the principal (taking into account her risk and social preferences) should set the optimal choice of the minimum effort requirement $\underline{e}$ irrespective of the agent's or bot's effort choice. Recall that there is no feedback until the end of the experiment and that delegation takes place if and only if $e \geq \underline{e}$, which means that the principal has control over the minimum effort that the agent needs to choose for her to delegate the

[32] This is based on the weak assumptions that principal's utility from a delegation lottery is increasing in the probability of success and that the principal weakly prefers if the agent chooses project $\mathcal{P}$ (see Bartling et al. 2014, pp. 2018-9). See also Bartling et al. (2014, p. 2022) for a discussion of the potential (but unlikely) effects of extreme forms of inequality aversion.

decision right. The instructions and control questions were designed such that the logic of setting an optimal minimum effort requirement was clearly understood, and our robustness results on bounded rationality bring some support for the non-significance of explanations linked to the misunderstanding of the instructions. In this sense, the measured IV, that depends upon the principal's choice of the minimum effort requirement $\underline{e}$, should be independent of beliefs about the agent's or bot's effort choice. Similarly, though principals in Part 1 of T1 are faced with risk and uncertainty, while principals in Part 1 of T2 and T3 are faced only with risk, the independence on beliefs, if it holds, indicates that this should not be an issue for our treatment comparisons.

In terms of the belief about the agents' chosen project, this could, in principle, have an effect on our treatment comparisons. In particular, if principals believed that project alternative $\mathcal{P}$ was chosen by agents with positive probability in T1, then we would underestimate the intrinsic value of decision rights in T1 with respect to T2 and T3 (see Bartling et al. 2014, pp. 2022-3 on how this could underestimate the IV in T1). In our experiment, the agents' project choices indicate that this would be a reasonable anticipation specially in France (agents chose project $\mathcal{P}$ 32% of games in France and 9% of games in Japan).[33] If principals anticipated these probabilities correctly, we would underestimate the value of IV and independence and the differences between France and Japan in these two measures. But if this would be the case, behaviorally it should translate into a lower $\underline{e}$ in T1 than in T2 and T3. However, we find no significant differences for $\underline{e}$ between treatments in France and we find that $\underline{e}$ is significantly higher in T2 than in T1 and T3 in Japan (see Table A4 in Appendix A). The principals own choices of project also bring mild evidence on the focus of own gains (though they are silent in terms of anticipations). Principals chose the project that gives them the higher payoff 84% of games in France and 88% of games in Japan. But as with the other beliefs, we cannot exclude with certainty that this belief has not played a role in our experiment.

Finally, remark that the willingness to keep control in treatments 2 and 3 could, at least in principle, be due to motives linked to the chance device *per se* (e.g. aversion to randomness). Our findings would be consistent with aversion to randomness if one interprets R3 to be an aggregated preference for self-reliance *and* the willingness not to be affected by a chance device (nature). However, the latter explanation seems to be at odds with some previous experiments that suggest that subjects tend to "delegate" the decision to "randomness" in order to avoid some subjective costs (e.g. cognitive cost, responsibility aversion or regret; see Dwenger et al. 2014 and Agranov and Ortoleva 2017). Future research could try to separate these two motives and shed further light on the effects of the interference of random devices on people's decisions to hold or delegate control.

[33]Note that we exclude from these calculations (and from any similar calculations presented below) the data from games 5 and 10, where the payoffs are the same for the two players, as well as the passive (non-incentivized) agents that participated in T3.

7 Conclusion

Several recent experimental analyses provide us with new insight on the incentive effects of decision rights and the preference for holding control. For instance, while principals often use control to reduce the agent's self-seeking actions, experimental results of Falk and Kosfeld (2006) suggest that holding control may carry some "hidden costs" in terms of agents' performance and principals' payoffs. In a context of participative decision making, Corgnet and Hernán-González (2014) show that consulting agents is beneficial for principals only if they follow the agent's choice. However, we have few insight into the motivations that lie behind the value of holding control when there is no instrumental reason to pursue it. This paper is an attempt to shed some light about the motivations that lie behind the non-delegation of decision rights and its potential contextual determinants.

We find that, somewhat surprisingly, independence and power are not motivations that lie behind an intrinsic value to hold control in our setting. Instead, the will to apply one's decision seems to be the main motivation behind this preference. We find that these preferences are shared by French and Japanese subjects, but that the intrinsic value of decision rights is higher in France in good part because independence and power are on average negatively valued in Japan. So in general, while our results support the main finding of Bartling et al. (2014) concerning the positive and statistically significant intrinsic value of decision rights in this setting, they suggest that this value is not dependent upon another person being the potential holder of control.

Future research should investigate more thoroughly the effects of beliefs on this type of experimental settings. A potential way to do so for this experiment would be to run some additional sessions of T2 and/or T3 with a bot that would make choices consistent with agents that have previously participated in the experiment (e.g. either taking an average of agents' behavior or the behavior of one randomly chosen agent in particular). If beliefs play no fundamental role in our design, we should find non-significant differences between these additional sessions and the sessions where the bot chooses project $\mathcal{A}$ and randomly determines its effort (as in the current design).

Finally, we find worth pointing out that the experimental setting is fairly abstract and also demanding in terms of understanding and rationality requirements. A companion study with an easier design and more contextual cues could help to understand how the intrinsic value of decision rights might translate to "real-world" settings. In such an experiment, one possible interesting extension would be to test for within-country and between-country variation taking different subject-pools (say students and factory workers.). This would allow, among other things, to test if the variation in the roots of the intrinsic value of decision rights is greater within a country than the variation between two countries.

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Appendix

A Decisions Part 1

Table A1: Within Country Differences, $\underline{e}$

	Treatment 1		Treatment 2		Treatment 3	
Rennes	60.575***	55.650***	63.842***	66.229***	61.629***	70.919***
	(2.829)	(9.809)	(2.078)	(6.166)	(2.612)	(9.572)
Nice	62.733***	58.604***	65.660***	67.775***	70.046***	77.194***
	(5.204)	(11.036)	(2.186)	(6.347)	(5.394)	(9.456)
Tsukuba	54.025***	46.453***	61.108***	67.532***	56.882***	71.325***
	(3.968)	(10.948)	(2.766)	(6.871)	(2.774)	(11.166)
Osaka	49.791***	43.735***	60.667***	65.893***	52.862***	62.664***
	(3.709)	(10.538)	(3.034)	(7.651)	(4.574)	(10.230)
Female		−4.095		−1.653		0.880
		(4.114)		(2.875)		(3.902)
Raven's Score		0.650		−0.322		−0.821
		(0.727)		(0.466)		(0.748)
Economics & Management		−0.152		4.934*		4.705
		(4.335)		(2.759)		(3.820)
Loss Aversion		0.111		−0.597		−1.727
		(0.989)		(0.803)		(1.309)
Illusion of Control		0.059		0.175		0.143
		(0.280)		(0.186)		(0.274)
R^2	0.797	0.800	0.889	0.894	0.836	0.840
N	860	850	1010	990	870	860
H_0: Rennes = Nice	0.717	0.598	0.548	0.608	0.164	0.315
H_0: Tsukuba = Osaka	0.438	0.644	0.915	0.689	0.455	0.147

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

Table A2: Within Country Differences, E

	Treatment 1		Treatment 2		Treatment 3	
Rennes	70.682***	68.304***	63.926***	60.512***	68.950***	75.596***
	(2.350)	(9.500)	(2.538)	(6.570)	(2.662)	(9.485)
Nice	54.213***	52.821***	64.455***	61.629***	67.646***	73.220***
	(4.988)	(10.589)	(2.809)	(6.820)	(5.008)	(9.450)
Tsukuba	63.710***	60.485***	63.000***	62.812***	65.318***	77.271***
	(3.621)	(9.985)	(2.541)	(7.793)	(2.054)	(11.276)
Osaka	55.400***	52.22***	62.111***	60.757***	59.367***	67.306***
	(2.825)	(9.344)	(3.171)	(7.883)	(3.856)	(9.969)
Female		−0.570		−1.200		6.120*
		(3.913)		(3.329)		(3.282)
Raven's Score		0.314		−0.056		−0.814
		(0.618)		(0.538)		(0.745)
Economics & Management		−2.946		3.999		0.271
		(3.692)		(3.395)		(3.430)
Loss Aversion		0.123		0.688		−1.018
		(0.851)		(1.092)		(1.107)
Illusion of Control		−0.062		−0.016		−0.008
		(0.234)		(0.248)		(0.227)
R^2	0.875	0.875	0.896	0.900	0.888	0.892
N	860	850	1010	990	870	860
H_0: Rennes = Nice	0.004	0.003	0.889	0.775	0.819	0.668
H_0: Tsukuba = Osaka	0.074	0.106	0.827	0.620	0.177	0.043

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

Table A3: Minimum Effort Requirement, $\underline{e}$

T1 France	61.328***	62.155***
	(2.579)	(5.855)
T1 Japan	51.760***	53.663***
	(2.716)	(5.816)
T2 France	64.469***	65.171***
	(1.555)	(4.874)
T2 Japan	60.923***	63.606***
	(2.042)	(5.522)
T3 France	64.298***	64.878***
	(2.535)	(5.040)
T3 Japan	54.785***	56.103***
	(2.734)	(5.912)
Female		-1.979
		(2.062)
Raven's Score		-0.003
		(0.379)
Economics & Management		3.698*
		(2.028)
Loss Aversion		-0.649
		(0.595)
Illusion of Control		0.096
		(0.157)
R^2	0.844	0.846
N	2740	2700

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regression with clustered standard errors per subject.

Table A4: Minimum Effort Requirement, $\underline{e}$, Between Treatement Differences

France	Wald Tests
H_0: T1 = T2	0.328
H_0: T1 = T3	0.453
H_0: T2 = T3	0.921
Japan	
H_0: T1 = T2	0.004
H_0: T1 = T3	0.529
H_0: T2 = T3	0.030

Notes: This table displays p-values for two-tailed Wald tests applied on the minimum effort requirement $\underline{e}$ per subject and game with individual controls and clustered standard errors per subject.

Table A5: Effort, E

T1 France	64.937***	61.006***
	(2.599)	(6.060)
T1 Japan	59.265***	56.804***
	(2.339)	(5.479)
T2 France	64.109***	60.984***
	(1.917)	(5.025)
T2 Japan	62.628***	60.986***
	(1.980)	(5.484)
T3 France	68.537***	65.608***
	(2.404)	(5.071)
T3 Japan	62.213***	59.941***
	(2.271)	(5.777)
Female		1.4957
		(2.045)
Raven's Score		-0.085
		(0.369)
Economics & Management		0.811
		(2.047)
Loss Aversion		0.263
		(0.579)
Illusion of Control		-0.003
		(0.150)
R^2	0.884	0.885
N	2740	2700

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regression with clustered standard errors per subject.

Table A6: Effort, E, Between Treatement Differences

France	Wald Tests
H_0: T1 = T2	0.995
H_0: T1 = T3	0.203
H_0: T2 = T3	0.132
Japan	
H_0: T1 = T2	0.177
H_0: T1 = T3	0.333
H_0: T2 = T3	0.731

Notes: This table displays p-values for two-tailed Wald tests applied on the effort E per subject and game with individual controls and clustered standard errors per subject.

B Nonparametric Tests

Table A7: Within Country Differences:
Parametric and non parametric tests

	Treatment 1	Treatment 2	Treatment 3
H_0: Rennes = Nice			
Wilcoxon-Mann-Whitney test	0.302	0.432	0.867
Student test	0.209	0.154	0.661
H_0: Tsukuba = Osaka			
Wilcoxon-Mann-Whitney test	0.609	0.844	0.482
Student test	0.744	0.865	0.703

Notes: This table displays p-values for two-tailed Wilcoxon-Mann-Whitney and Student tests applied on the average IV by subject.

Table A8: The Roots of the Intrinsic Value of Decision Rights (Nonparametric Tests)

	R1: Independence $(IV_{T1} - IV_{T3})$	R2: Power $(IV_{T3} - IV_{T2})$	R3: Self-reliance (IV_{T2})
France	-0.394	5.955	36.709^{***}
Japan	-12.387^{*}	-8.648^{*}	39.967^{***}

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on Mann-Whitney U tests (R1 and R2) and Wilcoxon signed-rank test (R3) and with average IV by subject.

C Situational Determinants

The experimental design allows us to test for two situational determinants of the IV and its rationales: (i) stake size and (ii) conflict of interest. In terms of stake size, it is possible to distinguish between "low stakes" games (1-5) and "high stakes" games (6-10) [see Table 2].

Table A9 shows the intrinsic value of decision rights and its rationales for the two stake size levels. As it can be seen from the Table, the magnitudes of all our estimated absolute values increase with the stake size. In terms of the IV, this is consistent with the findings of Bartling et al. (2014). One can note that this is not surprising, since the percentage difference also increases with the stake size. The IV is positive and significantly different between France and Japan for both low and high stake sizes. This is again consistent with our main results. The only difference with respect to our main analysis is that the IV in Japan becomes insignificant for low stakes. But either using percentage difference as the dependent variable or non-parametric tests with average IV by individual the intrinsic value of holding control is highly significant for low stakes also in Japan ($p = 0.019$ based on OLS regression with clustered standard errors per subject and individual controls, and $p = 0.003$ based on a Wilcoxon signed-rank test respectively). In terms of the roots of the intrinsic value of holding control, our main results are robust to the stake size. In particular, self-reliance continues to be the only positive and significant rationale of the IV. In addition, independence and power continue to be non-significantly valued in France and on average negatively valued (though either not significantly or significantly just at 10%) in Japan.

In terms of the conflict of interest between the principal and the agent, Bartling et al. (2014) distinguish between "high conflict" games (3, 4, 8 and 9), "low conflict" games (1, 2, 6 and 7), and "no conflict" games (5 and 10) [see Table 2].[34] However, performing a similar analysis as in Table A9 may lead to misleading inferences given that the stake size is different for different degrees of conflict; in particular, it is not possible to disentangle the two effects with such method. In order to further investigate our results concerning different stake sizes and have a sense of the effect of the degree of conflict between the principal and the agent, we test for the marginal effects of the stake size and degree of conflict of interest on our IV measure.

Table A10 shows the marginal effect of the stake size and degree of conflict on the IV, per treatment and country.[35] As seen from the Table, and taking all rationales into account (i.e., values for T1), while the intrinsic value of holding control increases 0.155 and 0.075 points per additional unit of stake size in France and Japan respectively, it decreases 0.341 and 0.128 points for each additional unit of degree of conflict in France and Japan respectively. In terms of the roots of the intrinsic value of holding control, the marginal effect of stake size is only significant

[34] In Bartling et al. (2014) conflict of interest is defined as the principal's *relative* payoff difference between projects $\mathcal{A}$ and $\mathcal{P}$ $[(P_{\mathcal{A}} - P_0) \ / \ (P_{\mathcal{P}} - P_0)]$.

[35] The principal's payoff of project A in case of success ($P_{\mathcal{A}}$) is used as a proxy for the stake size of each game while the difference between the principal's payoff and the agent's payoff of project A in case of success ($P_{\mathcal{A}} - A_{\mathcal{A}}$) is used as a proxy for the degree of conflict in each game. We use project A since it determines the high payoff of the delegation lottery for which the principal has not to pay the cost of effort.

Table A9: The Effect of Stake Size

	IV IV_{T1}	R1: Independence $(IV_{T1} - IV_{T3})$	R2: Power $(IV_{T3} - IV_{T2})$	R3: Self-reliance (IV_{T2})
France (Low)	29.767^{***}	1.351	2.450	25.966^{***}
France (High)	52.800^{***}	-3.509	9.257	47.052^{***}
H_0: Low = High	$p = 0.001$	$p = 0.565$	$p = 0.395$	$p = 0.001$
Japan (Low)	11.965	-8.166^{*}	-4.355	24.486^{**}
Japan (High)	26.677^{**}	-16.014	-14.610^{*}	57.301^{***}
H_0: Low= High	$p = 0.026$	$p = 0.395$	$p = 0.240$	$p < 0.001$
H_0: FR = JP (Low)	$p < 0.001$	$p = 0.141$	$p = 0.272$	$p = 0.769$
H_0: FR = JP (High)	$p = 0.014$	$p = 0.375$	$p = 0.069$	$p = 0.281$

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regression with clustered standard errors per subject and individual controls.

for self-reliance in France ($p < 0.001$, Wald test based on the OLS regression of Table A10 with individual controls), and for self-reliance and independence in Japan ($p < 0.001$ and $p = 0.060$ respectively, Wald test based on the OLS regression of Table A10 with individual controls). As for the marginal effect of degree of conflict, it is only significant for self-reliance in France and Japan ($p = 0.013$ and $p < 0.001$ respectively, Wald test based on the OLS regression of Table A10 with individual controls). Though it may be seen as surprising that the degree of conflict has no effect on the value of independence and power, it seems to accord with the result that in our setting independence and power are not behind the intrinsic value of decision rights.

Table A10: The Marginal Effect of Stake Size and Conflict of Interest

T1 France	14.153	13.393
	(9.783)	(13.564)
T1 Japan	3.345	3.733
	(7.636)	(11.867)
T2 France	9.848	9.649
	(6.394)	(9.753)
T2 Japan	-5.503	-2.786
	(6.851)	(11.163)
T3 France	10.462*	10.162
	(6.002)	(10.504)
T3 Japan	-3.026	-1.044
	(8.035)	(11.668)
Stake*T1 France	0.156***	0.155***
	(0.034)	(0.035)
Stake*T2 France	0.125***	0.125***
	(0.030)	(0.030)
Stake*T3 France	0.168***	0.168***
	(0.026)	(0.026)
Stake*T1 Japan	0.075**	0.075**
	(0.036)	(0.036)
Stake*T2 Japan	0.209***	0.207***
	(0.030)	(0.031)
Stake*T3 Japan	0.171***	0.171***
	(0.034)	(0.035)
Conflict*T1 France	-0.344***	-0.341***
	(0.120)	(0.123)
Conflict*T2 France	-0.192**	-0.192**
	(0.077)	(0.077)
Conflict*T3 France	-0.331***	-0.331***
	(0.092)	(0.092)
Conflict*T1 Japan	-0.128	-0.128
	(0.121)	(0.121)
Conflict*T2 Japan	-0.309***	-0.334***
	(0.077)	(0.076)
Conflict*T3 Japan	-0.308***	-0.342***
	(0.088)	(0.083)
Female		0.711
		(4.050)
Raven's Score		-0.053
		(0.679)
Economics & Management		-0.049
		(4.033)
Loss Aversion		-0.256
		(1.162)
Illusion of Control		0.268
		(0.246)
R^2	0.299	0.300
N	2740	2700

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

D IV in Percentage Difference

Table A11: Within Country Differences, IV/CE

	Treatment 1		Treatment 2		Treatment 3	
Rennes	0.246***	0.267***	0.187***	0.185*	0.187***	0.239***
	(0.035)	(0.082)	(0.034)	(0.097)	(0.025)	(0.073)
Nice	0.190***	0.215**	0.239***	0.248**	0.231***	0.280***
	(0.034)	(0.087)	(0.034)	(0.099)	(0.040)	(0.069)
Tsukuba	0.100**	0.131	0.177***	0.205**	0.138***	0.217***
	(0.041)	(0.093)	(0.018)	(0.095)	(0.022)	(0.078)
Osaka	0.090***	0.121	0.191***	0.201**	0.138***	0.192***
	(0.028)	(0.073)	(0.029)	(0.094)	(0.026)	(0.070)
Female		0.020		0.022		0.021
		(0.040)		(0.039)		(0.029)
Raven's Score		−0.005		−0.005		−0.004
		(0.005)		(0.007)		(0.006)
Economics & Management		−0.031		−0.008		−0.010
		(0.039)		(0.043)		(0.031)
Loss Aversion		0.006		0.012		−0.010
		(0.011)		(0.015)		(0.008)
Illusion of Control		0.001		0.000		0.001
		(0.002)		(0.003)		(0.002)
R^2	0.225	0.223	0.270	0.276	0.292	0.306
N	860	850	1010	990	870	860
H_0: Rennes = Nice	0.252	0.303	0.282	0.172	0.355	0.412
H_0: Tsukuba = Osaka	0.834	0.867	0.664	0.918	0.991	0.480

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

Table A12: The Intrinsic Value of Decision Rights, IV/CE

T1 France	0.226***	0.250***
	(0.026)	(0.053)
T1 Japan	0.095***	0.133**
	(0.024)	(0.051)
T2 France	0.205***	0.233***
	(0.026)	(0.057)
T2 Japan	0.183***	0.223***
	(0.016)	(0.050)
T3 France	0.201***	0.230***
	(0.022)	(0.048)
T3 Japan	0.138***	0.174***
	(0.017)	(0.048)
Female		0.021
		(0.021)
Raven's Score		-0.004
		(0.004)
Economics & Management		-0.014
		(0.023)
Loss Aversion		0.002
		(0.007)
Illusion of Control		0.000
		(0.001)
R^2	0.258	0.261
N	2740	2700

Notes: *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject.

E Robustness to Other Definitions of Cultural Background

Since we are interested in the effect of the cultural background, in the main analysis we have excluded subjects that are neither born in France or in Japan *and* are not of French or Japanese nationality. Our results are robust to other definitions of link to the country or cultural background, that either "weaken" (Definitions 1, 2, and 3) or "strengthen" (Definitions 4 and 5) the definition used in the main text. We test for the following definitions:

- **Definition 1**: A subject is said to be French/Japanese if she/he was born in France/Japan *or* one of her/his parents was born in France/Japan.
- **Definition 2**: A subject is said to be French/Japanese if she/he is of French/Japanese nationality.
- **Definition 3**: Union of Definition 1 and Definition 2.
- **Definition 4**: Intersection of Definition 1 and Definition 2.
- **Definition 5**: Intersection of Definition 1 and Definition 2 *and* at least one parent was born in France/Japan.

Table A13 reports the number of subjects for the different definitions. Table A14 presents the summary of the main results in terms of sign and significance, where "Def 0" represents the definition used in the main text.

Table A13: Number of Subjects per Definition

	France			**Japan**	
Def 1 ↓ / Def 2 →	French	Not French	Def 1 ↓ / Def 2 →	Japanese	Not Japanese
French	133	9	Japanese	130	4
Not French	8	32	Not Japanese	0	2

For definition 5 remain 121 subjects in France and 130 subjects in Japan.

Table A14: Summary of the Results per Definition

	France	Japan	FR - JP
R1: Independence			
Def 0:	0	$-^{*}$	0
Def 1:	0	$-^{*}$	$+^{*}$
Def 2:	0	$-^{**}$	0
Def 3:	0	$-^{*}$	0
Def 4:	0	$-^{**}$	$+^{*}$
Def 5:	0	$-^{**}$	$+^{**}$
R2: Power			
Def 0:	0	$-^{*}$	$+^{*}$
Def 1:	0	$-^{*}$	0
Def 2:	0	$-^{*}$	$+^{*}$
Def 3:	0	$-^{*}$	0
Def 4:	0	$-^{*}$	$+^{*}$
Def 5:	0	$-^{*}$	$+^{*}$
R3: Self-reliance			
Def 0:	$+^{***}$	$+^{***}$	0
Def 1:	$+^{***}$	$+^{***}$	0
Def 2:	$+^{***}$	$+^{***}$	0
Def 3:	$+^{***}$	$+^{***}$	0
Def 4:	$+^{***}$	$+^{***}$	0
Def 5:	$+^{***}$	$+^{***}$	0

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level, based on OLS regressions with clustered standard errors per subject and individual controls. The null hypothesis for the differences between France and Japan are on two-sided tests (H_0: FR = JP).

F Alternative Explanations

These findings are robust to alternative explanations based on loss aversion, illusion of control, or bounded rationality discussed in Bartling et al. (2014). Our regressions show that these have no significant impact on the intrinsic value of decision rights. Our data is neither consistent with explanations based on reciprocity, preference reversals, or corner solutions (see Bartling et al. 2014 for details). If reciprocity would be behind the measured IV, the differences in the certainty equivalents between the delegation and control lotteries in Part 2 should be higher the lower the minimum effort requirement imposed by the principal in Part 1. However, the data do not lend support to this trend. In a regression of the percentage difference in certainty equivalents on the minimum effort requirement, controlling for subject and game fixed effects, the percentage difference in the certainty equivalents increases by 3.5 percentage points per 10 point increase in the minimum effort requirement ($p < 0.001$, standard errors clustered at the subject level).

In terms of preference reversals, there exists a large literature showing that people tend to overbid a high-amount lottery in a pricing task (as the Part 2 of our experiment is) while preferring a high-probability lottery in a binary choice (e.g. Lichtenstein and Slovic 1971; Grether and Plott 1979; Berg et al. 2010). If success payoffs of delegation lotteries are larger than the ones of control lotteries, subjects will give, according to this explanation, a higher certainty equivalent to delegation lotteries. We need then to check if delegation lotteries are considered as high-amount lotteries, i.e., if $P_{\mathcal{A}}$ is larger than $P_{\mathcal{P}} - C(E)$. We find that control lotteries have a smaller success payoff in 56.1% of the cases (59.3% in France, and 52.7% in Japan), a larger one in 43.7% of the cases (40.6% in France, and 47% in Japan) and the payoffs are equal in 0.3% of the cases (2 cases in France, and 7 in Japan). Moreover, our findings indicate that the control and delegation lotteries have similar probabilities. The average success probabilities are, respectively, 63.6% (65.6% in France and 61.4% in Japan) and 59.8% (63.5% in France and 55.8% in Japan). In 43.6% of cases (43.9% in France and 43.2% in Japan), the control lottery has a higher probability of success than the delegation lottery. On the contrary, delegation is the high-probability lottery in 36.7% of cases (39.7% in France and 33.4% in Japan). The two lotteries have the same probability of success in 19.7% of cases (16.3% in France and 23.4% in Japan). Taken together, these results suggest that preference reversals are not behind the intrinsic value of decision rights observed in our experiment.

Finally, corner minimum effort requirements, i.e., $\underline{e} = 1$ and $\underline{e} = 100$, could in principle undermine the elicitation of the principals' point of indifference. Nonetheless, we observe low percentages of corner solutions for $\underline{e}$. In our complete sample, principals selected $\underline{e} = 1$ in 6.2% of cases. In total, 75.2% of subjects have never chosen $\underline{e} = 1$ (84.5% in France, and 65.2% in Japan), 8.8% of them have chosen $\underline{e} = 1$ only once (7% in France, and 10.6% in Japan), and 8% twice (7% in France, and 9.1% in Japan). It turns out that $\underline{e} = 100$ is chosen in 5.29% of cases,

and 81.4% of subjects have never chosen $\underline{e} = 100$ (83.8% in France, and 78.8% in Japan), 6.9% of them have chosen $\underline{e} = 100$ only once (4.2% in France, and 9.9% in Japan), and 5.5% twice (7% in France, and 3.8% in Japan). These findings, both for $\underline{e} = 1$ and $\underline{e} = 100$, are similar for all the treatments.[36] Given its low frequency, and in accordance with the additional control experiment ran by Bartling et al. (2014) to address this issue, we conclude that these choices do not pose a problem to the elicitation of the principals' point of indifference.

[36]The higher frequency is for treatment 1 and $\underline{e} = 1$ in Japan, in which 46.5% of subjects have never chosen $\underline{e} = 1$, 18.6% of them have chosen $\underline{e} = 1$ once, and 11.6% twice.

G Instructions

This Appendix contains the English instructions of the experiment that were handed out to subjects in the position of principals in the three treatments, and from which the French and Japanese instructions were translated and back translated. The French and Japanese instructions, as well as the agent's instructions of Part 1 (the remaining instructions are common to principals and agents) are available from the authors upon request.

To be self-contained, we exclude repetitions of the instructions between treatments. The red-colored sentences are specific to different treatments, with [T1] indicating sentences for treatment 1, [T2] sentences for treatment 2, and [T3] sentences for treatment 3. The black-colored sentences are common to all instructions, based on treatment 1 and with the exception (not highlighted) that "Participant B" is substituted for "the bot" in treatment 2 and sometimes in treatment 3 (only in sentences where "Participant B" in the instructions refer to the one that makes decisions or the potential holder of the decision right). This appendix is organized as follows:

A. Instructions for Part 1 (Principals)

B. Instructions for Part 2 (All subjects)

C. Instructions for Illusion of Control Task (All subjects)

D. Instructions for Loss Aversion Task (All subjects)

E. Instructions for Cognitive Ability Task (All subjects)

F. Supplementary Cost Sheet (All subjects)

A. Instructions for Part 1 (Principals)

Instructions for Participant A

Welcome to this experiment.

Please carefully read the following instructions. These will provide you with all the information needed to participate in this experiment. If you don't understand something, don't hesitate to raise your hand. We will come and answer your question where you are seated.

You will receive an initial endowment of **5 euros** at the start of the experiment. You can earn an additional monetary amount during the experiment by earning **points**. The number of points you will earn depends on both your decisions and those of other participants.

All the points you earn during the course of this experiment will be converted to euros at the end of the experiment. The following exchange rate will be applied:

100 points = 2.50 euros

At the end of the experiment, you will receive the money you earned during the experiment as well as the initial sum of 5 euros.

Please note that **all communication is strictly forbidden during the entirety of the experiment**. We also want to emphasize that you must only use the computer functions that are related to the experiment. We remain at your disposal to answer any questions you might have.

This experiment is composed of **4 parts**:

1. [T1 and T3] The first part of the experiment is composed of 10 rounds. For each of these 10 rounds, you will be randomly paired with a Participant B. You will be able to implement a project with the Participant B who is randomly paired with you in each round. A detailed explanation of the first part of the experiment is found in the following pages.
1. [T2] The first part of the experiment is composed of 10 rounds. For each of these 10 rounds, you will interact with a ``bot''. You will be able to implement a project with the bot in each round. A detailed explanation of the first part of the experiment is found in the following pages.

2. In the second part of the experiment, you will be presented with 20 different decisions between a fixed and an unfixed amount. You will receive detailed instructions on the second part of the experiment once the first part is concluded.

3. The third part of the experiment is very short and you will receive detailed instructions once the second part is concluded.
4. In the fourth part of the experiment, we will ask you to answer a series of questions.

General Instructions for the First Part of the Experiment

[T1 and T3] There are two types of participants in the first part of the experiment: Participant A and Participant B. **You are Participant A**.

There are 10 rounds. You will be paired with a different Participant B in each round. A **project** can be implemented in each round. If the project is a success, Participant A and B will receive positive payments. A successful implementation of the project will lead to a positive payment for participants A and B.

[T2] There are 10 rounds. You will be paired with a **bot** for each round. A **project** can be implemented in each round. If the project is a success, you will receive a positive payment.

The decision right

In each round, either you or Participant B has the decision right. The participant with the decision right can make two decisions:

1. **Which project – A or B – will be implemented?**
   Participant A receives a greater share of the project payment in Project A and Participant B receives a greater share of the project payment in Project B (It is possible that Participant A and Participant B receive the same share in certain rounds).

2. **What is the probability the project will be successful?**
   The determination of the probability of success is connected to the costs paid by the participant who has the decision right. The higher the probability of success, the higher the costs.

[T3] Please note that if the bot has the decision right, the bot makes the decisions **on behalf of Participant B**. To put it another way, Participant B will not make their decisions themselves. This means that the payment of the project and the costs linked to the choice of the probability of success (a choice made by the bot) are automatically assigned to Participant B.

[T2 and T3] The manner in which the bot makes decisions is described later in the instructions.

Payment of the project

The payments that result from the implementation of the project vary from one round to another. You will be informed of the payments at the start of each round.

Example: The payments for one project for one round. In the case that Project A is successful, you receive 200 points and Participant B receives 150 points. In the case that Project B is successful, Participant B receives 200 points and you receive 150 points. In the event that the project fails, both participants receive 100 points each.

		Your Payment	Payment for Participant B
In the case of success	**Project A**	200	150
	Project B	150	200
In the case of failure		100	100

The probability of success

If you have the decision right, then you can determine the probability of success for the chosen project, either A or B.

How is the probability of success determined?

The probability of success is a number between 0 and 100 that can be chosen freely.

$$\mathbf{0 \leq \text{probability of success} \leq 100}$$

A probability of success of 0 means that the project will never be successful. A probability of success of 100 indicates that the success of the project is guaranteed. A value of 50 indicates that a project has a 50% chance of success.

The cost of the choice of the probability of success

The higher the probability of success you choose, the higher the cost. Two information sheets (one blue and one yellow) are at your desk: they both provide a table and a graph outlining the cost schedule for the different probabilities of success. Each round, you will be informed whether the cost schedule from the blue or yellow sheet will be applied. You can also always have the computer show you the costs on the monitor while choosing the probability of success.

The success of the project

At the end of the experiment, one of the 10 rounds will be randomly selected by the computer. The choices made by you and Participant B in this round will determine your payments for the first part of the experiment.

The success or failure of the project chosen by the participant with the decision right for the randomly selected round will be determined in the following manner.
[T2 and T3] The success or failure of the project chosen by the one with the decision right (either you or the bot) for the randomly selected round will be determined in the following manner.
A number between 1 and 100 will be drawn; all numbers between 1 and 100 have an equal chance of being drawn. The number that is drawn will then be compared to the probability of success that was chosen by the participant with the decision right.

If the number drawn is **smaller than or equal** to the probability of success that was chosen, the project is a success. If the number drawn **is larger**, the project is not a success. **The greater the probability of success that you have chosen, the greater the chance that the**

number drawn will be smaller than your chosen probability. To put it another way, there is a greater chance your project will be successful.

Examples:

1. **Example 1**: You have chosen a **probability of success of 15**, that is to say 15%.

   This means:
   - If the number drawn at random is between 1 and 15 (= 15 chances out of 100), the project is successful.
   - If the number drawn is larger than 15 (= 85 chances out of 100), the project is not a success.

2. **Example 2**: You have chosen **a probability of success of 80**, that is to say 80%.

   This means:
   - If the number drawn at random is between 1 and 80 (= 80 chances out of 100), the project is successful.
   - If the number drawn is larger than 80 (= 20 chances out of 100), the project is not a success.

- **Suppose that the number chosen at random is 93.**
  In this case, the project is not a success in either example (the randomly drawn number is larger than the chosen probability of success in both examples).

- **Suppose that the number chosen at random is 54.**
  In this case, the project in Example 1 would not have been successful (the randomly drawn number is larger than 15) but the project in Example 2 would have been a success (the randomly drawn number is less than 80).

- **Suppose that the number chosen at random is 3.**
  In this case, the project would have been a success in both examples (the randomly drawn number is lower than the chosen probability of success in both examples).

The income

The incomes for Participant A and Participant B are made up of two elements:

- The payment from the chosen project in the event the project is successful. In the case the project fails, the two participants receive a lower payment that is independent of the project chosen.
- The costs linked to the chosen probability of success are deducted from the payment of the participant who has the decision right.

This results in the following four possibilities for you:

1. You have the **decision right** and the project is **successful**:

Income = Payment from the project that you chose minus the costs linked to the choice of the probability of success

2. You have the **decision right** and the project is a **not a success**:

Income = Payment in case of failure minus the costs linked to the choice of the probability of success

3. You **do not have the decision right** and the project is **successful:**

Income = Payment from the project chosen by Participant B

[T2] Income = Payment from the project chosen by the bot

[T3] Income = Payment from the project that the bot chose on behalf of Participant B

4. You **do not have the decision right** and the project is a **not a success:**

Income = Payment in case of failure

[T2] Please note that the bot's payments are hypothetical. **Nobody in the room will receive the points earned by the bot during the first part of the experiment.**

[T3] Please note that **Participant B makes no decisions.** Thus, they have no influence on your income. But the decisions that the bot makes in their place as well as your decisions will affect the income of Participant B.

Detailed Procedure of One Round on the Computer

[T1] 1st Stage: Participant B's decision

In each round, you as participant A first have the decision right. You can also opt to delegate the decision right to Participant B. Before deciding if you want to delegate the decision to Participant B, Participant B must make a definite choice of a project and a probability of success in the event that you delegate the decision right.

If you end up delegating the decision right to Participant B, then the decisions participant B makes in the first stage will be realized.

You will not yet learn which decisions participant B makes in the first stage.

[T2] 1st Stage: Bot's decision

In each round, you as participant A first have the decision right. You can also opt to delegate the decision right to the bot. Before deciding if you want to delegate the decision to the bot, the bot must make a definite choice of a project and a probability of success in the event that you delegate the decision right.

How does the bot make its decisions?

1. The bot always chooses the project that earns itself the most points.
1. The bot chooses a probability of success between 0 and 100 **at random**. There is thus a 1/101 chance that the bot picks a probability of success equal to 0; a 1/101 chance that the bot picks a probability of success equal to 1; etc.; and a 1/101 chance that the bot picks a probability of success equal to 100.

If you end up delegating the decision right to the bot, then the decisions the bot makes in the first stage will be realized.
You will not yet learn which decisions the bot makes in the first stage.

[T3] 1st Stage: Bot's decision on behalf of Participant B

In each round, you as participant A first have the decision right. You can also opt to delegate the decision right to the bot. Before deciding if you want to delegate the decision to the bot, the bot must make a definite choice of a project and a probability of success (on behalf of Participant B) in the event that you delegate the decision right.

How does the bot make its decisions?

1. The bot always chooses the **project that earns Participant B the most points**.
2. The bot chooses a probability of success between 0 and 100 **at random**. There is thus a 1/101 chance that the bot picks a probability of success equal to 0; a 1/101 chance that

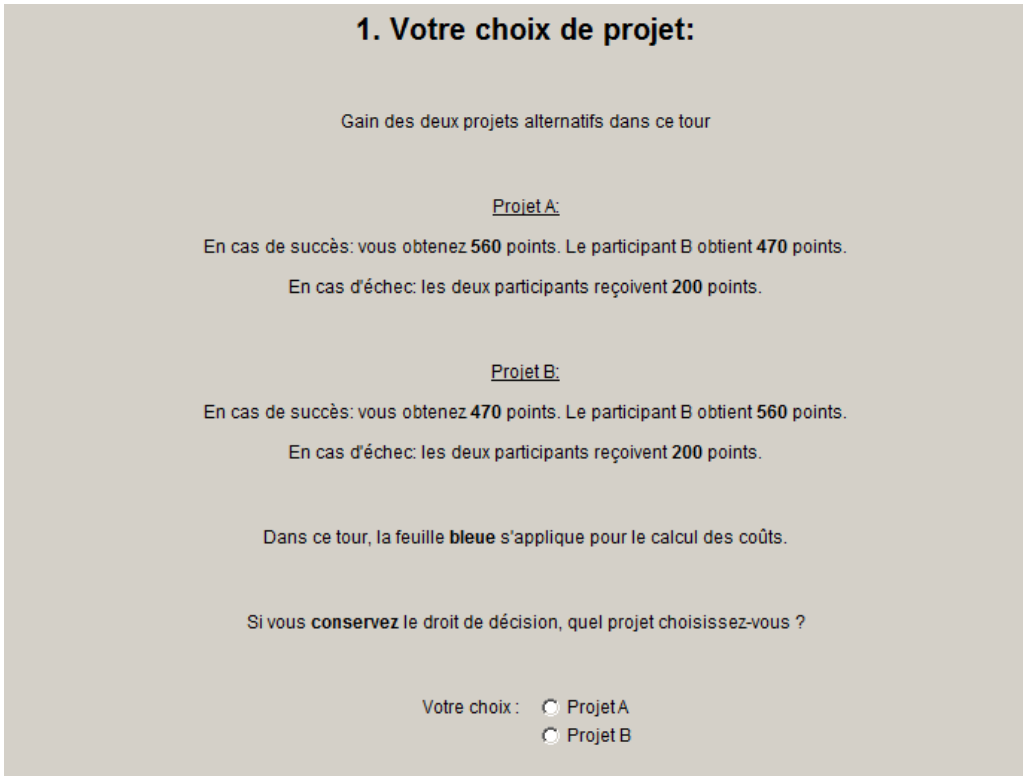
the bot picks a probability of success equal to 1; etc.; and a 1/101 chance that the bot picks a probability of success equal to 100.

If you end up delegating the decision right to the bot, then the decisions the bot makes in the first stage will be realized.

You will not yet learn which decisions the bot makes in the first stage.

2nd Stage: Choice of project

At this stage of the experiment, you have not yet made the final decision on whether or not you will delegate the decision right. For this reason, you must select the project that you would like to implement in case you opt to keep the decision right. The choice of project will be made on this type of screen:

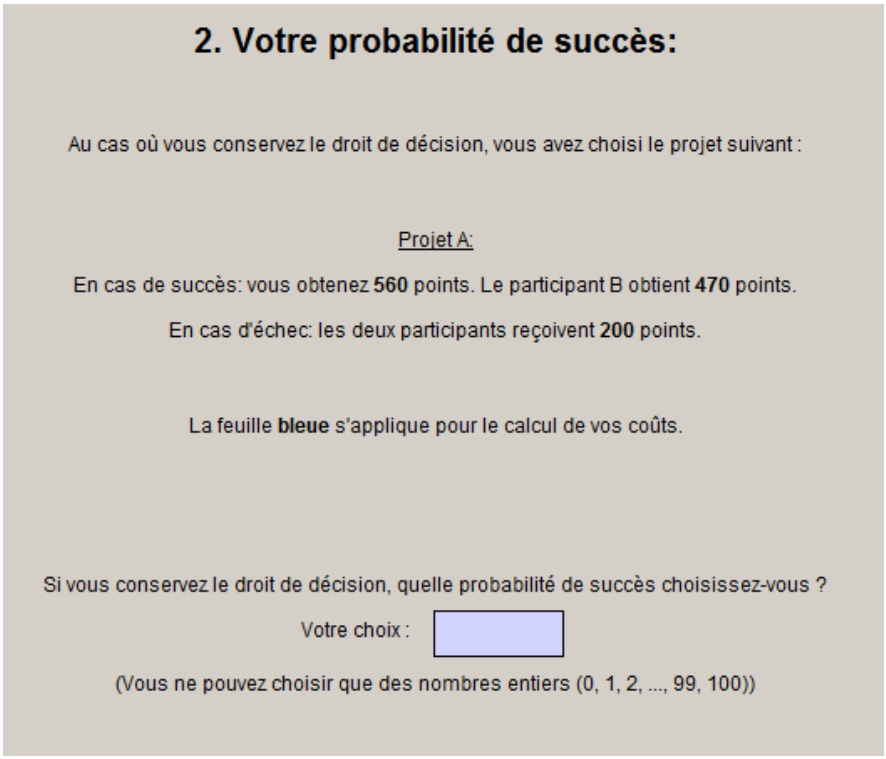


After having chosen a project, please click on the "OK" button.

3rd Stage: Choice of probability of success

When selecting the probability of success, you still have not made a definite choice of whether or not to delegate the decision right. After having chosen a project, you must select the probability of success for this choice in case you keep the decision right. The cost of the probability of success will only be applied if you ultimately keep the decision right.

You make your choice of the probability of success on this type of screen:



After having selected the probability of success, click on the button "Display costs". This will then show you the exact costs of the probability of success that you chose. You can modify your probability of success if you wish. By clicking on "Confirm", you make your definitive selection.

4th Stage: Who has the decision right?

You can decide in each round – after participant B has made his decisions – whether you would like to delegate the decision right to participant B or if he would like to retain this for yourself. In this case, you do not make the decision directly, but by **determining a minimum requirement**:

[T3] You can decide in each round – after the bot has made his decisions on behalf of Participant B – whether you would like to delegate the decision right to the bot or if he would like to retain this for yourself. In this case, you do not make the decision directly, but by **determining a minimum requirement**:

In each round, you determine the minimum probability of success that Participant B must have chosen in order for you to be willing to delegate the decision right to them. You can choose any minimum requirement between 1 and 100.

Participant B has already chosen their probability of success at the moment when you determine a minimum requirement. Thus there is no possibility you will influence the choice made by Participant B.

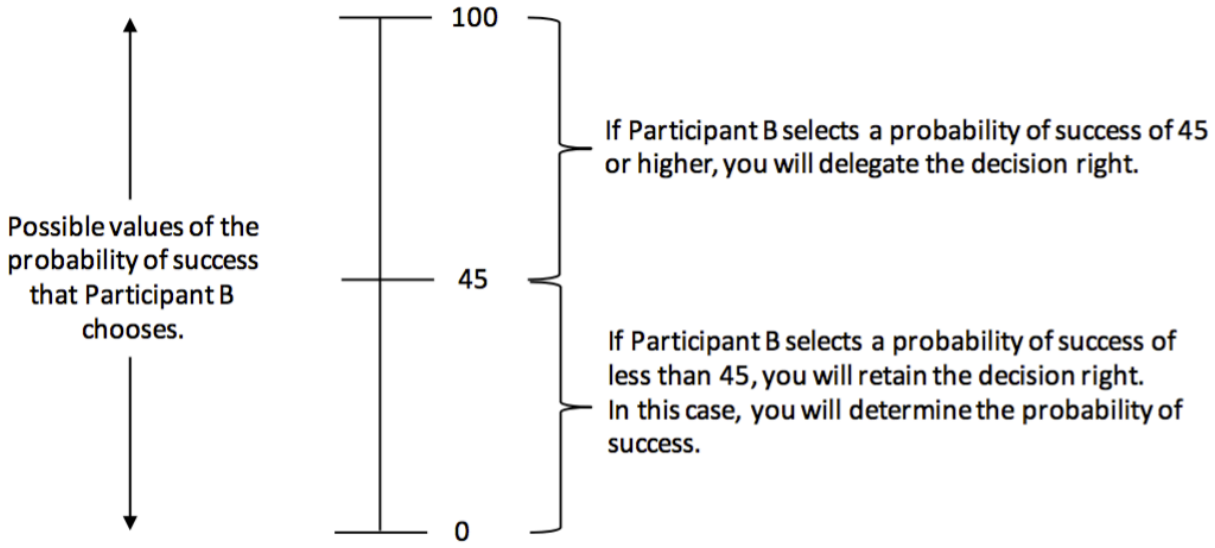
Please note that you do not know the probability of success chosen by Participant B when you determine your minimum requirement.

[T3] Please also note that Participant B will make no decisions.

If the probability of success chosen by Participant B is equal to or higher than the minimum requirement you have determine, you will delegate the decision right. If the probability of success chosen by Participant B is lower than the minimum requirement you determine, you will keep the decision right.

The graph seen below will clarify the link between the minimum requirement you have determine, the probability of success chosen by Participant B, and the question of who will have the decision right.

If, for example, you chose **a minimum requirement of 45,** this means that you wish to delegate the decision right to Participant B if they have selected a probability of success of 45 or more.



When considering what minimum requirement to determine, you should ask the following question:

- Do I want to delegate the decision right if Participant B selects a probability of success of 1? If the answer is no, you should ask the question:
- Do I want to delegate the decision right if Participant B selects a probability of success of 2? If the answer is no, you should ask the question:

- Do I want to delegate the decision right if Participant B selects a probability of success of 3? And so on.

Do this until you reach a level of probability of success chosen by Participant B above which you would delegate the decision right. This level should be your minimum requirement.

- In the above example, the value is 45. This means that you would just be willing to delegate the decision right if Participant B chooses a probability of success of 45 but that you would prefer retaining this right at all values of 44 or less.

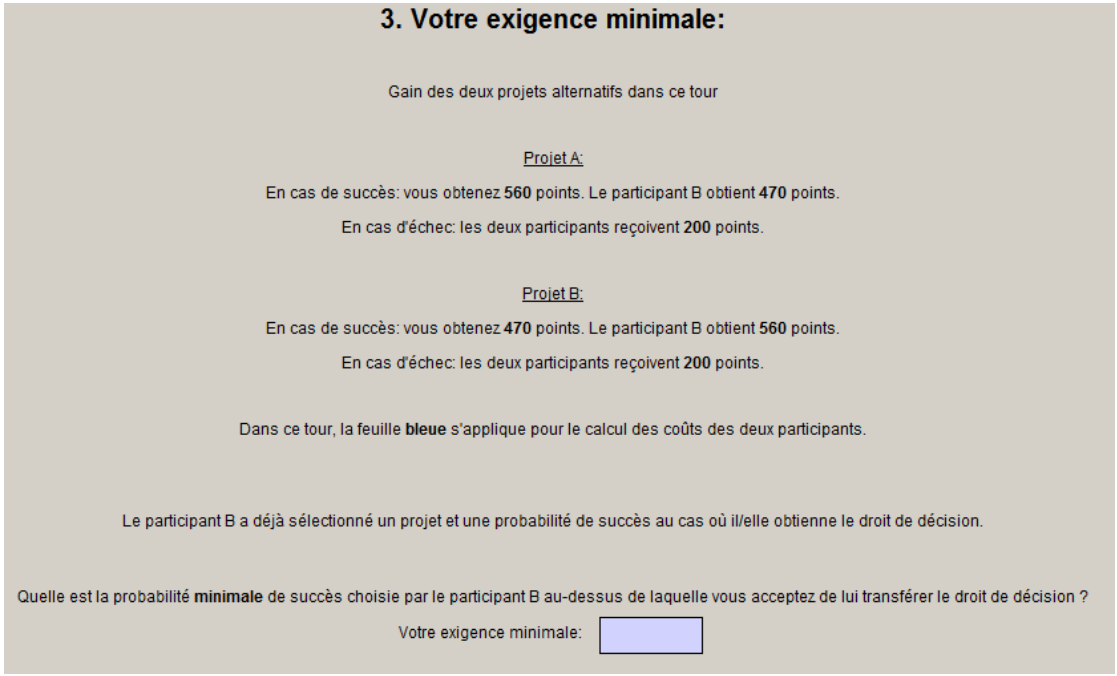
Other examples:

1. You select **a minimum requirement of 78**.
   This means:
   - If during Stage 1, Participant B selects a probability of success between 0 and 77, you do not delegate the decision right.
   - If during Stage 1, Participant B selects a probability of success between 78 and 100, you delegate the decision right to them.

2. You select **a minimum requirement of 4**.
   This means:
   - If during Stage 1, Participant B selects a probability of success between 0 and 3, you do not delegate the decision right.
   - If during Stage 1, Participant B selects a probability of success between 4 and 100, you delegate the decision right to them.

You make your decision on the minimum requirement for participant B on a screen like the one shown below:

The upper part of the screen informs you of the payments in the two project alternatives as well as the payment in case of lack of success in the round in question. You will also be informed whether the cost schedule on the blue or yellow sheet will be applied for the round in question. You can indicate your choice of a minimum requirement for delegating the decision right in the lower part of the screen. Here is an example:



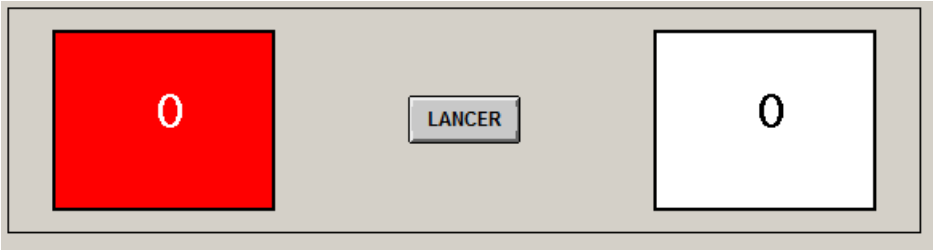
After having indicated your minimum requirement, please click on the "OK" button. A new round will then begin.

How the success of the project is determined

At the end of the experiment, the computer will randomly select one of the 10 rounds and the payments for you and Participant B for this part of the experiment will be determined on the basis of the decisions made by you and Participant B **in that round**. As you will not know which round will be randomly selected by the computer, you should make careful decisions every round.

a) The computer will first randomly determine which round will be selected for payment.
b) The computer then assesses whether the Participant B you had been randomly paired with for that round chose a probability of success that was at least equal to your minimum requirement.
   - If the minimal requirement is lower than or equal to the probability of success chosen by Participant B, you will delegate the decision right.
   - If the minimal requirement is greater than the probability of success chosen by Participant B, you will retain the decision right.

If you keep the decision right, the success of the project you chose during the randomly-selected round is determined by a pair of **electronic dice** that will randomly pick a number between 1 and 100. This number is then compared to the probability of success you have chosen.
More precisely, the participant who holds the decision right will see the following on their screen:



The number on the red background represents the tens column and the number on the white background represents the ones column.

Please then click on the "THROW" button. You will see numbers on the dice **change quickly in a random manner**. You can stop the numbers by clicking on the button "STOP".
As you will see, the numbers change too quickly to be able to choose which numbers to stop on.

After having clicked on "STOP", the two numbers that appear on the screen will give you a number between 1 and 100 (two zeroes represent 100).
If the number is less than or equal to the probability of success chosen by the participant who had the decision right, the project is then a success. On the contrary, if the number is greater than the probability of success chosen by the participant who had the decision right, the project is then a failure.

[T2 and T3] If you did not have the decision right, a number between 1 and 100 will be chosen at random by the computer. If this number is less than or equal to the probability of success chosen by the bot at random, the project is then a success. On the contrary, if the number is greater than the probability of success chosen by the bot, the project is then a failure.

Summary of the First Part of the Experiment

These are the stages of one round:

1st Stage: Participant B chooses a project and a probability of success in the event that you delegate the decision right to them.

2nd Stage: You choose a project in the event you keep the decision right.

3rd Stage: You choose a probability of success in the event you keep the decision right.

4rd Stage: You choose the minimum requirement for the probability of success for the project that Participant B must choose in order for you to agree to delegate the decision right to them.

At the end of the experiment, one of the 10 rounds will be drawn at random. The decisions that you and Participant B made during that round will determine the monetary income for the first part of the experiment. This will be added to your initial payment of 5 euros and the payments you obtain in the rest of the experiment.

Do you have any questions regarding this experiment? Please raise you hand if you have one. We will come answer you where you are seated.

You will find questions to test your understanding of the experiment on the following pages.

Comprehension Questions

Please answer the following comprehension questions. Please signal the experiment supervisor if you have any questions.

1. Consider the case where you have selected a minimum requirement of 85.

a) If Participant B selected a probability of success of 80, who has the decision right in this round? ……

b) If Participant B selected a probability of success of 90, who has the decision right in this round? ……

2. Consider the case where you have selected a minimum requirement of 55.

a) If Participant B selected a probability of success of 50, who has the decision right in this round? ……

b) If Participant B selected a probability of success of 60, who has the decision right in this round? ……

3. Consider the case where Participant B chose a probability of success of 3.

a) If you chose a minimum requirement of 1, who has the decision right in this round? ……

b) What is the probability that the project will be successful? ……

c) If you chose a minimum requirement of 4, who has the decision right in this round? ……

d) What is the probability that the project will be a successful? ……

4. Consider the case where Participant B chose a probability of success of 90.

a) If you chose a minimum requirement of 85, who has the decision right in this round? ……

b) What is the probability that the project will be successful? ……

c) If you chose a minimum requirement of 95, who has the decision right in this round? ……

d) What is the probability that the project will be successful? ……

5. Consider the case where you keep the decision right and you have chosen a probability of success of 54. The cost schedule from the yellow information sheet applies in this round. Assume further that you obtain 8 as your number on the red background and 2 as your number on the white background.

a) What are your costs? ……

b) Will the project be successful? ……

The following payments are applied for this project:

		Your Payment	Payment for Participant B
In case of success	**Project A**	200	150
	Project B	150	200
In case of failure		100	100

Consider the case that you have chosen Project A.

c) What will be your payment? ……

d) What will be the payment for Participant B?

Now consider the case where you have chosen a probability of success of 24. Also, you now have the number 1 on the red background and the number 5 on the white background. The cost schedule from the yellow paper is applied for this round.
You have again chosen Project A.

e) What are your costs? ……

f) Will the project be successful? ……

g) What will be your payment? ……

h) What will be the payment for Participant B? ……

6. Consider the case where you have delegated the decision right. Participant B selected Project B and chose a probability of success of 48. The cost schedule from the blue paper is applied for this round.

The following payments are applicable to the project:

		Your Payment	Payment for Participant B
In case of success	**Project A**	180	150
	Project B	150	180
In case of failure		100	100

Consider the case where Participant B obtains the number 5 on the red background and the number 7 on the white background.

a) Will the project be successful? ……

b) What will your payment be? ……

c) What will be the payment of Participant B? ……

Consider the case where Participant B obtains the number 3 on the red background and the number 9 on the white background.

d) Will the project be successful? ……

e) What will your payment be? ……

f) What will be the payment of Participant B? ……

Comprehension Questions: Answers

Please answer the following comprehension questions. Please signal the manager of the experiment if you have any questions.

1. Consider the case where you have selected a minimum requirement of 85.

   a) If Participant B selected a probability of success of 80, who has the decision right in this round? **You**

   b) If Participant B selected a probability of success of 90, who has the decision right in this round? **Participant B**

2. Consider the case where you have selected a minimum requirement of 55.

   a) If Participant B selected a probability of success of 50, who has the decision right in this round? **You**

   b) If Participant B selected a probability of success of 60, who has the decision right in this round? **Participant B**

3. Consider the case where Participant B chose a probability of success of 3.

   a) If you chose a minimum requirement of 1, who has the decision right in this round? **Participant B**

   b) What is the probability that the project will be successful? **3%**

   c) If you chose a minimum requirement of 4, who has the decision right in this round? **You**

   d) What is the probability that the project will be a success? **According to your choice**

4. Consider the case where Participant B chose a probability of success of 90.

   a) If you chose a minimum requirement of 85, who has the decision right in this round? **Participant B**

   b) What is the probability that the project will be successful? **90%**

   c) If you chose a minimum requirement of 95, who has the decision right in this round? **You**

d) What is the probability that the project will be successful? **According to your choice**

5. Consider the case where you keep the decision right and you have chosen a probability of success of 54. The cost schedule from the yellow information sheet applies in this round. Assume further that you obtain 8 as your number on the red background and 2 as your number on the white background.

a) What are your costs? **29.2 points**

b) Will the project be successful? **No**

The following payments are applied for this project:

		Your Payment	Payment for Participant B
In case of success	**Project A**	200	150
	Project B	150	200
In case of failure		100	100

Consider the case that you have chosen Project A.

c) What will be your payment? **100 – 29.2 = 70.8**

d) What will be the payment for Participant B? **100**

Now consider the case where you have chosen a probability of success of 24. Also, you now have the number 1 on the red background and the number 5 on the white background. The cost schedule from the yellow paper is applied for this round.
You have again chosen Project A.

e) What are your costs? **5.8**

f) Will the project be successful? **Yes**

g) What will be your payment? **200 – 5.8 = 194.2**

h) What will be the payment for Participant B? **150**

6. Consider the case where you have delegated the decision right. Participant B selected Project B and chose a probability of success of 48. The cost schedule from the blue paper is applied for this round.

The following payments are applicable to the project:

		Your Payment	Payment for Participant B
In case of success	**Project A**	180	150
	Project B	150	180
In case of failure		100	100

Consider the case where Participant B obtains the number 5 on the red background and the number 7 on the white background.

a) Will the project be successful? **No**

b) What will your payment be? **100**

c) What will be the payment of Participant B? **100 – 46.1 = 53.9**

Consider the case where Participant B obtains the number 3 on the red background and the number 9 on the white background.

d) Will the project be successful? **Yes**

e) What will your payment be? **150**

f) What will be the payment of Participant B? **180 – 46.1 = 133.9**

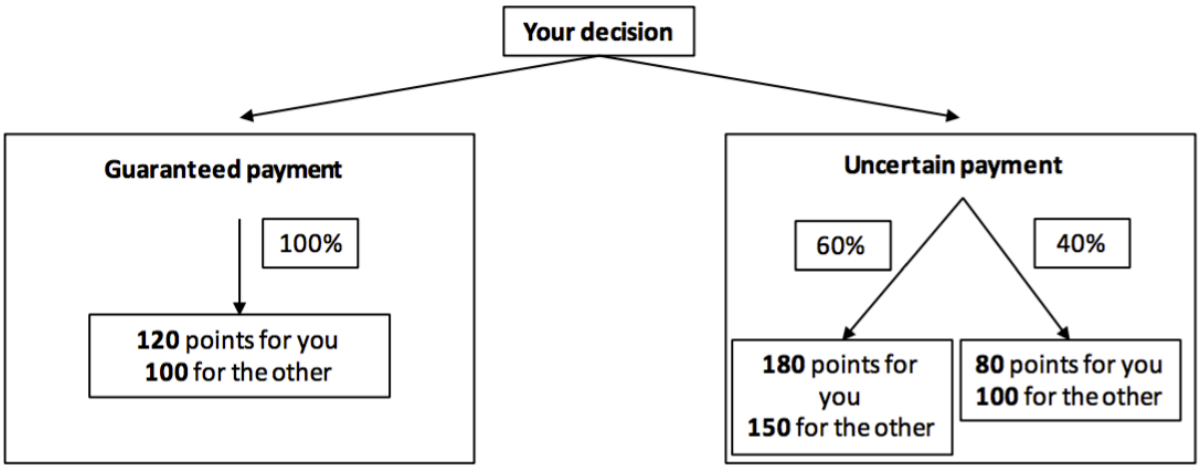
B. Instructions for Part 2 (All subjects)

Second Part of the Experiment

The second part of the experiment is made up of 20 rounds. You will be randomly paired with another participant for every round. The exchange rate of 2.50 euros for 100 points is still applicable.

In each round, you must choose between a guaranteed payment and an uncertain payment. Your choice will also affect the payment of the other participant with whom you have been randomly paired.

Here's an example:



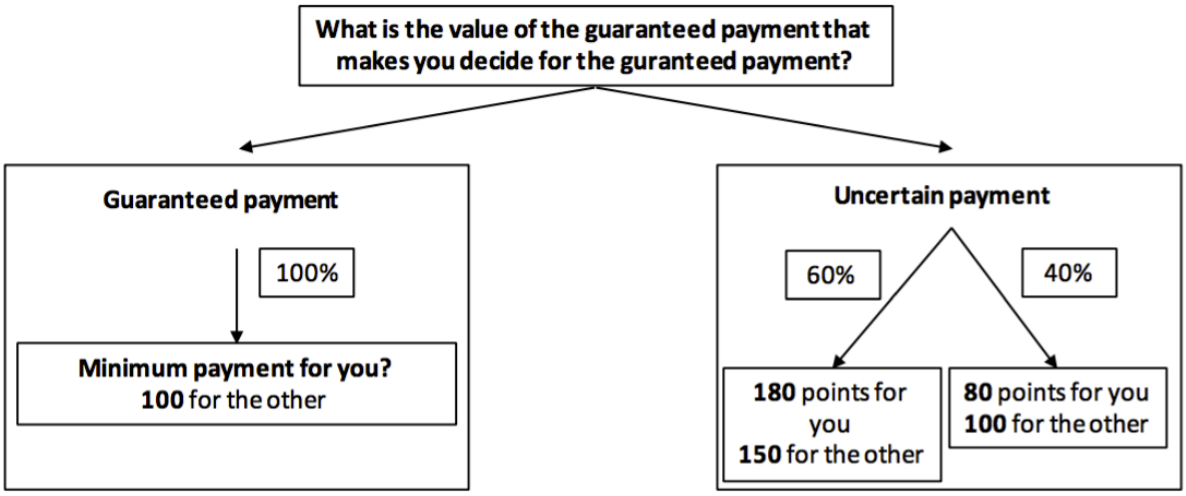
If, in the example above, you decide for the guaranteed payment, you will receive 120 points and the participant you have been randomly associated will receive 100 points.

If you opt for the uncertain payment, there is a 60% probability that you will receive 180 points and the other participant will receive 150 points. There is a 40% probability you will receive 80 points and the other participant will receive 100 points.

In each of the 20 rounds, you choose between a guaranteed payment and an uncertain payment. The amount of the payments and the probabilities change each round.

How do you choose between guaranteed payment and uncertain payment in each round?

When you make your choice between the guaranteed payment and the uncertain payment, you don't yet know the amount of the guaranteed payment. Thus, you can't directly choose between the guaranteed payment and the uncertain payment. Instead, you must indicate the minimum payment for which you prefer to choose the guaranteed payment than the uncertain payment.



In each round, you will be informed of the guaranteed payment for the other participant, the uncertain payment available to you and the other participant, and the probabilities associated with the uncertain payment in each round.

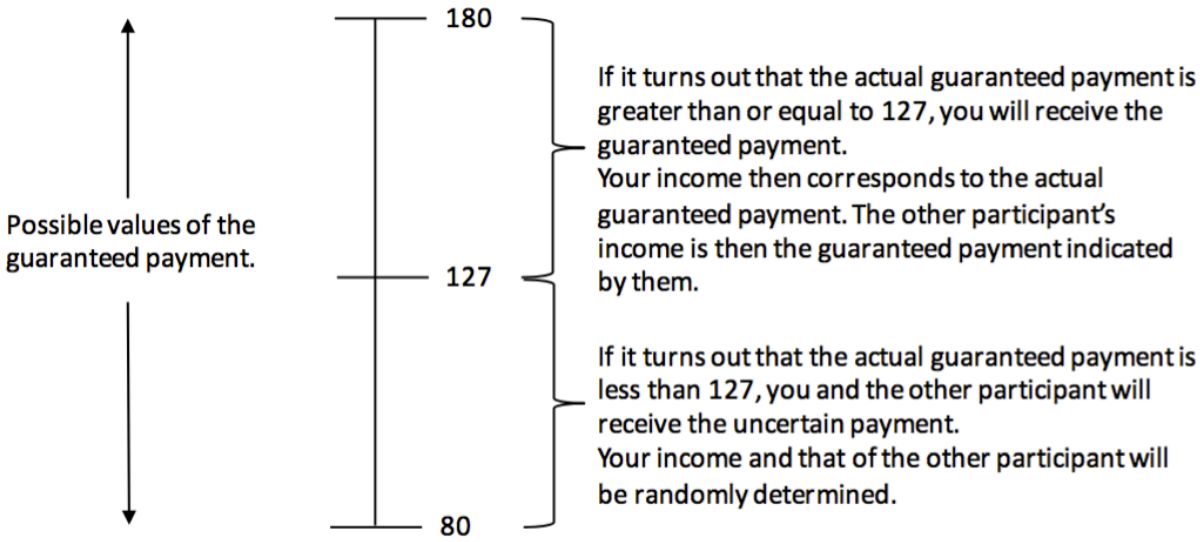
After having indicated the **minimum payment** that would make you choose the guaranteed payment in a round, you will be informed of your **actual guaranteed payment** for that round. The choice between the guaranteed payment and the uncertain payment is made in the following manner:

- If the guaranteed payment is less than the minimum payment that you have chosen, the uncertain payment determines your income and that of the other participant.
- If the guaranteed payment is equal to or greater than the minimum payment you have chosen, you will receive the actual guaranteed payment and the other participant will receive the guaranteed payment shown on the screen (100 points in the above example).

The possible values of your guaranteed payment lie between both of your uncertain payments (in the above example, between 80 and 180 points). Every amount in this range (80, 81,..., 180) is possible and has the same probability of occurring. The minimum guaranteed payment you choose can be any integer value between the two possibilities for your uncertain payment.

The following graph clarifies the relationship between the minimum payment you choose, the amount of the actual guaranteed payment, and your choice between the guaranteed payment and the uncertain payment.

If, for example, you choose a **minimum payment of 127**, this means that you prefer any guaranteed payment between 127 and 180 points to the uncertain payment.
You will only learn the exact value of your **actual guaranteed payment** after you have chosen your minimum payment.



When you consider your minimum payment, then you should (assuming the numbers from the example above) ask the following questions:

- Would I prefer a guaranteed payment of 180 points to the uncertain payment? If yes, you then should ask:
- Would I prefer a guaranteed payment of 179 points to the uncertain payment? If yes, you then should ask:
- Would I prefer a guaranteed payment of 178 points to the uncertain payment? Etc.

Continue until you reach a value for the guaranteed payment where you just prefer the guaranteed payment to the uncertain payment. You should then choose this value as your minimum payment.

In the above example, this value is 127. This means you have a slight preference for the guaranteed payment of 127 over the uncertain payment but you prefer the uncertain payment over the guaranteed payment of 126 (or any guaranteed payment less than 126).

The income:

If the actual guaranteed payment is at least as high as the minimum payment you selected:

You will receive the actual guaranteed payment.
The other participant will receive the guaranteed payment assigned for them.

If the actual guaranteed payment is less than the minimum payment you selected:

One of the two possible uncertain payments will be selected randomly according to the indicated probabilities.

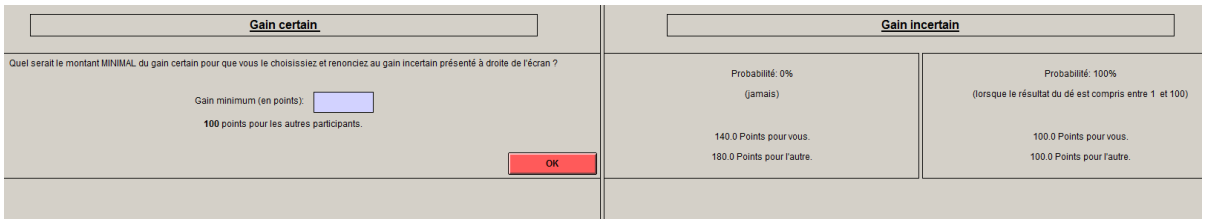
At the end of the experiment, the computer will pick 2 of the 20 rounds at random.

For each of the randomly selected rounds, the minimum payment you have chosen will be compared to the actual guaranteed payment. If the actual guaranteed payment is equal to or greater than the minimum payment you have chosen, you will receive the guaranteed payment. If the actual guaranteed payment is less than the minimum payment you have chosen, a random draw will determine which of the uncertain payments you and the other participant each receive.

As you don't know which rounds will be randomly drawn by the computer, it is in your interest to make careful decisions every round.

Procedure on the Computer

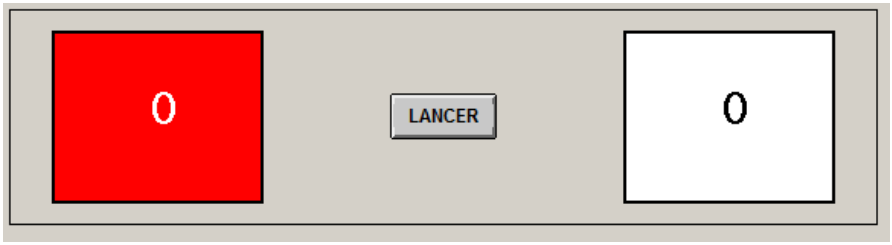
For each round, you will choose the guaranteed payment that you must receive as a minimum in order to make you prefer the guaranteed payment over the uncertain payment. This decision will be made each round on this type of screen:



On the right of the screen you can see the possible values for your uncertain payments and the uncertain payments for the other participant who has been paired with you in a random manner. You will also see the probability of receiving each of the possible payments. This information changes for each of the 20 rounds.

You indicate the **minimum payment** on the left of the screen. This minimum payment indicates what value the guaranteed payment must be for you to prefer the guaranteed payment to the uncertain payment. Once you have entered your choice, please click on the "OK" button. You can modify the number you enter up until the point you click on the "OK" button.

At the end of the experiment, two rounds will be drawn randomly. If the actual guaranteed payment is less than the minimum payment you have chosen in one of these two rounds, a number between 1 and 100 will be selected randomly by a pair of **electronic dice**. More precisely, you will see the following image on your screen:



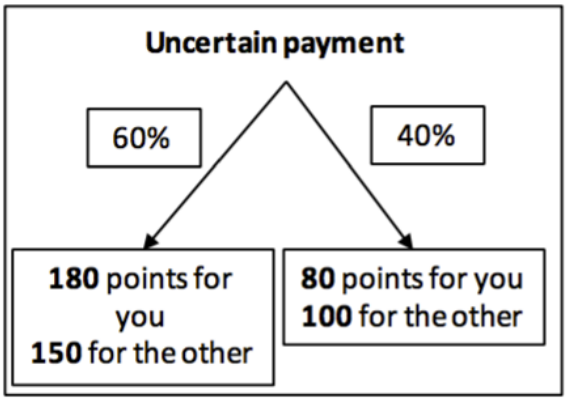
The number on the red background represents tens and the number on the white background represents ones (two zeros indicate 100).

Please then click on the "THROW" button. You will see numbers on the dice **change quickly in a random manner**. You can stop the numbers by clicking on the "STOP" button.
As you will see, the numbers change too quickly to be able to choose which numbers to stop on.

After having clicked on "STOP", the two numbers that appear on the screen will give you a number between 1 and 100 (two zeros represent 100).

The number on the screen will then determine which of the uncertain payments you and the other participant (who you have been randomly paired with for this part of the experiment) will receive.

For example, consider the scenario with the following uncertain payments:



If you ended up with an uncertain payment rather than a guaranteed payment, a number between 1 and 100 will be selected at random using the electronic dice.

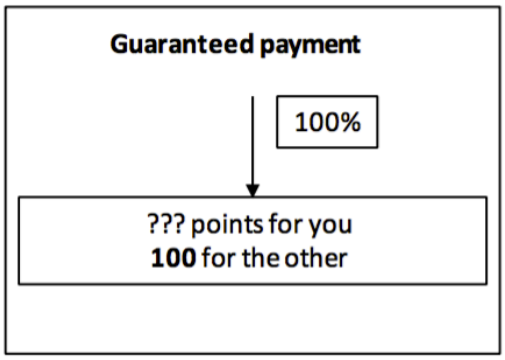
- If the number is between 1 and 60, then you will receive 180 points and the other participant will receive 150 points.
- If the number is between 61 and 100, then you will receive 80 points and the other participant will receive 100 points.

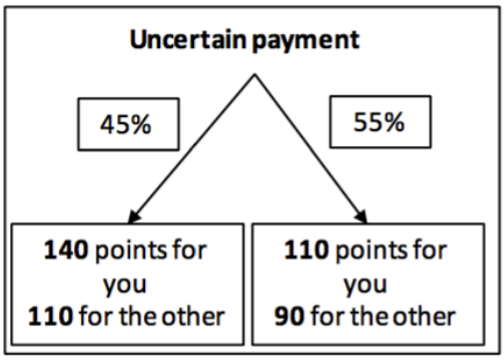
Do you have any questions regarding the second part of the experiment? If so, please raise your hand. We will come to your seat to give you an answer.

You will find questions to test your understanding of the experiment on the following pages.

Comprehension Questions

Consider a scenario with the following sums and probabilities:





1. **In the case that you chose a minimum payment of 120:**
   (b) If the actual guaranteed payment is 128:
   What will your payment be for this round? .....
   What will the payment be for the other participant in this round? .....

   (b) If the actual guaranteed payment is 117:
   What will your payment be for this round? .....
   What will the payment be for the other participant in this round? .....

2. **In the case that you chose a minimum payment of 135:**
   (a) In the case the actual guaranteed payment is 128:
   What will your payment be for this round? .....
   What will the payment be for the other participant in this round? .....

   (b) In the case the actual guaranteed payment is 113:
   What will your payment be for this round? .....
   What will the payment be for the other participant in this round?

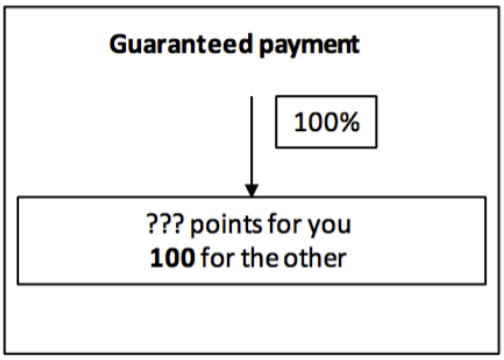
3. **In the case that you chose a minimum payment of 115:**
   (a) In the case the actual guaranteed payment is 128:
   What will your payment be for this round? .....
   What will the payment be for the other participant in this round?.....

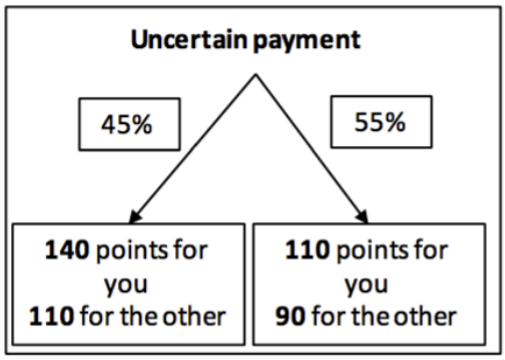
   (b) In the case the actual guaranteed payment is 135:
   What will your payment be for this round? .....
   What will the payment be for the other participant in this round?.....

If you have a question, please raise your hand. We will come answer you where you are seated.

Comprehension Questions: Answers

Consider a scenario with the following sums and probabilities:





A. In the case that you chose a minimum payment of 120:

(b) In the case the actual guaranteed payment is 128:
What will your payment be for this round? **128**
What will the payment be for the other participant in this round? **100**

(b) In the case the actual guaranteed payment is 117:
What will your payment be for this round? **140 or 110**
What will the payment be for the other participant in this round? **110 or 90**

B. In the case that you chose a minimum payment of 135:

(a) In the case the actual guaranteed payment is 128:
What will your payment be for this round? **140 or 110**
What will the payment be for the other participant in this round? **110 or 90**

(b) In the case the actual guaranteed payment is 113:
What will your payment be for this round? **140 or 110**
What will the payment be for the other participant in this round? **110 or 90**

C. In the case that you chose a minimum payment of 115:

(a) In the case the actual guaranteed payment is 128:
What will your payment be for this round? **128**
What will the payment be for the other participant in this round? **100**.

(b) In the case the actual guaranteed payment is 135:
What will your payment be for this round? **135**
What will the payment be for the other participant in this round? **100**

If you have a question, please raise your hand. We will come answer you where you are seated.

C. Instructions for Illusion of Control Task (All subjects)

Additional Information

The computer will select a round at random to use as the basis to calculate your payments for the first part of the experiment. If you have the right to decide for the chosen round, you will be able to stop the electronic dice yourself.

We would like to know how important it is to you to be able to stop the electronic dice yourself and not leave it to the computer to stop them. (It's just a matter of stopping the dice and not the possibility of selecting the probability of success or the project).

Thus, you will receive 30 new points. You can use a part or the totality of these points to purchase the right "to stop the electronic dice yourself". If you don't purchase this right, the dice are stopped in a random manner by the computer. If you do purchase this right, you will do the stopping yourself.

We are asking the following question:
Do you wish to pay to have the ability to stop the electronic dice yourself ?

Yes
No

If you click on "Yes", we will ask you to then indicate the maximum number of points you are ready to pay to have the ability to stop the electronic dice yourself (in the event that you have the right to decide).

When you are answering this question, have in mind the following process: you can purchase the right to stop the electronic dice yourself by indicating your maximum willingness to pay for this right – this must lie between 1 and 30. Then, a price between 1 and 30 will be drawn at random. If the price is less than or equal to your willingness to pay, you will pay the price and stop the electronic dice yourself. If the price is greater, you keep the 30 points and the electronic dice are stopped randomly. **With this procedure, it is best to honestly indicate how much you value the right to stop the electronic dice.**

Example 1: You are willing to pay a maximum of 5 points to have the ability to stop the electronic dice yourself (your readiness to pay is 5 points). The price that is randomly drawn is 18 points. As your readiness to pay is less than the price, you don't pay the price. You keep the whole 30 points and the electronic dice are stopped randomly.

Example 2: You are prepared to pay a maximum of 25 points to have the ability to stop the electronic dice yourself (your readiness to pay is 25 points). The price that is randomly drawn is 7 points. As your readiness to pay is greater than the price, you pay the price of 7 points. You keep 23 of the 30 points and stop the electronic dice yourself.

If you are ready to pay for the ability to stop the electronic dice, we ask that you indicate your exact readiness to pay.

At this moment in the experiment, you do not yet know which rounds will be drawn at random by the computer.
If you delegated the right to decide or did not have the right to decide in the round that was drawn randomly, you will not pay for the right to stop the electronic dice.

As well, if you chose the guaranteed payment in the two rounds drawn randomly from the second part of the experiment, you will not pay for the right to stop the electronic dice.

Please raise your hand if you have any questions about these instructions. We will come answer you at your seat. If not, click on the “CONTINUE” button.

D. Instructions for Loss Aversion Task (All subjects)

You now have the possibility to play in a series of lotteries. The potential earnings will be added to your total income, the potential losses will be subtracted from your total income.

You will soon be presented with a series of lottery decisions. For each lottery, please decide whether you accept or reject this lottery. At the end, one of the lotteries will be chosen at random.

If you accepted that lottery, a random process will determine whether you have won or lost the lottery.
If you rejected the lottery, nothing will happen and your total income will remain unchanged.

For each of the following lotteries, please choose whether to accept or reject the lottery:

1. With a probability of 50%, you win 5 euros; with a probability of 50%, you lose 1 euro.

2. With a probability of 50%, you win 5 euros; with a probability of 50%, you lose 2 euros.

3. With a probability of 50%, you win 5 euros; with a probability of 50%, you lose 3 euros.

4. With a probability of 50%, you win 5 euros; with a probability of 50%, you lose 4 euros.

5. With a probability of 50%, you win 5 euros; with a probability of 50%, you lose 5 euros.

6. With a probability of 50%, you win 5 euros; with a probability of 50%, you lose 6 euros.

E. Instructions for Cognitive Ability Task (All subjects)

(Raven's Progressive Matrices Test)

Information regarding the fourth part of the experiment

Please answer this last questionnaire, following the next instructions:

1. For each question, choose, among the 8 options shown on the bottom of the screen, the image most adapted to fill the black space in the picture above. In order to register your choice, click on the corresponding number in the right part of the screen, then click on the "OK" button.

2. There are 16 questions in total. Try to answer correctly to the most possible questions within a time limit of 10 minutes.

3. If you wish to reach one question directly, you can enter its number (1-16) and click on the "Go" button on the left part of the screen.

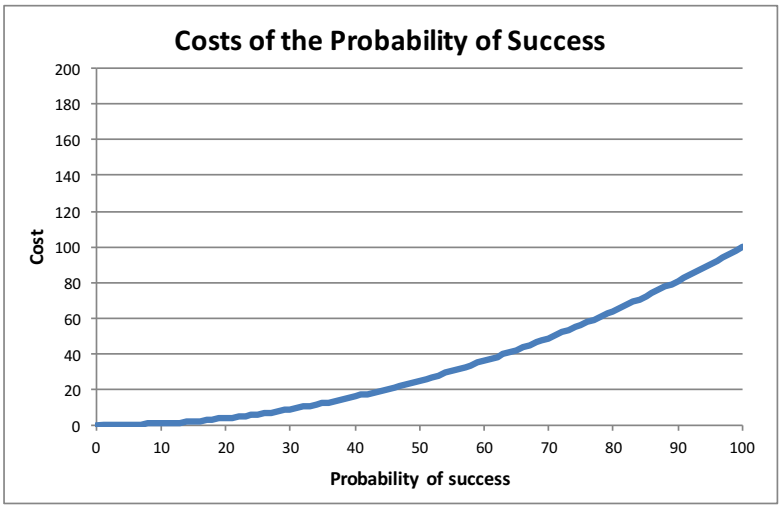
4. You can equally go to the preceding (next) question by clicking on the "Preceding" ("Next") buttons on the left low corner of the screen.

F. Supplementary Cost Sheet (All subjects)

(The figure and the table display all possible effort levels and their associated costs. This was distributed to all subjects to aid the determination of the intended effort level in Part 1 of the experiment. This is the "yellow" sheet with the cost parameter k=0.01. The "blue" sheet was equivalent with the respective costs with k=0.02)

Supplementary sheet with cost schedule

YELLOW SHEET



Probability of Success	Cost	Probability of Success	Cost	Probability of Success	Cost	Probability of Success	Cost
0	0						
1	0,1	26	6,8	51	26,1	76	57,8
2	0,2	27	7,3	52	27,1	77	59,3
3	0,3	28	7,9	53	28,1	78	60,9
4	0,4	29	8,5	54	29,2	79	62,5
5	0,5	30	9	55	30,3	80	64
6	0,6	31	9,7	56	31,4	81	65,7
7	0,7	32	10,3	57	32,5	82	67,3
8	0,8	33	10,9	58	33,7	83	68,9
9	0,9	34	11,6	59	34,9	84	70,6
10	1	35	12,3	60	36	85	72,3
11	1,3	36	13	61	37,3	86	74
12	1,5	37	13,7	62	38,5	87	75,7
13	1,7	38	14,5	63	39,7	88	77,5
14	2	39	15,3	64	41	89	79,3
15	2,3	40	16	65	42,3	90	81
16	2,6	41	16,9	66	43,6	91	82,9
17	2,9	42	17,7	67	44,9	92	84,7
18	3,3	43	18,5	68	46,3	93	86,5
19	3,7	44	19,4	69	47,7	94	88,4
20	4	45	20,3	70	49	95	90,3
21	4,5	46	21,2	71	50,5	96	92,2
22	4,9	47	22,1	72	51,9	97	94,1
23	5,3	48	23,1	73	53,3	98	96,1
24	5,8	49	24,1	74	54,8	99	98,1
25	6,3	50	25	75	56,3	100	100

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