On the economic value of decision rights: An experimental test

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ABSTRACT

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by

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According to the theoretical freedom-of-choice literature and a growing body of experiments, the economic value of a decision right is reflected not only in its instrumental value, but also in an additional intrinsic value. Building upon findings from previous experiments, I use a novel two-stage laboratory experiment to examine (i) whether individuals value decision rights intrinsically, (ii) how intrinsic valuation depends on structural determinants of the related decision, and (iii) why individuals value decision rights that have no instrumental benefits. I find decision rights to have intrinsic value which is conditioned by stake size, risk, and domain. Intrinsic-value assignment is positively correlated with a preference for self-determination and –in the domain of losses– with a preference for non-interference of others. Aversion to paternalism is no significant motive behind the intrinsic valuation of decision rights.

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List of Symbols

A	Lottery A
$\mathrm{A}_{\mathrm{high}}$	High outcome in lottery A
$\mathrm{A}_{\mathrm{low}}$	Low outcome in lottery A
AA	Ambiguity aversion index
$\overline{AA}$	Average ambiguity aversion index in the experiment
B	Lottery B
$\mathrm{B}_{\mathrm{high}}$	High outcome in lottery B
$\mathrm{B}_{\mathrm{low}}$	Low outcome in lottery B
c	Cost
C	Cost set
CE	Certainty equivalent
CL	Compound lottery aversion index
$\overline{CL}$	Average compound lottery aversion index in the experiment
χ^2	χ^2-statistic
D	Decision right
EU	Expected utility
H	Random number in stage 1 of the experiment
i	Individual
IC	Illusion of control index in the experiment
$\overline{IC}$	Average illusion of control index
IP	Indifference probability (control variable)
LA	Loss aversion index
$\overline{LA}$	Average loss aversion index in the experiment
LP	Points of loss (test of loss aversion)
lp	Lottery Pair
n	Number of observations
p	p-Value (probability)
p_{l}	(Unknown) Probability of receiving lottery A in stage 2
P	Random number in stage 2 of the experiment
r	Pearson's r

R	Risk index
$\overline{R}$	Average risk index in the experiment
ρ	Spearman's rank correlation coefficient
t	t-statistic (t-test)
U	Utility
V	Value
V_{ins}	Instrumental value of a decision right
V_{int}	Intrinsic value of a decision right
WTP_D	Willingness-to-pay for a decision right
x	Probability for the high outcome in lottery A
$\underline{x}$	Individual indifference probability
$\underline{x}_{lp}$	Individual indifference probability for a lottery pair lp
x_{stated}	Stated indifference probability
x_{true}	True indifference probability
z	Binary choice task number (test of risk attitudes)
$\tilde{z}$	Binary choice task number where a subject chooses the secure payment for the first time (test of risk attitudes)

List of Acronyms

Aut	Autonomy
Ave	Average
CHF	Swiss franc
CP	Control Premium
DoC	Desirability of Control
ES	Economics Student
G	Gender
Info	Information
I, P and C	Internal, Powerful Others and Chance
IV	Intrinsic Value
HA	Human Agent
HAinfo	Treatment *'Human Agent (Info)'*
HAno	Treatment *'Human Agent (No Info)'*
LoC(E)	Locus of Control (External)
LoC(I)	Locus of Control (Internal)
MT	Magical Thinking
N	Treatment *'Nature'*
pool	Pooled (data)
WTP	Willingness-to-Pay

1

Introduction

The economic value of a decision right is the sum of its *instrumental value* and its *intrinsic value*. In a decision situation, the *instrumental value* of a decision right is equal to the difference between the value of the most preferred option and the value of the expected or default option. It is a measure of the maximum outcome surplus that can be achieved by a decision right, and constrains the value of a decision right only to the outcome of the decision process. The *intrinsic value* on the contrary shifts the focus from the outcome surplus to the decision right itself. It is a value in addition to the instrumental value and reflects the value of having the right to make and execute a decision.

While the classic economic analysis, like Expected Utility Theory or Game Theory, almost exclusively focuses on instrumental values as source of utility (Frey et al., 2004, p. 379), not just psychologists (e.g. Rotter, 1966; Langer, 1975; Deci and Ryan, 1985; Leotti et al., 2010) and the freedom-of-choice literature (e.g. Sen, 1988; Dowding and van Hees, 2009; Nussbaum, 2011) suggest that decision rights have an intrinsic importance in addition to an instrumental value. By now, also a growing strand of experimental literature indicates that individuals intrinsically value decision rights (e.g. Bartling et al., 2014; Ferreira et al., 2020; Neri and Rommeswinkel, 2017).

The reasons why decision rights are valued intrinsically are manifold. Based on the pioneering study by Bartling et al. (2014) and two subsequent experiments by Ferreira et al. (2020) and Neri and Rommeswinkel (2017), this dissertation considers three fundamental causes: 1. a *preference for self-determination*, 2. a *preference for non-interference*, and 3. an *aversion to paternalism*. First, if individuals intrinsically value decision rights because decision rights represent both the empowerment to personally cause and control one's outcomes, intrinsic valuation is caused by a preference for self-determination. Second, a preference for non-interference reflects the aversion to have one's outcomes determined by the behavior and decision-making of other individuals. If decision rights are intrinsically valued due to a preference for non-interference, decision rights prevent interference by others, or ensure protection from the influence of others. Third, an even stronger aversion to interference by others is an aversion to paternalism. If decision rights are intrinsically

valued because of an aversion to paternalism, decision rights enable to evade paternalistic behavior and decision-making by others.

The concept of self-determination is based on Self-Determination Theory developed by Deci and Ryan (Deci and Ryan, 1985, 2000). It is one of the leading approaches in psychology literature on human motivation and personality. Non-interference takes up the distinction between positive freedom and negative freedom in philosophy (Berlin, 1969), and reflects the latter. Aversion to paternalism can be seen as a more pronounced manifestation of violation of autonomy and negative freedom.

However, not only *internal motivations*, but also *structural determinants of a decision* can be decisive for the intrinsic value of the related decision right (this idea goes back to Bartling et al., 2014). The *importance of a decision* (in terms of stake size), the *risk of a decision* (in terms of involved risk), or the *desirability of outcomes* (in terms of the domain of outcomes) can influence whether or not decision rights carry an intrinsic value.

The purpose of this dissertation is to analyze by means of a laboratory experiment whether decision rights have an *intrinsic value*, how potential *structural determinants of the related decision* affect this value, and which *internal motivations* ultimately underlie the intrinsic valuation of decision rights. To this end, I use a novel two-stage experimental design. I test in the second stage of the experiment how much subjects are willing to pay to obtain the right to decide themselves for one lottery out of a pair of two risky lotteries for which subjects stated indifference in the first stage. Since the two lottery options are equally preferred according to before elicited individual indifference statements, the decision right that subjects can buy cannot have an instrumental value. Instead, the stated willingness-to-pay (WTP) for the decision right is nothing more than a measure of the intrinsic value awarded to a decision right. Eight different rounds allow to analyze within-subjects structural determinants of a decision in terms of the effect of stake size, risk and domain of outcomes on intrinsic valuation. By variation of the presence of either nature (in terms of chance) or human agents in the decision situation between subjects, conclusions can be drawn about the internal motivations for intrinsic valuation.

This experiment is inspired by Bartling et al. (2014) and closely related to Ferreira et al. (2020) and Neri and Rommeswinkel (2017). Complementing their work, I use a new but comparable approach to provide clear evidence for a pure intrinsic value. However, this approach takes a different perspective. In contrast to a delegation and social decision-making context, this experiment aims to identify the intrinsic value of decision rights in an individual decision-making context as the willingness-to-pay for decision freedom. In addition, this experiment examines intrinsic valuation also in the domain of losses to provide insight into situations in which decision rights might be of lower intrinsic value. The conflicting findings on the role of a *preference for self-determination* and a *preference for non-interference* reported by Ferreira et al. (2020) and Neri and Rommeswinkel (2017) make it particularly worthwhile to investigate these motives further. Following Ferreira

et al. (2020) in their design element to distinguish between humans and nature as decision opponents aims to derive a more secure understanding. To my knowledge, I am the first to examine an aversion to paternalism as motive behind the intrinsic valuation of decision rights.

I find that, on average, decision rights are intrinsically valued, but that the *existence* of an intrinsic value significantly depends on structural determinants of the decision. Stake size and risk are causal factors in assigning intrinsic value to decision rights. Accordingly, the *level* of intrinsic valuation is also significantly higher for decision rights over decisions that involve high stakes and high risk. Interestingly, decision rights over gains have a significantly higher intrinsic value than those over losses only if nature (in terms of chance) is involved in the decision situation. The *internal motive* why decision rights are intrinsically valued in this experiment is primarily a preference for self-determination. A preference for non-interference of others is present only in the domain of losses, where the aversion to human decision-making increases in relevance with the existence of paternalistic tendencies.

Studying the intrinsic valuation of decision rights leads to a better understanding of the economic value of a decision right which is conditioned by the situation, context and type of decision. As the results of this experimental study explicitly show, individuals derive value from the process of decision-making and active choosing itself, in the absence of any instrumental benefits, and conditional on the context and type of a decision. This is not only a further step towards an empirical foundation of the "freedom of choice" concept (as proposed by Bartling et al., 2014, p. 2010), and adds to recent debates on paternalism (e.g. Sunstein, 2014; Arvanitis et al., 2022). At the same time, these insights are useful for management, human resources management and politics to anticipate under what conditions the granting and increase of decision authority can be beneficial, as it can lead to motivation, job satisfaction, life satisfaction, prosocial behavior, happiness and well-being (Patall et al., 2008; Benz and Frey, 2008; Verme, 2009; Gagné, 2003; Frey and Stutzer, 2002; Ryan and Deci, 2006).

The dissertation is divided into two parts and organized as follows. Part I lays the foundations and provides a critical overview of the literature concerning the intrinsic value of decision rights, while Part II presents the experimental study on the intrinsic value of decision rights.

Part I contains Chapter 2 ('Foundations'), Chapter 3 ('Literature Review') and Chapter 4 ('Upshot'). To begin, Chapter 2 introduces the terms decision right, instrumental value and intrinsic value of a decision right (with a focus on the intrinsic value component), and finally economic value of a decision right. Following these definitions, a classification and characterization of decision rights is presented, that will serve as an analytical tool for the subsequent literature review of experimental studies examining the intrinsic value of decision rights. Moreover, this approach to classify and characterize decision rights suggests

different types of decision rights to have a different economic value, and thus highlights the necessity to examine the value of a decision right under the relevant conditions.

Chapter 3 then reviews literature from different disciplines, i.e. economics, psychology and economic philosophy, each supporting the assumption of an intrinsic value of decision rights. From this review, I derive three working hypotheses (existence of an intrinsic value, effect of structural determinants, and internal motivations) to be tested with the experimental study. A narrow review of specific literature from experimental economics follows each hypothesis, outlining research gaps and demonstrating the contribution of my experimental study especially in the specific field. The concluding Chapter 4 recapitulates.

Part II contains Chapter 5 ('The Experiment'), Chapter 6 ('Results'), and finally Chapter 7 ('Discussion and Conclusion'). Chapter 5 presents the experimental design in detail. After describing the two main stages of the experiment, a formal model deduces the intrinsic value measurement from the experimental design. The within-subjects design and between-subjects design are presented next, where the former manipulation serves to examine structural determinants, and the latter to study internal motivations. Control measurements and questionnaire items collected as part of the experiment conclude the description of the experimental design. Chapter 5 ends with a presentation of the formal and refined working hypotheses, and a brief summary of the experimental procedure.

Chapter 6 then moves on to present the results of the experiment, analyzing first, the existence of an intrinsic value (main hypothesis 1), and second, the level of intrinsic valuation (working hypotheses 2 and 3). Robustness checks are presented in the last section of this chapter.

The dissertation finishes off with the final Chapter 7 which includes a more general discussion of the experiment, its results, and its implications, followed by concluding remarks.

Part I

Decision Rights: A Critical Overview

2

Foundations

Many decision situations in economic life (e.g. financial or investment decisions, pension scheme or health insurance decisions, career choice decisions, or decisions at the workplace) consist inherently of options that are difficult to weigh against each other. Weighing advantages and disadvantages of different options, decision situations can eventually turn for the decision maker into decisions between subjectively equally preferable options. In these situations, there can be no instrumental value in having the right to decide. Rather, it is an intrinsic value attached to the decision right: Despite indifference, one still prefers to make the decision oneself, rather than leaving the decision to someone else or chance.

Classic economic analysis, like Expected Utility Theory (von Neumann and Morgenstern, 1947), takes only instrumental (consequentialist) arguments into consideration for an individual's utility maximization. From this perspective, facing a decision situation between equally preferred options, it would not matter, respectively, would not affect utility, who makes the decision (the individual herself, another person, or chance). However, economic philosophy (e.g. Sen, 1988), psychological theories (e.g. Deci and Ryan, 1985, 2000), and recently also evidence from experimental economics (Bartling et al., 2014) challenge this approach, suggesting that making a decision has an intrinsic value beyond instrumental benefits. Latter, furthermore, especially challenge theoretical models of the delegation of decision rights (e.g. Aghion and Tirole, 1997), where only the instrumental value of a decision right is considered (Bartling et al., 2014, p. 2005).

This dissertation starts with foundations. In Section 2.1, I begin with a definition of the term *decision right*, followed by definitions of the *instrumental*, *intrinsic* and *economic value* of a decision right. An overview of all central definitions of this dissertation can be found in Table A.1 in the Appendix. In Section 2.2, I present a classification of decision rights. This classification serves, first, as an overview of the terminology used in this dissertation. Second, it is a tool to analyze and categorize the literature examining the valuation of decision rights reviewed in Chapter 3. Although adapted to the context of the valuation of decision rights, this classification moreover applies to a wide range of economic experiments on decision-making which can be characterized within this classification.

2.1 Definitions

In this dissertation, a *decision right* is understood as the right to decide (for oneself), that entitles to make and execute a decision. A decision right applies to a decision situation, i.e. a situation of choice between at least two available options, where a decision has to be taken, or where one option has to be chosen.[1] Sugden (2003), referring to Mill (1859), notes that "there cannot be choice unless there are options to be rejected" (Sugden, 2003, p. 787). One point worthy of note, the experimental study presented in this dissertation concentrates on decision situations consisting of two options. Questions with regards to the number of options or extent of choice are not considered, which is the case, for example, in the literature concerning choice overload (e.g. Iyengar and Lepper, 2000; Botti and Iyengar, 2006; Ortoleva, 2013; Le Lec et al., 2022) or the opportunity aspect of freedom of choice (see Dowding and van Hees, 2009; Gravel, 2009). Furthermore, this dissertation examines the value of decision rights and making a decision in the first place, in distinction to the valuation of (larger or smaller) choice-sets, like this is the case in the experimental study of Le Lec and Tarroux (2020).

Decision Right

The right to decide (for oneself), that entitles to make and execute a decision.

In order to determine the value of a decision right from an economic perspective, two general measures for the economic value of a decision right have to be distinguished, i.e. its *instrumental value* and its *intrinsic value*. Afzal et al. (2022), for example, present evidence from laboratory experiments that a decision over a consumption bundle has an instrumental value, as other individuals frequently fail or deliberately make decisions that are not consistent to their partners' preferences for whom they are deciding. Additional to this instrumental value, yet, the authors show that individuals demand agency over a decision also beyond instrumental benefits, as individuals are willing to pay to decide themselves even when their partners select their preferred choice.

For the sake of this dissertation, I apply the following definitions. In a decision situation, the *instrumental value* of a decision right is equal to the difference between the value of the most preferred option and the value of the expected or default option. It is a measure of the maximum outcome surplus that can be achieved by a decision right, and constrains the value of a decision right only to the outcome of the decision process.

[1] Note that the term *choice* in the literature frequently has several meanings. An individual can *have* (a) choice if there is more than one option available. An individual can *make* a choice, or choose, in the sense of making a decision. Choice can also refer to the *extent of choice* or the choice-set, i.e. the number of options to choose from.

Instrumental Value of a Decision Right

The difference between the value of the most preferred option and the value of the expected or default option.

The *intrinsic value* on the contrary shifts the focus from the outcome surplus to the decision right itself. It is a value in addition to the instrumental value and reflects the value of having the right to make and execute a decision. Generally speaking, something carries an intrinsic value if it "is valuable for its own sake as opposed to being valuable for the sake of something else to which it is related in some way" (Zimmerman and Bradley, 2019). Sen (1988, p. 290), for example, describes the intrinsic value of freedom to choose as the significance "beyond that of providing only the means of choosing the particular alternative that happens to be chosen." Raz (1986, p. 177) distinguishes the instrumental and intrinsic value as follows: "Something is instrumentally valuable to the extent that it derives its value from the value of its consequences, or from the value of the consequences it is likely to have, or from the value of the consequences it can be used to produce. Having intrinsic value is being valuable even apart from one's instrumental value."

Intrinsic Value of a Decision Right

The value of having the right to make and execute a decision.

While the instrumental value of a decision right has been the focus of classical economic analysis, the intrinsic value component has achieved more attention only recently. Therefore, this experimental study will concentrate solely on the existence and importance of the intrinsic value of a decision right, in order to highlight the need to include both measures, instrumental and intrinsic, into economic considerations of decision-making. Literature supporting the assumption that the intrinsic value component is an integral part of the economic value of a decision right will be presented in the next chapter, Chapter 3.

Economic Value of a Decision Right

The economic value of a decision right is the sum of its instrumental value and its intrinsic value.

2.2 A Classification of Decision Rights

A decision right can be classified, first, by the nature of the *decision situation*, second, by the scope of the *decision-making context*, and third, by the type of *decision*. Furthermore, a decision right can be characterized according to the *obligation* related to the decision

right, and, in general, its *function*. Figure 2.1 outlines this approach to classify and characterize decision rights. It serves first and foremost as an overview of the terminology used in this dissertation. Moreover, without a claim of completeness yet, this classification and characterization of decision rights provides a tool to compare different methodologies to examine the value of decision rights. The terminology will be explained in more detail in the following.

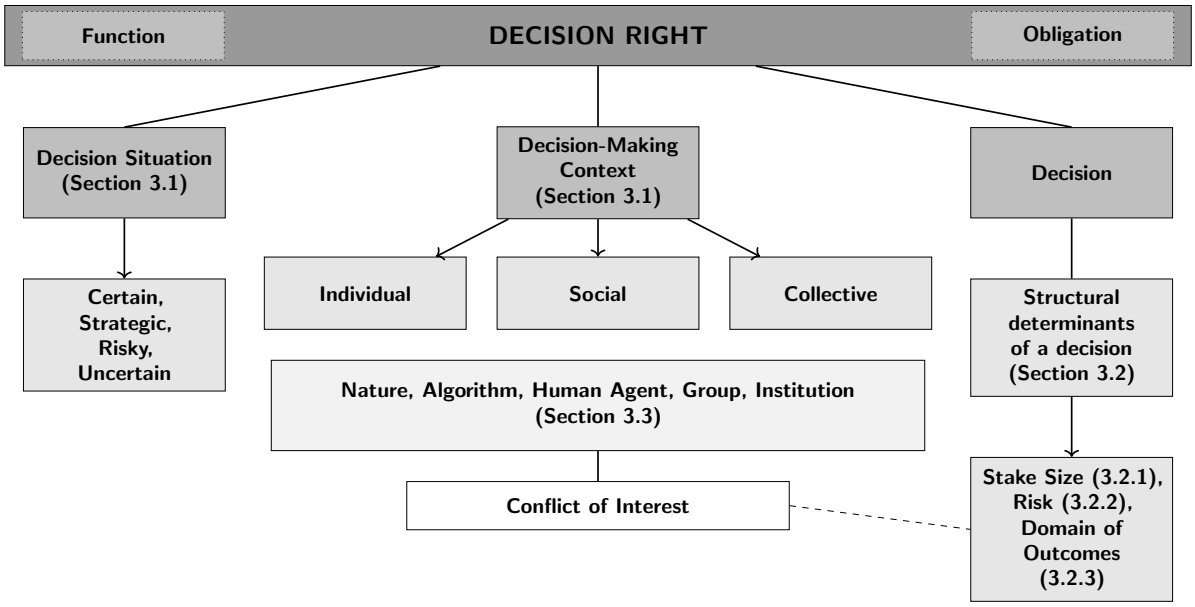


Figure 2.1: Overview of the Terminology

Decision Situation. The decision situation to which a decision right applies can be certain, strategic, risky, or uncertain. The classic dictator game (Forsythe et al., 1994), for example, comprises a *certain* decision situation for the owner of the decision right, or the decision maker (i.e. the dictator), as the final outcomes of her allocation decision are certain. In the ultimatum game (Güth et al., 1982), the decision situation (for the first-mover decision maker) can be described as *strategic*, as the final outcomes depend strategically on the decision of the first-mover (i.e. the proposer) in anticipation of the decision of the second-mover (i.e. the responder). A *risky* decision situation is characterized by risky options, thus, a situation where the outcome of a decision is a lottery. This is the case, for example, in investment decisions, or in decision experiments on Expected Utility Theory (von Neumann and Morgenstern, 1947) or Prospect Theory (Kahneman and Tversky, 1979). In an *uncertain* decision situation that is not risky, or where probability distributions are unsure, the decision maker is exposed to ambiguous decisions.

Decision-Making Context. The scope of the decision-making context of a decision right can be individual, social, or collective. In an *individual* decision-making context, the decision of the decision maker implies direct outcome consequences just for herself, like, for example, in a risky investment decision similar to Gneezy and Potters (1997). In contrast to a *social* decision-making context, where a decision has direct outcome consequences for at least one person different from the decision maker. Here, the decision maker decides over outcomes not just for herself, but either for herself and at least one other person (like for example an allocation decision in the dictator game), or for just someone else or others. In both of these cases, decision rights involve social responsibility.[2] In the latter case of decision-making for others (for a literature review on decision-making for others see, e.g., Polman and Wu, 2020), decision rights come moreover especially with power over others. A *collective* decision-making context exists as soon as the decision right is divided or shared among a group of individuals, which is typically the case for team decisions (for a literature review on team decision-making see, e.g., Kocher et al., 2020), or in a broader sense for participation rights (as considered by, e.g., Downs, 1957).[3]

Furthermore, the decision-making context implies whether the *opponent*, i.e. the entity that decides if not the actual decision maker herself, is *nature* (in terms of chance, like for example a coin flip), an *algorithm* (e.g. a computer algorithm or artificial intelligence), a *human agent* (i.e. another person with or without outcome consequences), a *group* of individuals, or an *institution*. As a result, the decision-making context can involve a conflict of interest, vice versa corresponding interests, between the actual decision maker and the opponent.

Decision. The type of decision related to a decision right is determined by *structural determinants of the decision*. Structural determinants can be, e.g., the importance of a decision in terms of stake size, the involvement of risk in a decision, the desirability or domain of outcomes over which the decision is taken, the level of social responsibility in terms of the number of individuals affected the decision, or the level of conflict of interest in terms of differences in outcomes or inequality resulting from a decision (for the original idea and potential structural determinants see Bartling et al., 2014, p. 2036).

Obligation and Function. The *obligation* associated with a decision right expresses whether or not the decision that is related to the decision right has to be taken. Participation rights, for example, do not explicitly impose an obligation to make a decision. Also for

[2] A decision right can also entail externalities, more precise, *indirect* outcome consequences for at least one person different from the decision maker. An individual decision-making context involving externalities can, in this sense, also be interpreted as a *quasi-social* decision-making context.

[3] In this sense, the decision-making context indicates the *exclusivity* of a decision right. While in a collective decision-making context, a decision right is non-exclusive, in both other contexts a decision right is typically exclusive.

other types of decision rights, related decisions can be denied, deferred or procrastinated. However, many decision rights, especially in an organizational context, oblige to make a decision. These two aspects of a decision right, namely, the entitlement to make a decision and the actual act of decision-making, are closely related to the distinction between formal authority (the right to decide) and real authority (the effective control over decisions) by Aghion and Tirole (1997). Aghion and Tirole define these two forms of authority in the context of their theory of allocation of authority in organizations.

The *function* of a decision right refers to the latter aspect, the actual act of decision-making. A decision right can have the function of *making* a decision (in a sense to cause or being responsible for a decision) and also of *executing* a decision that has been made (in a sense to control or implement a decision).[4]

In sum, this approach to classify and characterize decision rights suggests that different types of decision rights can have a different economic value. In addition, the value of a decision right might depend on who has the decision right by default - the individual herself (and whether she decides to delegate her decision right), or the opponent (and whether the individual decides to obtain the decision right). However, a comparison between the value of obtaining and delegating a decision right is beyond the scope of this dissertation and is of interest for future research.

[4]The idea to separate these two functions of a decision right goes back to Ferreira et al. (2020, p. 112).

3

Literature Review

This chapter presents contributions from three specific disciplines, i.e. economics, psychology and economic philosophy, supporting the assumption that the economic value of a decision right includes an intrinsic value component. However, also more critical literature is outlined. From this broad review, I derive the working hypotheses of this dissertation. In total, this chapter presents three working hypotheses to be tested by the experimental study described in Chapter 5, which are adapted to the specific experimental design in Section 5.6. Following each hypothesis, this chapter moreover presents experimental studies specific to the study of the intrinsic valuation of decision rights and each hypothesis in detail. Finally, research gaps are outlined in order to highlight the contribution of my experiment in the relevant field. Based on the theoretical foundations of the previous chapter, Table 4.1 compares the most relevant experiments and summarizes the essential features of each approach to examine the intrinsic valuation of decision rights.

The chapter is divided into three sections. While Section 3.1 concentrates on the intrinsic value of decision rights in general, Section 3.2 considers more closely the structural determinants of a decision that are supposed to affect the intrinsic value of the related decision right. This section looks at three structural determinants in detail, i.e. stake size, risk, and the domain of outcomes. Finally, Section 3.3 deals with motives underlying the intrinsic valuation of decision rights, in particular, a preference for self-determination, a preference for non-interference and an aversion to paternalism. Central definitions also from this chapter are included in the glossary (see Appendix A.1).

3.1 Intrinsic Value of Decision Rights

3.1.1 Economics

One first strand of economics literature that supports the assumption of an intrinsic value component is experimental economics literature that examines *worker's performance and motivation* within principal-agent relationships. In line in assuming that decision

rights are not just valued instrumentally, these experiments find hidden cost of control on worker's performance and effort provision when decision autonomy is limited by the employer (e.g. Falk and Kosfeld, 2006; Ziegelmeyer et al., 2012; Fehr et al., 2013; Riener and Wiederhold, 2016; Sloof and von Siemens, 2021), and motivational effects if decision autonomy is delegated (e.g. Charness et al., 2012; Koch and Nafziger, 2016; Burdin et al., 2018; Sjöström et al., 2018; Schmelz and Ziegelmeyer, 2020). However, most of these experiments find negative and positive reciprocity, next to instrumental concerns, to play a considerable role in explaining worker's reactions to the restriction or granting of their decision authority. Further motives that moderate the effect of principals' control decisions on agents' motivation and effort provision (whereby the negative reaction is sometimes called a 'control aversion') are the legitimacy of control (Schnedler and Vadovic, 2011), the distance between principal and agent (Dickinson and Villeval, 2008; De Chiara et al., 2022), agents disappointment of principals' choices in team-building events (Riener and Wiederhold, 2016), and principles of procedural fairness (Kahneman et al., 1986; Charness and Levine, 2007; Kessler and Leider, 2016)(see also De Chiara et al., 2022). Contrary to the experiments mentioned here, however, Chaudhry and Klinowski (2016) find no motivational effects resulting from the delegation of decision autonomy, even after controlling for preferences.

Closely related to the reasoned assumption that decision autonomy in the workplace increases motivation and job satisfaction is the literature on *self-employment* and *the design of human resources management systems*. Hamilton (2000), for example, presents results from an analysis of survey panel data on self-employment and paid employment. The data shows that self-employment is associated with substantial nonpecuniary benefits, such as freedom in the work environment and "being your own boss". In line, Benz and Frey (2008) find empirical evidence for 23 countries that having an interesting job and having greater autonomy in self-employed work lead to a higher job satisfaction compared to employed work. The authors suggest that the freedom of choice associated with self-employment leads to a higher self-determination, and thus satisfaction. Carr and Mellizo (2013), in examining survey data on employed work, yet find that autonomy (more precise, e.g., have influence on working times or decide what tasks to do) plays an important role in explaining satisfaction also with employed work. Finally, Bartling et al. (2013), analyzing high-performance work systems, find that systems that offer full autonomy and refrain from monitoring can lead to higher levels of job satisfaction, and thus contribute to welfare.

A more general support for the existence of an intrinsic value component provides the literature examining *procedural preferences* (e.g. Dold and Khadjavi, 2017; Chlaß et al., 2019), *procedural fairness* (e.g. Falk et al., 2003; Bolton et al., 2005; Trautmann, 2009; Krawczyk, 2011) and the *importance of procedural utility* (e.g. Frey et al., 2004; Benz, 2008). This research shows that in addition to or even detached from the outcome of a

decision-making process, individuals value the procedures that lead to certain outcomes and care about the circumstances how outcomes come about. In their prominent paper that introduces procedural utility, Frey and colleagues emphasize that "[p]rocedural utility is an important source of human well-being" (Frey et al., 2004, p. 377). For classic works on procedural preferences in psychology, I refer to Thibaut and Walker (1975) or Lind and Tyler (1988). Discussions from a political science perspective can be found in Lane (1988), and more recent in Esaiasson et al. (2019).

Procedures also matter for cooperation and *institutional choice in public good games*. Sutter et al. (2010) find evidence that participation rights are important for the successful implementation of institutions aiming to improve the provision of public goods. The authors show that an institution that is endogenously chosen leads to higher levels of cooperation than the same exogenously imposed institution. Dal Bó et al. (2010) derive the same conclusion using a prisoner's dilemma game and additionally controlling for selection effects. At the same time, yet, Oxoby (2013) experimentally demonstrates that once an allocator can determine contributions of all group members to a public good, individuals in the allocators' role decide to do so and to restrict the freedom of choice of others in order to reach efficiency. Also in a charitable giving experiment, Carlsson et al. (2017) find evidence that a small majority of allocators is willing to restrict others' donation choices, and thus to limit freedom of choice. However, as an experiment of Fleiß and Palan (2013) indicates, when having the choice, individuals are also willing to give up freedom of choice and to decide for an allocator institution instead of a voluntary contribution mechanism to achieve efficient outcomes. In line, Harms et al. (2021) by means of a public good game find that individuals choose procedures that maximize payoffs. However, the authors find also intrinsic motives to play a role in individuals' decisions for certain procedures. Silverman et al. (2014) reveal that once the controlling institution is perceived to be legitimate, reactions towards the institution change and contributions increase.

Finally, the literature on *voting and participation rights* in the intersection of political science and economics gives reason to assume that decision rights, likewise to participation rights, are intrinsically valued. Starting from the paradox of voting (Downs, 1957), i.e. the observation that individuals participate in an election although the likelihood of being pivotal is vanishing small and thus the costs of voting are higher than the instrumental value of voting, researchers have tried to examine and explain why individuals value participations rights in the absence of instrumental advantages (see, e.g., Riker and Ordeshook, 1968; Güth and Weck-Hannemann, 1997; Brennan and Hamlin, 1998; Frey and Stutzer, 2005).

3.1.2 Psychology

In psychology research, there is a substantial body of literature on the value of choice.[5] Rather than to review single studies, I will refer to three selected and prominent review studies to show that the main body within this literature is supportive of the assumption of an intrinsic value of decision rights. To my knowledge, however, there is no study to explicitly measure the extent of an intrinsic value of a decision right or of choice separate from instrumental benefits or controlling for preferences over options.

Leotti et al. (2010) conduct a literature review to demonstrate their claim that a preference for control and the opportunity for choice (which is a condition for the former) are psychological and biological human needs. The authors present evidence that choice is desirable (i.e. choice is preferred over no-choice and options that lead to more choice are preferred over options that do not) and that the restriction of choice is aversive (i.e. the removal of choice produces stress). As outlook for future research, Leotti and colleagues raise the question how certain personal (i.e. personal and cultural values) and situational conditions (i.e. complexity, ambiguity and risk/threat) affect the desirability of choice.

More recently, Murayama et al. (2016), conducting a literature review on studies in neuroscience research, conclude that personal choice has a rewarding value and activates a reward process in the brain (more precise the striatum). Highlighting the importance to study autonomous decision making (as a personal choice in contrast to a forced choice) and its implications for behavior in social and cognitive neuroscience, the authors propose 'autonomy neuroscience' as a new realm of research.

Finally, Patall et al. (2008) by means of a meta-analysis of relevant studies examine the effect of choice on intrinsic motivation. The authors find a positive and significant effect of choice on intrinsic motivation which is moderated by, inter alia, the type and the number of choices. Interestingly, this effect seems to be most powerful when individuals face a foreclosed choice, more precise, when options are existent but not available.

For a critical and widely respected review on the provision of choice, I refer to Botti and Iyengar (2006). While acknowledging the importance of choice, the authors draw attention to instances in which choice can impair social welfare. This detrimental effects of choice are summarized under three categories, namely information overload (the increase in options), preference uncertainty (unstable preferences cause uninformed choices), and negative emotions (psychological pain resulting from undesirable outcomes).

3.1.3 Economic Philosophy

Views on freedom (of choice) and liberty in philosophy are closely linked to the assumption that decision rights, beyond instrumental purposes, provide additional intrinsic value.

[5] Note that within this literature, the terms *choice* and *decision(-making)* are often used interchangeably. Furthermore, some authors refer to choice as the number of options.

The Capability Approach by Amartya Sen (Sen, 1999) is one of the leading approaches to measure and evaluate human well-being. Within the Capability Approach, the concept of freedom of choice is of central importance. Freedom implies the ability to "choose a life one has reason to value" (Sen, 1999, p. 74). In addition to such an instrumental value, however, freedom is also of intrinsic importance and has "a value as ends on their own right" (Sen, 1988, p. 270). Furthermore, likewise to freedom, choice consists of an instrumental and an intrinsic value too, because "[i]nsofar as choosing is itself valuable, the existence and extent of choice have significance beyond that of providing only the means of choosing the particular alternative that happens to be chosen" (Sen, 1988, p. 290). Sen distinguishes between two concepts of freedom, i.e. opportunity freedom and process freedom, the former associated with instrumental aspects for living a valuable life, and the latter with intrinsic importance of enjoying freedom. "The process aspect of freedom is concerned with the procedure of free decision by oneself" (Sen, 1993b, p. 522). The acknowledgment of the intrinsic importance of freedom can also be found in libertarian works of, e.g., Hayek (1960), Nozick (1974), and Buchanan (1986) (cited from Sen, 1993b, p. 520). Also within a different version of the Capability Approch developed by Martha Nussbaum (2011), the intrinsic importance of freedom is emphasized. "Options are freedoms, and freedom has intrinsic value" (Nussbaum, 2011, p. 25).

Closely related to the concept of freedom is John Stuart Mill's idea of liberty (Mill, 1859). "The only freedom which deserves the name, is that of pursuing our own good in our own way" (Mill, 1859, p. 15). Mill, too, powerfully emphasizes the value of being free to choose, which in his view is of intrinsic value (Sugden, 2003, p. 786). "The human faculties of perception, judgement, discriminative feeling, mental activity, and even moral preference, are exercised only in making a choice" (Mill, 1859, p. 57f).

Empirical evidence that freedom and happiness are positively correlated is given by Veenhoven (2000), Frey and Stutzer (2002), Haller and Hadler (2004), and Inglehart et al. (2008).

3.1.4 A Working Hypothesis

To sum up, acknowledging an intrinsic value with respect to individual freedom and decision-making has a longstanding tradition in economic philosophy. Especially the work of Mill and Sen strongly emphasizes the importance to include an intrinsic value component, next to instrumental concerns, into considerations of freedom and liberty. Also in psychology, the study of the value of choice has attracted widespread attention and consent. Here, above all, Self-Determination Theory (Deci and Ryan, 1985, 2000), considered in detail in Section 3.3.1, provides a fundamental basis to give reason for an intrinsic value of decision rights. Finally, in economics, as already mentioned earlier, considering not only final outcomes but also intrinsic motives for analysis of decision-

making has attracted attention and support only in recent years. Frey and colleagues in particular are one of the first to explicitly argue to attach importance to procedural utility.

Based on fundamental philosophical theories in combination with numerous empirical evidence from psychological and economic research, I therefore derive the following main hypothesis to test with my experimental design:

Working Hypothesis 1 (Existence) *Decision rights have an intrinsic value.*

As I present in the next section, not only the contributions cited above lead to the assumption of an intrinsic value of decision rights. First and foremost, recent studies in experimental economics that explicitly examine the valuation of decision rights point in the direction that the economic value of a decision right includes an intrinsic value component.

3.1.5 Related Experimental Studies

In economics, a growing strand of experimental economics literature focuses on the non-instrumental valuation of decision rights. The main body of experiments within this literature provides initial proof of the intrinsic valuation of decision rights, yet also finds that *biases in decision-making* play a significant role to retain decision rights. Apart from that, only a small number of experiments focuses more specifically on the measurement of the *pure intrinsic value* of decision rights.

Biases in Decision-Making

Fehr et al. (2013) by means of an authority-delegation game find that a significant number of principals avoids delegating the decision right over a risky project selection to their agents. Principals retain authority even though delegation would maximize their expected payoffs. Since the authors find this behavior to appear especially in rounds after which principals were overruled by agents after delegation, it is not explicitly an intrinsic value, but a distaste for being overruled stemming from a distaste for ex post regret, *regret aversion*, which is most likely to explain the control premium attached to the decision right within the social decision-making context. Related to this are the findings of Dominguez-Martinez et al. (2014), who also identify preferences for control within a manager-worker monitoring and delegation game that is comparable to Fehr et al. (2013). The authors show that in their experiment, this preference is driven by managers' *loss aversion* in combination with a fear of disappointment ex post to a delegation. Notable, in another part of the experiment, Dominguez-Martinez et al. (2014) find that individuals are willing

to pay positive amounts for a useless decision right. However, as the willingness-to-pay in this part is not connected to managers' delegation decisions in the main part of the experiment, pure preferences for control are excluded as a possible explanation.[6]

Owens et al. (2014) identify an intrinsic preference of subjects to control own outcomes in a quiz game and a tendency towards self-reliance in answering quiz questions, summarized as a preference for payoff autonomy. In the individual decision-making context, subjects have to decide under a certain level of ambiguity about their partner's success probability whether their payout should depend on their own or on their partner's answer. Although the authors can rule out overconfidence as a possible explanation for the control premium attached to the decision right over quiz answers, both *ambiguity aversion* and a *preference to bet on oneself* can be driving factors next to the desire for control in explaining the control premium attached to the decision right. In an experiment of similar spirit, Danz et al. (2015), applying a delegation game framed as a soccer club game, find evidence that managers (principals) do not optimally delegate decisions over the acquisition of new players to coaches (agents). The authors show that this behavior is mainly driven by a principal's tendency to exhibit a *hindsight bias*. Although the authors find inefficient delegation rates even for 'rational' principals, overconfidence cannot be ruled out as an explanation for the non-instrumental value to keep the decision right.

Related, Sloof and von Siemens (2017) show that an *illusion of control* leads to the overvaluation of decision authority when subjects are asked about their willingness-to-pay for the right to make an uninformed task decision themselves rather than letting another uninformed participant from the experiment choose on their behalf. In the individual decision-making context, two tasks are available for choice, whereby one of the two tasks equals a preferred activity with a known probability of 50 percent. An illusion of control explains a substantial share for the willingness-to-pay for choosing oneself. Nevertheless, also in the absence of a control illusion the authors find an intrinsic preference for control.

Intrinsic Value

Bartling et al. (2014) are the first to provide clean evidence for the existence of an intrinsic value of decision rights additional to an instrumental value. Using a principal-agent delegation game, the authors measure the intrinsic value of a decision right as the control premium a principal attaches to a decision right in order to implement her own decision on a risky project choice instead of the decision of her agent. The chosen project determines the payoffs for both players. In this social decision-making context, principal and agent have conflicting interests regarding the projects available for choice.

[6] Also more critical against preferences for control, Fehrler and Janas (2021) show that the reluctance of individuals to delegate a decision to a group of experts, vice versa, to prefer consulting experts individually and keeping the decision right, can only be weakly explained by non-instrumental benefits of the decision right.

In a replication and extension of Bartling et al. (2014), Ferreira et al. (2020) and Buffat et al. (2020) both support the existence of an intrinsic value to hold control. Noteworthy, Buffat et al. (2020) replicate the same size effects of the intrinsic value measure as Bartling et al. (2014). Also Ferreira et al. (2020), when averaging over the two subsamples of French and Japanese subjects, come close to the findings of Bartling et al. (2014).

Neri and Rommeswinkel (2017), using an auction/willingness-to-pay setting for decision rights in a social decision-making context, also find that individuals attach an intrinsic value to decision rights. In the two-player game, the decision right enables the holder to make a card selection, where each of the two sides of the card determines the payoff for one of the two players. While payoff uncertainty in terms of risk persists at the stage of bidding, the holder of the decision right learns about her own preferences in the choice stage. However, uncertainty in terms of risk can still remain with regard to the preferences of the other player, and thus with regard to a possible conflict of interest.

Finally, Bobadilla-Suarez et al. (2017) show in an individual decision-making context that individuals are willing to forgo monetary rewards to decide themselves rather than delegate the decision to a better-informed artificial advisor. In this decision task experiment, subjects have to choose between two shapes, whereby one shape leads to a high payoff and one shape to a low payoff with a known probability of 50 percent. As the authors can exclude overconfidence as motive explaining the control premium attached to the implicit decision right, they conclude that it is an intrinsic value for choice that causes individuals wanting to make their own choices. Nevertheless, the authors acknowledge that information ambiguity in case of delegation can help to explain their results.

3.1.6 Research Gap

From the above narrow review of the specific field can be concluded that more experimental studies, or alternative experimental designs, are needed to assess the pure intrinsic value of decision rights. Furthermore follows from the comparison of relevant experiments in Table 4.1 that most of the experiments, especially from the latter class, measure the intrinsic value of decision rights predominantly as a control premium inside a *delegation* and *social* decision-making context. To my knowledge, there is no experiment so far to measure intrinsic value as a willingness to obtain decision authority in an *individual* decision-making context.

My experiment aims to close this gap by providing a new experimental design to assess the pure intrinsic value of decision rights and combining the following three features. First, the intrinsic value is measured as the willingness-to-pay for decision rights that moreover do not entail instrumental advantages. Second, in line with the majority of experiments in the existing literature, the decision right applies for a risky decision situation but, third, in an individual decision-making context. Note that Ertac et al. (2020) too, study individuals'

willingness-to-pay for the right to make a risky allocation task decision themselves instead of letting a randomly assigned partner decide for them. However, their measure of decision autonomy does not allow to separate between an instrumental and intrinsic value of decision rights.

My experiment elicits the intrinsic value of decision rights in an individual decision-making context inside considerations on freedom of choice. It moreover allows to test whether the non-instrumental valuation of decision rights is robust to biases in decision-making, in particular loss or regret aversion (Fehr et al., 2013), ambiguity aversion (Owens et al., 2014), and illusion of control (Sloof and von Siemens, 2017). Finally, and likewise important, this experiment studies the effect of structural determinants of a decision and the motives behind intrinsic valuation. Each of these aspects is reviewed in the following.

3.2 Structural Determinants

3.2.1 Stake Size

The size of stakes, or the level of outcomes over which a decision is taken, presumably has an effect on the intrinsic value of the related decision right, especially when interpreting decisions over high stakes as more important decisions compared to decisions taken over low stakes.

Keren and Teigen (2010) show that most individuals prefer to take highly important decisions that have high weight consequences rather themselves than using a random decision device. Surprisingly, except of this study and to the best of my knowledge, there is little empirical evidence on how the importance of a decision affects the willingness of individuals to make a decision. Intuitively, yet, as also the findings by Bartling et al. (2014) suggest, individuals tend to prefer to make more important decisions themselves, as these decisions bear greater consequences.

In contrast, however, Dwenger et al. (2018) find evidence that individuals dislike to make an important decision in the process of university applications, and rather randomize their choices comparable to using a coin flip. In line, Zeelenberg and Pieters (2007) suppose that negative feelings of regret are more intense for more important decisions, and likewise are the feelings in anticipation of an important decision.

Worth mentioning, from a methodological point of view, raising stakes in experimental economics frequently serves as robustness check. Findings from dictator, ultimatum, and trust games reveal only weak effects of individual behavior changes when stakes increase (Camerer, 2003, p. 60). Performance measurements in experiments though are more sensitive to the level of financial incentives (Camerer and Hogarth, 1999).

3.2.2 Risk

Besides stake size, the *risk* involved in a decision can be another possible structural determinant affecting the intrinsic value of a decision right. Thereby, the risk involved in a decision can be measured by the diversity of options (in terms of outcomes) over which the decision is taken. In this sense, risk of a decision increases with the diversity of a choice-set, or the dissimilarity of options to choose from. In the following, I present literature pointing in the direction that the risk of a decision affects the intrinsic value of the related decision right.

Steffel and Williams (2018) show that rates of delegating a decision to another person increase when options are objectively more similar, or when decisions feel 'difficult'. Tversky and Shafir (1992), too, suppose that options which are more identical increase the difficulty of a decision, thereby leading to decision deferral. Agranov and Ortoleva (2017) find evidence that individuals prefer to delegate choices to chance when they perceive one option as being not clearly better than the other option. The authors call these choices 'hard questions', where one option does not clearly dominate another option. Also, more difficult decisions, where there is no dominant alternative, lead to higher levels of anticipated regret (Sugden, 1985; Zeelenberg and Pieters, 2007). The conclusion that less diversity between options to choose from (in the sense of less option attractiveness differences) causes greater difficulty of a decision, and thus a decision avoiding behavior, can also be found in Anderson (2003, p. 158). Also within the freedom-of-choice literature, attempts have been made to incorporate diversity, or the similarity or dissimilarity of options, into considerations of an individuals' freedom (see Dowding and van Hees, 2009; Gravel, 2009). Here, diversity is associated with a more difficult and harder, yet also a more substantial and meaningful choice (Baujard, 2007, p. 242).

Psychological literature also finds that individuals generally perceive risk as negative and react rather averse towards perceived risk (Weber et al., 2002). Moreover, researchers assume risky decisions to increase threat, affecting the willingness to make a decision negatively (see Leotti et al., 2010). In line, Loewenstein et al. (2001) hypothesize that individuals not just evaluate risk cognitively, but especially react emotionally to risk in the first place. These emotions towards risk can include fear, anxiety, and dreads, where the decision-maker is assumed to experience these negative emotions in a situation of risky choice. In contrast, however, is the hypothesis that individuals perceive risk positively and hold preferences for gambling, where individuals derive an intrinsic utility from the presence of risk (Diecidue et al., 2004, p. 241).

Notably, Botti and McGill (2006) find that option differentiability does not affect preferences for choice. Individuals prefer choice over no choice likewise for both, more or less differentiated options. However, choice enhances satisfaction with desirable outcomes and dissatisfaction with undesirable outcomes when options are more differentiated.

3.2.3 Domain of Outcomes

Finally, the following literature points in the direction that the intrinsic value of a decision right is affected by the desirability of a decision, more precise, by the desirability of outcomes over which a decision is taken.

Since publication of Prospect Theory (Kahneman and Tversky, 1979), a descriptive theory alternative to Expected Utility Theory (von Neumann and Morgenstern, 1947), it is well known that "losses loom larger than gains. The aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount." (Kahneman and Tversky, 1979, p. 279). This tendency is called *loss aversion*. According to Prospect Theory, loss aversion is a reference-dependent preference. Gains and losses are valued relative to a reference point, whereby the reference-dependent value function is steeper in the domain of losses than in the domain of gains (Tversky and Kahneman, 1991, p. 1039). Loss aversion is able to explain various patterns in field and experimental data (Abdellaoui et al., 2007). Gächter et al. (2022), in a recent lab-in-the-field experiment, find evidence for loss aversion in both riskless and risky choices, whereby in the latter case, more than 70 percent of individuals can be classified as loss averse. Also in one of the first direct empirical tests of loss aversion, Schmidt and Traub (2002) find that the majority of choices in their experiment are loss averse choices. However, as a substantial fraction of individuals yet shows a loss seeking behavior, the authors note that examining the extent of loss aversion on an aggregate level can lead to false conclusions about the occurrence of loss aversion. In line, more critical discussions on studies of loss aversion can be found in Gal and Rucker (2018) and Yechiam (2019).

Bobadilla-Suarez et al. (2017), controlling for loss aversion, find similar control premia in both domains, gains and losses. The authors note that their "finding runs counter to the idea that people prefer to delegate decisions involving unwanted outcomes in order to avoid regret" (Bobadilla-Suarez et al., 2017, p. 199). Fehr et al. (2013) find feelings of regret to play a role in decision delegation, yet in favor of keeping a decision, as in their experiment, retaining a decision right mitigates or avoids potential for regret.

According to Regret Theory (Bell, 1982; Loomes and Sugden, 1982), *regret* describes the negative feeling that individuals experience from the reflection how much better their position would have been if they had chosen differently (Loomes and Sugden, 1982, p. 808), whereas personal agency and responsibility are central to the feeling of regret, or self-blame (Zeelenberg and Pieters, 2007, p. 6). The anticipation of such a feeling of regret can lead to decision aversion, which means to prefer to avoid making decisions regardless of consequences (Beattie et al., 1994, p. 129f), with losses increasing the feeling of anticipated regret (Anderson, 2003). Various studies find individuals to be overall regret averse (e.g. Loomes, 1988; Zeelenberg et al., 1996; Coricelli et al., 2005; Filiz-Ozbay and Ozbay, 2007; or for a review Bleichrodt and Wakker, 2015), or show generally that

anticipated regret leads to decision-avoiding behavior, like for example, to maintain the status quo (Sautua, 2017), choice deferral (Simonson, 1992; Steffel and Williams, 2018), or omission (Kahneman and Miller, 1986).

More general, empirical evidence from neuroscience supports that losses are perceived different than gains (e.g. Seymour et al., 2007; Tom et al., 2007; Leotti and Delgado, 2014). Botti and Iyengar (2006) point out that choice between undesirable outcomes generates negative emotions and psychological pain, therefore leading to decision-avoidant behavior (see also Botti et al., 2009). Botti and Iyengar (2004), too, report evidence that when facing less preferred options, individuals who have to decide between these options are less satisfied with the outcome than individuals for whom the decision was taken by another person.

Also a strand of experimental studies shows that individuals tend to engage in a decision-delegating or *responsibility-shifting* behavior when unpopular allocation decisions have to be made, in order to avoid punishment and shift the blame (Coffman, 2011; Bartling and Fischbacher, 2012; Oexl and Grossman, 2013; Feier et al., 2021), or pursue self-interest and maintain a positive image (Fershtman and Gneezy, 2001; Hamman et al., 2010; Gawn and Innes, 2019).[7] However, in experimental economics it remains an open question if individuals react in a likewise responsibility-averse manner when making unpleasant decisions only for themselves. Note that a contrary finding though is reported by Hausfeld et al. (2020), who examine the value of decision-making power over the choice between a fair and an unfair option as a social decision. The authors surprisingly find that the majority of subjects never pays to delegate the choice.

Next to loss aversion, a further observation associated with the distinction between gains and losses, that is captured by the course of the value function (in this case, a concave curvature in gains and a convex curvature in losses), is the *reflection effect*. The reflection effect states that individuals are risk averse in the domain of gains and risk seeking in the domain of losses (Kahneman and Tversky, 1979, p. 268). For example, having the choice between a sure outcome and a lottery, individuals tend to choose the sure outcome in gains and the lottery in losses. Leonhardt et al. (2011) assume responsibility aversion to be a motive for the uncertainty seeking behavior in the domain of losses. Individuals choose the more risky option to minimize their own role in outcome generation, as so chance serves as a secondary agent to determine the outcome as well. In this way, perceived responsibility for an outcome decreases. Tykocinski et al. (2017), via manipulating the level of responsibility, find evidence for responsibility aversion causing the reflection effect

[7]Somewhat related, Dana et al. (2007) show that individuals employ a moral wiggle room not to be blamed for unfair decisions. Erat (2013) finds preferences to delegate deception in form of a lie. For evidence from psychology for avoiding responsibility and blame in social decision-making contexts by means of delegation see Steffel et al. (2016) or Gordon-Hecker et al. (2017). For further literature in experimental economics examining especially responsibility attribution to the decision-maker, see, e.g., Bartling et al. (2015) in collective decision making, Cappelen et al. (2022) in redistribution decisions, and Gurdal et al. (2013) in risky decisions.

as well. When responsibility is high (more precise, when subjects have to decide), the framing effect is replicated in contrast to the case where responsibility is low (i.e. subjects just have to give their opinion what they would choose). Concerning the willingness to make decisions, a responsibility aversion in the domain of losses would in turn suggest a decision-avoiding behavior in the domain of losses in the first place.

Finally, related to all of the above findings, is the *framing effect*. "Different choices caused by phrasing the same outcomes as though they were gains versus phrasing them as though they were losses is the framing effect." (Fagley, 1993, p. 451).[8] The transformation of gains into losses is thereby induced by a shift of the reference point (Tversky and Kahneman, 1985). Furthermore, "[b]ecause losses resonate with people more than gains, a frame that highlights the losses associated with a choice makes that choice less attractive" (Rabin, 1998, p. 36). Wang et al. (2020) indeed report evidence that when framing decisions as a loss instead of a gain, individuals show less preferences for control over these loss decisions, including a likewise decreasing subjective value of control. However, also in the domain of losses, individuals show a significant positive preference for control. Besides this study, to the best of my knowledge, there have been no studies so far examining the effect of solely framing gains as losses on decision avoidance, although the framing effect being a well-established finding.

3.2.4 A Working Hypothesis

From this seemingly overwhelming evidence supporting the potential influence of structural determinants on the intrinsic value of a decision right, I derive the second working hypothesis of this dissertation:

Working Hypothesis 2 (Structural Determinants) *The intrinsic value of a decision right is affected by structural determinants of the related decision.*

Refined to the three specific structural determinants highlighted here, I deduce moreover the following three sub-hypotheses:

[8] Note that loss aversion, the reflection effect and framing are three related, but yet distinct effects with regard to gains and losses within Prospect Theory (see also Fagley, 1993). While loss aversion typically involves a comparison between a loss and a gain of the same amount, both relative to a reference point (for example winning 10 Euros or losing 10 Euros), the reflection effect compares explicitly risk behavior in losses vs. gains (for example, choosing between a sure gain and a risky lottery with positive outcomes vs. choosing between a sure loss and a risky lottery with negative outcomes, whereby gains and losses differ just in terms of the sign). Framing also refers to a comparison between losses and gains, yet here the emphasizes is on the pure presentation of an outcome, more precise, if the same outcome is presented either as a gain or as a loss.

Working Hypothesis 2.1 (Stake Size) *The intrinsic value of a decision right is affected by the importance of a decision, respectively by the size of stakes, i.e. the level of outcomes over which the decision is taken.*

From the small amount of literature reviewed in Section 3.2.1, however, the effect direction of the importance of a decision, respectively of the size of stakes, is not clear. As it seems, assessing the effect of stake sizes requires a context-specific evaluation. Keren and Teigen (2010) for example experimentally examine life and death judgement-decisions with respect to accident scenarios. Bartling et al. (2014) study project choice decisions affecting subjects' payoffs (commonly in experimental economics). Dwenger et al. (2018) use university admission data to study choices of applicants.

Working Hypothesis 2.2 (Risk) *The intrinsic value of a decision right is affected by the risk of a decision, respectively by the risk involved in a decision, i.e. the diversity of options (in terms of outcomes) over which the decision is taken.*

Also from the literature presented in Section 3.2.2 it is not clear whether risk, respectively the diversity of options, affects the intrinsic value of the related decision right positively or negatively. More similar options, thus less risk, can enhance the difficulty of a decision, suggesting low risk to have a negative effect on the intrinsic value of decision rights. However, high risk in turn is supposed to be perceived as aversive and threatening, which would suggest a likewise negative effect of high risk on the intrinsic value of a decision right.

Working Hypothesis 2.3 (Domain of Outcomes) *The intrinsic value of a decision right is affected by the desirability of a decision, respectively by the desirability of outcomes over which the decision is taken, i.e. desirable outcomes in terms of gains and undesirable outcomes in terms of losses.*

Based on Section 3.2.3, decisions in the domain of gains are supposed to be more desirable than decisions in the domain of losses. Thus, decision rights in the domain of gains are supposed to have a higher intrinsic value than in the domain of losses.

3.2.5 Related Experimental Studies

Experimental findings examining the effect of *structural determinants of a decision* on the intrinsic value of the related decision right are rare.

Bartling et al. (2014), as already mentioned above, find evidence that intrinsic valuation increases with stake size (i.e. the level of payoffs). Furthermore, the authors show that intrinsic valuation decreases with conflict of interest (i.e. relative payoff differences) between principal and agent. Contrary to the latter finding, Dominguez-Martinez et al. (2014) find a significant higher willingness-to-pay for a useless decision rights if the interest alignment (conflict of interest) between principal and agent is weaker (stronger). Neri and Rommeswinkel (2017) likewise analyze the effect of (expected) outcome inequalities between the two players of a group on intrinsic valuation, but find only weak evidence of inequality aversion to play a role for the bidding for a decision right. Bobadilla-Suarez et al. (2017), examining control premia for decision rights in both the domain of gains and the domain of losses, find quite surprisingly support for the existence of an intrinsic value of choice equally in both domains. Except for these results, little is known about the effect of structural determinants of a decision on the intrinsic valuation of the related decision right.

3.3 Motives

3.3.1 Preference for Self-Determination

Self-Determination Theory (Deci and Ryan, 1985, 2000) from social psychology emphasizes autonomy and competence as two of three innate psychological needs.[9] Autonomy within self-determination theory describes a sense of self-initiation and the experience of freedom. It reflects volition, more precise, a feeling of being an origin of one's behavior or locus of causality. Autonomy means "self-governance, or rule by the self" (Ryan and Deci, 2006, p. 1562). Competence within self-determination theory is understood as the need to feel effective and to achieve valued outcomes within the environment.

In (economic) philosophy, the concepts of personal autonomy (e.g. Taylor, 2005) and positive freedom or freedom of choice (e.g. Sen, 1988) are closely related to the concept of self-determination, respectively autonomy and competence. Ryan and Deci note too, that autonomy as defined within their theory is consistent with well-grounded philosophical perspectives (Ryan and Deci, 2006, p. 1559).

According to the concept of personal autonomy within moral philosophy, "a person is autonomous with respect to her desires, actions, or character to the extent that they originate in some way from her motivational set" (Taylor, 2005, p. 1). Personal autonomy is of central importance in moral and political philosophy as well as in applied ethics (Taylor, 2005, p. 18), and is a basic moral and political value (Christman, 2020). The concept,

[9] The derivation of the concepts autonomy and competence within Self-Determination Theory is based on various contributions from psychology which are not cited here in detail. For a comprehensive overview, I refer to Deci and Ryan (1985, 2000) or Ryan and Deci (2000).

nature and value of (personal) autonomy have been repeatedly analyzed, which emphasizes its importance. For further analysis see, next to Taylor (2005), e.g., Feinberg (1989) for meanings of autonomy as capacity, as condition, as ideal, and as right; May (1994) for the contrast of autonomy as self-rule and autonomy as self-sufficiency or autarkeia according to Aristotle and Immanuel Kant; Dworkin (1988) for a contemporary and widely noticed concept of autonomy; Friedman (2003) for an analysis of (personal) autonomy especially with regards to gender debates; Dworkin (2007) for a review of notions of autonomy in political philosophy by John Rawls, Joseph Raz, and Ronald Dworkin; or Christman (2020) for a more recent survey of autonomy in moral and political philosophy.

Positive freedom, from a more economic-philosophical point of view, captures the ability and the extent with regard to "what a person can choose to do or achieve" (Sen, 1988, p. 272), where freedom of choice describes "the opportunity for choice" (Pattanaik and Xu, 1990, p. 272). According to Sen (1988), freedom of choice is of foundational importance and central to leading a good life. Further views on positive freedom can be found in works of, e.g., Berlin (1969) or MacCallum (1967). Recent overviews of the concept of freedom in economics as well as freedom of choice and its measurement are given by Gravel (2009) and Dowding and van Hees (2009). Ultimately, positive freedom or freedom of choice can be seen to reflect especially the need for competence.

Applied to the valuation of decision rights, I summarize the concepts of autonomy and competence under the narrow notion of a *preference for self-determination*, which I define as the desire to personally cause and control one's outcomes.

Decision rights constitute a condition for fulfilling the innate need of self-determination. Deci and Ryan clearly state that "[s]elf-determination is a quality of human functioning that involves the experience of choice" (Deci and Ryan, 1985, p. 38). Furthermore, that "choice can, when meaningful, facilitate self-determination" and that a "feeling of choice" conveys a sense of autonomy (Ryan and Deci, 2006, p. 1577). In line, also researchers in (economic) philosophy consider likewise the link between choice, autonomy and freedom (e.g. Jones and Sugden, 1982; Dan-Cohen, 1992; Sen, 1997; Bavetta and Guala, 2003; Baujard, 2007; Christman, 2020). "Choice and autonomy [...] mutually reinforce one another: we value autonomy in part because of the freedom to choose that it validates, and we value free choice in part because it contributes to our autonomy" (Dan-Cohen, 1992, p. 221). Consistent that in many cases choice, autonomy and freedom are overlapping concepts, Vugts et al. (2020), conducting a literature review on the conceptualizations of autonomy in ethical debates, conclude that autonomy is mostly reflected by three concepts, namely freedom of choice (as the availability of options), agency (as the capacity to choose) and self-constitution (as emphasis of a person's individuality). Agency, thereby, can be assumed to be closely related to competence. This connection between choice, autonomy, and control in turn is supported by Skinner (1996), who finds choice, inter alia, to be an important condition for perceived control.

Decision rights that provide choice between equally preferred options can likewise be classified as autonomous choices that fulfill the preference for self-determination. From an instrumental point of view (i.e. choosing the preferred option), these decision rights do not provide the full degree of autonomy, or freedom.[10] However, they do provide autonomy considering that autonomy, too, contains an intrinsic value and is valuable for its own sake (Young, 1982; Sen, 1997; Taylor, 2005). Closely connected, also in consideration of competence as a component of self-determination, Sen (2002) states that the "procedure of free decision by the person himself (no matter how successful the person is in getting what he would like to achieve) is an important requirement of freedom" (Sen, 2002, p. 585).[11] This process view of freedom in turn, as also mentioned earlier, is part of classic works of economics and philosophy (Foster, 2011, p. 688f). Furthermore, decision rights between equally preferred options contain an opportunity for choice that is, again, intrinsically valuable. The intrinsic value of opportunity for or freedom of choice is considered, e.g., by Sen (1988), Pattanaik and Xu (1990), Klemisch-Ahlert (1993), or Sher (2018), and more critically, however, by Gravel (1994) or Bavetta (2004).

Numerous studies have shown that self-determination, or autonomy, as defined within Self-Determination Theory promotes motivation, prosocial behavior, well-being and happiness (Deci et al., 2001; Gagné, 2003; Ryan and Deci, 2000, 2006; Chirkov et al., 2010). Moreover, also perceptions and exercise of control have a positive impact on well-being (Shapiro et al., 1996; Wang and Delgado, 2019; Wang et al., 2021). Verme (2009), analysing World and European Values Surveys data, finds empirical evidence that freedom of choice (defined as size of an opportunity set) in combination with an internal locus of control is a predictor of life satisfaction. For different notions on preferences for control from psychology research see Rotter (1966) and Levenson (1972, 1974) for internal and external control perceptions, Burger and Cooper (1979) for the desirability of control, and Langer (1975) for the illusion of control. For an overview of constructs of control, I refer to Skinner (1996).

Related to the importance of having control are the findings by Dietvorst et al. (2018) assuming that a preference for modifiable algorithms stems not just from a preference to gain a better outcome through modification, but from a preference to be in control over the outcome. These findings are embedded in experimental research (mostly in psychology and economics) on reactions to artificial agents and, in particular, algorithm aversion,

[10] For a review on the extent and value of opportunity freedom captured on the basis of preferences (so called preference-based approach), see Dowding and van Hees (2009). For a more critical discussion on the value of choice considering insignificant choices, see Jones and Sugden (1982).

[11] See also Bavetta and Guala (2003), who, in a reference to Sudgen (1998), note the following: "Choosing (autonomously) has an intrinsic procedural value and having opportunities is instrumental to the exercise of autonomy. [...] Having opportunities is a necessary condition for choice but the latter, in turn, is desirable because it fosters moral and intellectual faculties. To distinguish, we might say that according to this view what is valuable is the exercising for autonomy rather than the exercising of autonomy." (Bavetta and Guala, 2003, p. 427f).

where studies show that when confronted with artificial agents, individuals tend to rely on themselves rather than on an (erring) artificial aid (Dzindolet et al., 2002; Dietvorst et al., 2015).[12]

Despite overwhelming evidence on the importance and benefits of self-determination and freedom, Schwartz (2000), however, raises concerns and argues that "freedom, autonomy, and self-determination can become excessive, and that when that happens, freedom can be experienced as a kind of tyranny" (Schwartz, 2000, p. 79). The author sets out that freedom from constraint can result in overwhelm and danger, caused by the fact that choice environments encompass imperfect information, the inability of individuals to accurately express their preferences, and finally, the feeling of regret to could have chosen better.[13]

In line, as also discussed earlier in this chapter, several researchers have both assumed that decision-avoiding behavior might occur under certain circumstances (e.g. Leotti et al., 2010), and also demonstrated that individuals indeed exhibit decision-avoidant behavior (e.g. Beattie et al., 1994; Anderson, 2003; Botti and Iyengar, 2006). Beattie et al. (1994), for example, point out four factors having the potential to cause decision aversion, or decision avoidance, namely the violation of equity norms in social decisions, anticipated regret, the belief in self-determination when deciding for others, and accountability or blame for a bad outcome. The authors find experimental evidence that the potential for regret, anticipated blame in social decisions, and decision-making for others explain decision avoidance. Nevertheless, they also find an opposite decision-seeking behavior of individuals when decisions are expected to be forced on oneself by another person. Anderson (2003) concludes from a psychological literature review that decision avoidance results in four effects, namely, choice deferral, status quo bias, inaction inertia, and omission. Especially worth mentioning here is the latter effect, omission. Experimental studies in psychology assume that individuals exhibit preferences for omission (e.g. Kahneman and Miller, 1986; Spranca et al., 1991; Ritov and Baron, 1992), or an omission bias, i.e. "the preference for harm caused by omissions over equal or lesser harm caused by acts" (Baron and Ritov, 2004, p. 74). Applied to the context of decision rights, this would suggest –running counter to a preference for self-determination– that since individuals tend to prefer omission to

[12]When confronted with the choice between an artificial agent and a human agent, these studies find that individuals prefer human decision-making over non-human decision-making (Önkal et al., 2009; Gogoll and Uhl, 2018; Yeomans et al., 2019; see Chugunova and Sele, 2022, also for an overview on experimental research on algorithm aversion), contradicting the hypothesis that individuals exhibit preferences for non-interference, as will be discussed in the following. Kirchkamp and Strobel (2019) experimentally examine responsibility perceptions for an outcome when a decision is shared with a human agent vs. a non-human agent. However, the authors find no clear evidence that perceived responsibility is less when a decision is jointly taken with a human. For contrary evidence in favor of an algorithm appreciation, however, see Logg et al. (2019).

[13]For an answer to Schwartz (2000) by Deci and Ryan, however, see Ryan and Deci (2006). Their criticism is largely based on the fact that Schwartz equates self-determination with choice, or with the number of options available to a decision-maker.

commission, or inaction to action, they also prefer not choosing to choosing, having no control to having control, and thus having no decision right to having a decision right.

Decision avoidance can also manifest itself in a preference for randomization (e.g. Agranov and Ortoleva, 2017; Dwenger et al., 2018; Lin and Reich, 2018).[14] Dwenger et al. (2018), studying decision-making over an important decision (i.e. university choice) in the field, find that individuals deliberately randomize their choices in the application process, comparable to a coin flip. The authors explain this behavior by individuals' indecision or perceived indifference. Furthermore, in additional classroom experiments, the authors find that when having the choice, the majority of subjects tend to choose lotteries over prizes (more precise, vouchers) rather than choosing a prize directly. Agranov and Ortoleva (2017), applying not an ambiguous but a risky decision-making setting, study in numerous rounds whether individuals prefer either a choice between two lotteries, each having up to four possible outcomes, or a costly, computerized coin flip. The authors find that almost one-third of subjects prefers the coin flip at least once, and that especially in hard decision where options are perceived as being not diverse. Furthermore, examining repeated choices between the two lotteries in a different treatment, the authors find that the decision behavior of individuals to choose different lotteries in the same choice situation is best explained by models of deliberate randomization.[15] Theoretical models that account for the possibility of deliberate randomization are considered, e.g., by Machina (1985) and Cerreia-Vioglio et al. (2019). Finally, Lin and Reich (2018) present evidence that individuals prefer randomization when facing a conflict between self-interesting and prosocial behavior. Despite these evidence, however, studies have also shown that individuals are reluctant to use explicitly chance (for example lotteries or a coin flip) as a decision device and to react averse to randomization, especially for burdensome or important (in terms of seriousness of outcomes) decisions (Oberholzer-Gee et al., 1997; Keren and Teigen, 2010).

In sum, it can be noted that many findings have in common that decision-avoidance results from a sense of refusing personal or moral responsibility. Following Botti and McGill, personal responsibility can be understood as "a sense of ownership of the outcome" (Botti and McGill, 2006, p. 212), or, interpreted more broadly, also as a sense of ownership of a decision that leads to an outcome. Frankfurt, discussing moral responsibility from a philosophical point of view, states that "a person is morally responsible for what he has

[14] In research on procedural fairness, randomization is frequently used as a tool to study fairness perceptions or other-regarding preferences with respect to ex post allocation decisions in social decision-making contexts like the dictator or ultimatum game (see, e.g., Bolton et al., 2005; Krawczyk and Le Lec, 2010; Krawczyk, 2011; Eliaz and Rubinstein, 2014), or social choice in general (see, e.g., Diamond, 1967). Bolton et al. (2005), for example, find that a random fair procedure is equally accepted as a fair allocation outcome, in case that either the former or the latter is available.

[15] Note that in a control treatment, Agranov and Ortoleva (2017) find the same preferences for randomization in a social decision-making context. The authors consider this finding consistent with Sandroni et al. (2013), who find preferences for randomization in a modified dictator game for almost one-third of dictators.

done only if he could have done otherwise" (Frankfurt, 1969, p. 829). Moral responsibility, thereby, arises from an exercise of agency, or a causal responsibility, and has the potential to result in blame (Talbert, 2019). In this sense, a freely chosen decision right, that inherently obliges to execute a decision, is inevitable linked to a sense of personal and moral responsibility, because, first, the decision that causes a certain outcome is taken over a set of options, and second, although the decision is obligatory, it is freely chosen.[16] As noted before, agency, responsibility, and thus choice, next to an awareness that another decision would have led to a better outcome, are in turn central elements for feelings of regret (Zeelenberg and Pieters, 2007, p. 6).[17]

3.3.2 Preference for Non-Interference

Philosophy often emphasizes one particular aspect of freedom, namely the negative notion of freedom (e.g. Mill, 1859; Hayek, 1960; Berlin, 1969; MacCallum, 1967). The concept of negative freedom, as introduced by Berlin (1969), describes the degree to which an activity of an individual is not being prevented or interfered with by others. "If I am prevented by others from doing what I could otherwise do, I am to that degree unfree" (Berlin, 1969, p. 122). Yet, also being forced by an authority to do what one would have chosen anyway is a violation of freedom in this sense (Sen, 2004, p. 331).

Decision rights explicitly imply the notion of negative freedom when they prevent from interference by others, vice versa, ensure non-interference of and freedom from others. A *preference for non-interference* in the context of decision rights thus reflects the desire for protection from the influence of others in one's outcomes.

Note that Berlin (1969) contrasts negative from positive freedom. Likewise, Ryan and Deci differentiate between autonomy and independence, the former referring to self-governance and the latter more concerning about regulation from the outside (Ryan and Deci, 2006, p. 1562). Although Sen includes both, internal limitations as well as external restraints in his understanding of positive freedom (Sen, 2002, p. 586), the former, inward looking aspect shapes his understanding of freedom. Against this backdrop, the

[16] At the same time, this leads to the superordinate question if the (forced) meta-choice of deciding whether or not to obtain/keep a decision right can be associated with responsibility, regret, or even feelings of guilt. This will be however discussed in Chapter 7. For an experimental study examining the attribution of responsibility to choices that do not meet conditions of a moral choice, I refer to Cappelen et al. (2022). For experimental evidence on randomization preferences of uninvolved social planners, suggesting that individuals attach social responsibility to their decisions, see Traub et al. (2009).

[17] It should be noted, however, that researchers in psychology disagree about the specific role of responsibility in feelings of regret (see Anderson, 2003, also for a discussion). In economics, both Bell (1982) and Loomes and Sugden (1982) do not explicitly address senses of responsibility in their original Regret Theory. Yet here, regret is intuitively associated with a decision between options or an act of choice, and thus responsibility (see also Bell, 1985b, or Loomes and Sugden, 1982, p. 807f comparing choiceless situations with acts of choice, where the latter constitute regret). Sugden (1985), in a later review of Regret Theory, acknowledges too, that regret depends not just on the wish to have chosen differently, but also on the extent of self-blame associated with a decision that has been taken.

preference for self-determination is supposed to capture a more inward looking motivation of the valuation of decision rights, whereas the *preference for non-interference* of other individuals focuses on an outward looking motivation. Mill, in his defense of liberty and refusal of interference of others, states: "But neither one person, nor any number of persons, is warranted in saying to another human creature of ripe years, that he shall not do with his life for his own benefit what he chooses to do with it. He is the person most interested in his own well-being" (Mill, 1859, p. 74). Here, a particular notion of interference and harming an individuals' negative freedom is apparent, namely that of paternalism.

3.3.3 Aversion to Paternalism

Paternalism, in general, can be defined as "the interference with a person's liberty of action justified by reasons referring exclusively to the welfare, good, happiness, needs, interests or values of the person being coerced" (Dworkin, 1972, p. 65). Libertarian paternalism, as introduced by Thaler and Sunstein, is "an approach that preserves freedom of choice but that authorizes both private and public institutions to steer people in directions that will promote their welfare" (Thaler and Sunstein, 2003, p. 179).[18] The opposite notion of libertarian paternalism is a non-libertarian paternalism, which forecloses choice (Sunstein and Thaler, 2003, p. 1185). However, a requirement to actively choose can also constitute a form of paternalism. People might prefer in particular contexts not to choose because "[t]hey might not have a preference at all, and they might not want to take the trouble to try to form one" (Sunstein, 2014, p. 6).[19]

Justifications or reasons for paternalistic interventions, especially in economics, are frequently based on insights from behavioral economics that individuals do not behave rationally, are subject to biases in decision-making and thus, do not behave according to their own welfare (see, e.g., Loewenstein and Haisley, 2008; Bernheim and Taubinsky, 2018). Libertarian paternalistic interventions can be summarized under the term 'nudges', which can consist of, e.g., default options, anchors or decision-frames (see Sunstein and Thaler, 2003; Thaler and Sunstein, 2003, 2008). Thaler and Sunstein define nudges as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein, 2008, p. 6). In the literature, however, there is an ongoing debate as to whether

[18] Other notions of paternalism that come close to libertarian paternalism are a light paternalism (Loewenstein and Haisley, 2008) and an asymmetric paternalism (Camerer et al., 2003), whereby all of these notions can be combined under the umbrella term of a soft paternalism (Mabsout, 2022, p. 166). A further prominent distinction is that between a hard and weak form of paternalism according to Feinberg (1971).

[19] Sunstein (2014) calls this a 'choice-requiring paternalism' in response to critiques on the relationship between libertarian paternalism, freedom of choice and autonomy. "If people choose not to choose, or if they would make that choice if asked, it is an insult to their autonomy to force them to choose." (Sunstein, 2015, p. 439).

or not libertarian paternalism, nonetheless preserving freedom of choice, is consistent with the concept of autonomy.[20]

Mills (2015) claims that paternalistic interventions do not necessarily undermine personal autonomy. He demonstrates four conditions (i.e. compatibility with an individual's preferred ends, low opt-out costs, publicity and transparency) under which nudges not only respect even different conceptions of autonomy, but can also promote autonomy. Nagatsu (2015) likewise shows that social nudges conform to autonomy under the aspects of social norm engineering and framing. Binder and Lades (2015) criticize libertarian paternalism for its potential to limit the ability to make reflected, autonomous decisions. However, by introducing 'autonomy-enhancing paternalism' as an alternative form of soft paternalism, the authors imply that paternalism can indeed support autonomy, namely once interventions aim to improve the ability to make better reflected, autonomous decisions. In the same spirit, Beshears et al. (2008) argue that interventions in form of advisory do not impair an individual's autonomy, as long as there is no obligation to obey that advise, such as in the case of opt-out defaults.

Yet, many researchers cast doubt that libertarian paternalism preserves autonomy (e.g. Mitchell, 2005; Bovens, 2009; Rizzo and Whitman, 2009; Hausman and Welch, 2010; Grüne-Yanoff, 2012; White, 2013; Wilkinson, 2013; Rebonato, 2014) as well as the empirical evidence mentioned above likewise points in this direction. Rebonato (2014) denies libertarian paternalists to preserve autonomy of choice as they neglect the value of the full choice process, and thus the intrinsic pleasure to make decisions. Hausman and Welch (2010) point out that nudges, if they do not take the form of rational persuasion, diminish autonomy as they aim to shape an individual's decisions and push individuals to make a certain choice. But even apart from this, paternalistic interventions, as they take advantage of non-rationality in decision-making, pose a threat to the autonomy of the individual (Hausman and Welch, 2010, p. 136). Also pointing out that libertarian paternalism reduces autonomy through manipulation and exploitation, Grüne-Yanoff (2012) moreover argues that interferences in the process of choice decrease personal liberty. Lastly, Arvanitis et al. (2022), who study nudges under the lens of self-determination theory, find evidence that these reduce the feeling of being autonomous.

General discussions on paternalism can be found in works of, e.g., Mill (1859) from an antipaternalistic position, Dworkin (1972, 2020) from a still libertarian stance, and

[20]For defenses of libertarian paternalism by Thaler and Sunstein themselves see Sunstein and Thaler (2003), Sunstein (2014) and Sunstein (2015). Note that the authors understand autonomy in a rather narrow sense in terms of freedom of choice (Sunstein and Thaler, 2003, footnote 22), and that they acknowledge that in cases where blocked choices are necessary for an individual's welfare "believers in autonomy will not agree that welfarist concerns override freedom of choice" (Sunstein and Thaler, 2003, footnote 149). Yet within the ethical debate on libertarian paternalism, different understandings of autonomy exist (for a comprehensive literature review, I refer to Vugts et al., 2020). However, in a broader view than in terms of freedom of choice, there seems to be a common understanding of autonomy as self-governance and ability of reflection.

Arneson (2005), Conly (2013) or Blumenthal (2013) for a defense of paternalism. For discussions of paternalism especially with regards to economics, I refer to Zamir (1998) and Mabsout (2022).

In the scope of my experiment, taking into account the above literature, I define the more pronounced feeling of violation of autonomy and negative freedom in the light of a perceivable paternalist as an *aversion to paternalism*. Decision rights in this case serve to evade paternalistic interventions that can be regarded as (i) intended interferences in the negative freedom and/or (ii) intentional limitations in autonomous decision-making.

3.3.4 A Working Hypothesis

All in all, the literature review gives rise to the following third working hypothesis on the motives behind the intrinsic valuation of decision rights:

Working Hypothesis 3 (Motives) *Internal motivations for the intrinsic valuation of decision rights are a preference for self-determination, a preference for non-interference and aversion to paternalism.*

Separated according to each motive, I hypothesize in more detail:

Working Hypothesis 3.1 (Self-Determination) *A preference for self-determination, i.e. the desire to personally cause and control one's outcomes, is a motive behind the intrinsic valuation of decision rights.*

Despite the vast support for Hypothesis 3.1 from different disciplines, Section 3.3.1 also points out to more critical literature in favor of a decision-avoiding behavior under certain circumstances. In sum, also referring back to Section 3.2, these more critical aspects support Hypothesis 2, respectively, lead to the assumption that the intrinsic value of a decision right is affected by structural determinants of a decision, and is thus context-dependent on certain decision types. Acknowledging the influence of responsibility, I define the general *preference for shifting responsibility* in the scope of decision rights as the desire to shift the responsibility for an outcome and to avoid certain types of decisions. Although anticipated regret seems to be a major driver of decision-avoidance in individual decision-making contexts, I purposely choose the term *responsibility*. Hereby I take account of the fact that not necessarily anticipated feelings of ex-post regret for an outcome (the (self-)blame for knowing that one could have been better off if chosen differently), but especially ex-ante negative emotions in general attached to certain decisions (like (self-)blame in general, fear, emotional pain, difficulty, or indecision) can explain decision-avoiding behavior.

Working Hypothesis 3.2 (Non-Interference) *A preference for non-interference, i.e. the desire for protection from the influence of others in one's outcomes, is a motive behind the intrinsic valuation of decision rights.*

Working Hypothesis 3.3 (Paternalism) *An aversion to paternalism, i.e. the pronounced feeling of violation of autonomy and negative freedom in the light of a perceivable paternalist, is a motive behind the intrinsic valuation of decision rights.*

In addition to Working Hypothesis 3.3 and for the purposes of this dissertation, I conclude from the review in Section 3.3.3 the following. Applied to an experimental setting examining (individual) decision-making in the context of decision rights, an experimenter, first, *acts* as a (libertarian) paternalist if she (i) sets the default to 'no decision right' in accordance with the welfare of a subject (i.e. the experimenter prevents a subject from unnecessary decision costs if she knows that a rational subject is, for example, indifferent between the available options and has no preference); and/or (ii) preserves freedom of choice at cost (i.e. allows a subject to obtain decision authority and to have choice). Second, she is also *perceivable* as a (libertarian) paternalist if she (iii) delegates the decision to be taken on behalf of the subject to a human agent who owns information relevant to the decision context (i.e., in this case, the human agent can be perceived as the potential paternalist as she owns information relevant to the decision context which can be associated with the welfare of a subject).

3.3.5 Related Experimental Studies

Until now, Neri and Rommeswinkel (2017), Ferreira et al. (2020), and Pikulina and Tergiman (2020) are the only experiments that study the motives behind the intrinsic valuation of decision rights.

By variation of the opponent in treatments between-subjects, Ferreira et al. (2020) find that the primary motive behind the intrinsic valuation of decision rights is not a preference for power or a desire for independence from the interference of others, but a *preference for self-reliance* towards implementing one's decision.

In sharp contrast, Neri and Rommeswinkel (2017) find that individuals intrinsically value decision rights only because of a *preference for non-interference* of others in determining own outcomes. A preference for power and a preference for freedom (of choice) cannot be supported to be motives behind intrinsic valuation by their experimental design. The former result is related to the experimental findings by Bohnet and Zeckhauser (2004), Bohnet et al. (2008), Butler and Miller (2018), and Humphrey and Mondorf (2021) on betrayal aversion and social risk premia in the context of trust games. These studies show

that individuals place a risk premium on trust decisions when outcomes are generated by another human agent as opposed to nature in terms of chance. The findings can be explained by a betrayal aversion (Bohnet and Zeckhauser, 2004; Butler and Miller, 2018), yet also by an aversion to losing control to a human agent (Bohnet and Zeckhauser, 2004; Humphrey and Mondorf, 2021). Li et al. (2020), however, explain behavior in the 'betrayal aversion game' not by a betrayal aversion, but instead by social ambiguity, i.e. individuals "treat acts by humans, also in the absence of strategic interactions, differently than acts of nature, which do not involve human agency and free will" (Li et al., 2020, p. 273).

By focusing explicitly on the aspect of power in social decision-making contexts, Pikulina and Tergiman (2020), by means of a power game, find evidence that individuals are willing to pay for a right that enables solely to choose another players' payoff. The authors show that this behavior results from an intrinsic preference for power over outcomes of others.[21] Related to that are the findings by Ertac et al. (2020) who find a positive demand for decision authority, that is, individuals are willing to incur costs to be able to make a risky decision for another person. Also Afzal et al. (2022) find evidence for preferences for power when choosing over a consumption bundle for a partner and a deliberate deviation from the partner's preferred choice. Somewhat related, Granic and Wagner (2021) find evidence that chairs of committees, who hold tie-breaking power, attach more value to their decision right in terms of attractiveness than other committee members, thus suggesting a non-instrumental value of decision rights.

Closely related to the idea that individuals prefer non-interference of others is the assumption that individuals react averse to paternalistic interventions. So far, however, little attention has been paid in experimental economics to study reactions to *paternalism* outside a self-commitment context (see here Uhl, 2011; Krawczyk and Wozny, 2017). However, the few experimental studies (Kataria et al., 2014; Lübbecke and Schnedler, 2020; Ackfeld and Ockenfels, 2021) and empirical studies (e.g. Lusk et al., 2014; Pedersen et al., 2014) that examine behavioral responses to paternalism find evidence that individuals, generally speaking, react averse to paternalism. Kataria et al. (2014) show that decision-makers punish protégés for restricting their freedom of choice, and that in both cases, restricting the instrumental and the intrinsic dimension of freedom of choice. Still, punishment takes only places if the decision-maker is worse off with the paternalistic act. However, if decision-makers are not aware of the benefits of the paternalistic act, they punish restrictions of choice nonetheless. Lübbecke and Schnedler (2020) find that 20 percent of subjects reject unrequired help from a paternalist and costly resist patronizing interference. The authors explain this behavior by a preference for holding and signaling authorship to the paternalist. Ackfeld and Ockenfels (2021) find evidence that paternalistic

[21] For a discussion how this result differentiates from Neri and Rommeswinkel (2017) and Ferreira et al. (2020), respectively how the results can be related to each other, I refer to Pikulina and Tergiman (2020). Since my experiment is applied to an individual decision-making context, preferences for power cannot be examined and are thus largely neglected.

bans in form of post-choice bans are more acceptable by paternalistic judges than pre-choice bans, presumably as they grant some room for autonomous decision-making. However, the authors do not study decision-makers' reactions to this bans. While Ackfeld and Ockenfels (2021) find individuals to be rather reluctant to impose prosocial behavior on decision-makers, evidence that individuals show preferences to act paternalistic in the first place is given by, e.g., Jacobsson et al. (2007), Gangadharan et al. (2018) and Ambuehl et al. (2021). However, it should be noted that in social dilemma contexts, individuals are willing to give up their decision rights to an authoritarian institution in order to achieve social efficient outcomes (see Fleiß and Palan, 2013). Furthermore, the literature suggests once the controlling party is legitimated, negative reactions towards control diminish (see Schnedler and Vadovic, 2011; Silverman et al., 2014).

4

Upshot

The literature review in Chapter 3 has demonstrated a seemingly overwhelming support from experimental economics, psychology, and philosophy for the main hypothesis that decision rights have an intrinsic value (Hypothesis 1). Nevertheless, more critical contributions in these fields suggest at the same time that the intrinsic value of a decision right is dependent on structural determinants of the related decision (Hypothesis 2), resulting in a preference for shifting responsibility. Furthermore, the decision-making context is supposed to affect the intrinsic valuation of a decision right, revealing insights on internal motivations for intrinsically valuing decision rights (Hypothesis 3).

Table A.2 summarizes the most important findings (with a reference to the most relevant studies) in support of (column *Support*) and contrary to (column *Rejection*) each of the three hypotheses, thereby emphasizing contradictory arguments concerning each hypothesis. With regard to the structural determinants of a decision, although there is massive support of Hypothesis 2, the direction of impact yet remains open. More precise, it is not clear whether or not structural determinants lead to a responsibility shift for a decision. In sum, Table A.2 highlights the importance of my experimental study to examine these three hypotheses in the wider context of non-instrumental preferences for decision-making.

In a more narrow and methodological scope, Table 4.1 demonstrates the contribution of my experimental test on the intrinsic valuation of decision rights in the specific field of experimental economics. Based on the assumption that different types of decision rights can have a different economic value (see Section 2.2), my experiment aims to

(i) measure the pure intrinsic value of a decision right in the absence of instrumental advantages as the willingness to obtain decision freedom in an individual decision-making context,

(ii) analyze how certain structural determinants of a decision (i.e. stake size, risk, and domain of outcomes) affect the intrinsic value of the related decision right, and

(iii) study the motives behind intrinsic valuation (i.e. a preference for self-determination, a preference for non-interference, and an aversion to paternalism).

The experimental study will be presented in Part II.

	IV Measure	Decision-Situation	Decison-Making Context	Opponent	Structural Determinants	Motives / Biases
Pure Intrinsic Value						
Bartling et al. (2014)	CP	Risky	Social	Human Agent	- Stake Size (+) - Conflict of Interest (+)	*not examined*
Bobadilla-Suarez et al. (2017)	CP	Risky	Individual	Artificial Agent	Domain (-)	*not examined*
Buffat et al. (2020)	CP	Risky	Social/ Collective	Human Agent	Level of Conflict (+)	Team Membership (-)
Ferreira et al. (2020)	CP	Risky	Social/ Individual	Human Agent/ Nature	- Stake Size (+) - Conflict of Interest (∼)	- Self-Reliance - Independence (-) - Power (-)
Neri and Rommeswinkel (2017)	WTP	(Risky)	Social	Human Agent	Inequality Aversion (±)	- Non-Interference (+) - Freedom (-) - Power (-)
Pikulina and Tergiman (2020)*	WTP	Certain	Social	Human Agent	*not examined*	Power (+)
Biases in Decision-Making						
Fehr et al. (2013)	CP	Risky	Social	Human Agent	*not examined*	- Distaste for being overruled (+) - Regret Aversion (+)
Owens et al. (2014)	CP	Uncertain	Individual	Human Agent	Level of Ambiguity (∼)	- Desire for Control (+) - Ambiguity Aversion (+) - Bet on oneself (≈)
Sloof and von Siemens (2017)	WTP	Risky	Individual	Human Agent	*not examined*	- Preference for authority (+) - Illusion of Control (+)
My experiment	WTP	Risky	Individual	Nature/ Human Agent (un-/informed)	- Stake Size (+) - Risk (∼) - Domain (∼)	- Self-Determination (+) - Non-Interference (∼) - Paternalism Aversion (-)

Notes: Symbols in parentheses denote +: evidence, ±: weak evidence, ∼: mixed evidence, -: no evidence, ≈: supposed to might have an effect. CP: Control premium, IV: Intrinsic Value, WTP: Willingness-to-pay. *Note that Pikulina and Tergiman (2020) do not explicitly examine the intrinsic value of decision rights, but the intrinsic value of power.

Table 4.1: Comparison of relevant experimental studies to study the non-instrumental valuation of decision rights

Part II

An Experimental Study on the Intrinsic Value of Decision Rights

5

The Experiment

The experiment, which is designed to test the three hypotheses derived in Chapter 3, consists in total of 4 parts (see Figure 5.1). In this chapter, each part of the experimental design is explained in detail, beginning with a description of the main stages for measuring the intrinsic valuation of decision rights, i.e. stage 1 (Part II of the experiment) which is presented in Section 5.1, and stage 2 (Part III of the experiment) explained in Section 5.2. Part I and Part IV of the experiment, as well as the post-experimental questionnaire, all primarily designed to collect data for control variables, are discussed in Section 5.5. Before that, however, the intrinsic value measurement is deduced in Section 5.3, followed by Section 5.4. Section 5.4 explains the within-subjects and between-subjects treatment structure of the experiment, the former to examine the effect of structural determinants of a decision on the related decision right and the latter to study internal motivations for intrinsic valuation. The description of the experimental design concludes with Section 5.6, which provides a refinement of the hypotheses formulated in Chapter 3. The last section of this chapter, Section 5.7, outlines a short description of the experimental procedure. For a translation of the original instructions of all four parts, see Appendix C.[22]

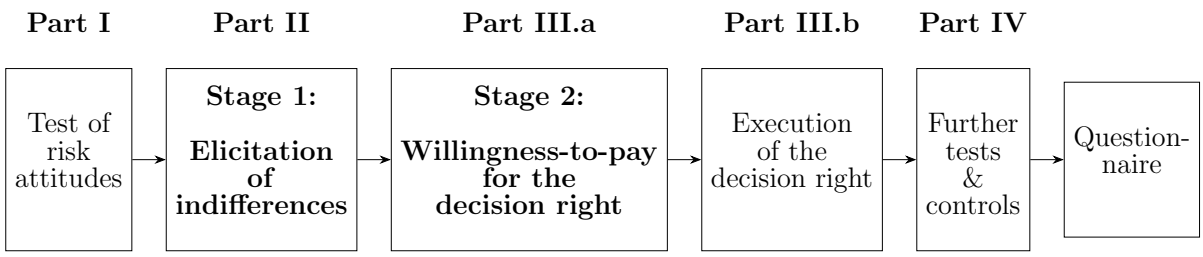


Figure 5.1: Course of the experiment

[22]Note that the graphical illustrations in the instructions are inspired by the original instructions of the experiment by Bartling et al. (2014).

5.1 Stage 1: Indifferences

Stage 1 aims to elicit subjects' individual indifference point between two risky lotteries, *lottery A* and *lottery B*, by means of the probability equivalence method as a special form of the paired-gamble method (Farquhar, 1984; Bleichrodt et al., 2007). This particular method is chosen, first, to reduce noise related to indifference statements caused by biases in decision-making associated with certainty equivalents such as the "certainty effect" (Kahneman and Tversky, 1979; see McCord and De Neufville, 1986). Second, comparing two risky alternatives seems to be more valid with regard to economic decision situations which often are decisions between risky options. Finally, this method is essential to study the effect of structural determinants of a decision on intrinsic valuation.

According to probability equivalence method, the two paired lotteries A and B each consist of two possible outcomes, with the outcomes of lottery B lying between the outcomes of lottery A:

$$[A_{\text{high}}, \underline{x}, A_{\text{low}}] \sim [B_{\text{high}}, 0.5, B_{\text{low}}], \ where\ A_{\text{high}} > B_{\text{high}} > B_{\text{low}} > A_{\text{low}}. \tag{5.1}$$

The probability within lottery B for receiving either the high outcome (B_{high}) or the low outcome (B_{low}) is by design fixed to 50%. The probability $\underline{x}$ within lottery A for receiving the high outcome (A_{high}), respectively the complementary probability *(1-$\underline{x}$)* for receiving the low outcome (A_{low}), is to be fixed by the subject.

In the experiment, subjects see the lottery pair and have to compare the two risky lotteries A and B (see also Figure 5.2). Subjects have to state at which *probability* $\underline{x}$ within lottery A they are indifferent between lottery A and B. Thus, $\underline{x}$ marks the *individual indifference point*, respectively the *individual indifference probability* that produces indifference between lottery A and lottery B. Using a slider, subjects choose their individual indifference probability between an interval of $x \in [40, 80]$ percent.[23] To better determine the exact probability of indifference, subjects are displayed the expected value and the range of each lottery below the respective lottery. Moving the slider changes the probability x within lottery A as well as the associated expected value of lottery A. Once subjects have determined their individual indifference probability, they must confirm the chosen probability by entering the number in a box at the bottom of the screen.

In total, subjects have to state their individual indifference points for eight lottery pairs in eight rounds in stage 1. Four lottery pairs are situated in the domain of gains

[23]Because a pilot study revealed that an interval of 20% to 80% produced confusion and inconsistent indifference statements among subjects, especially in lower ranges of the interval, the lower bound of the interval is set at 40%. The upper bound of the interval is limited to 80% to prevent (almost) certain lottery outcomes. The initial position of the slider is set to 50%. The lotteries are constructed such that a probability of $\underline{x} = 0.5$ in lottery A corresponds to risk neutrality according to Expected Utility Theory. This means that for a probability x of 50% in lottery A, the expected value of lottery A is equal to the expected value of lottery B.

and four lottery pairs are situated in the domain of losses. Each domain is presented to subjects in one block of 4 rounds. The two blocks are presented in randomized order between sessions.

The indifference probabilities are incentive compatible elicited by means of the Becker-DeGroot-Marschak mechanism (Becker et al., 1964).[24] At the end of the experiment, two rounds of stage 1 are randomly selected for payoff, one round from the gains block and one round from the losses block. To determine which lottery A or B of each round is played for payoff, a random number H from the interval $H \in [40, 80]$ is drawn by the computer separately for each round, and compared to the stated indifference probability $\underline{x}$ of that round. If the drawn random number H is lower than the indifference probability $(H < \underline{x})$, lottery B is played. If the random number H is higher or equal to the indifference probability $(H \geq \underline{x})$, lottery A is played, with H operating as probability for the high outcome in lottery A. In this way, subjects have no incentive to state an indifference probability that is higher than or lower than their actual preferred indifference probability. This becomes clear considering the following:

- If a subject states a untrue indifference probability x_{stated} that is lower than her actual preferred indifference probability x_{true}, i.e. $x_{stated} < x_{true}$, the following three cases could occur:

  i) $H < x_{stated} < x_{true}$: Lottery B is preferred and lottery B is played for payoff.

  ii) $x_{stated} \leq H < x_{true}$: Lottery A is played for payoff even though lottery B is preferred. Lottery A is played with the too low probability H.

  iii) $x_{stated} < x_{true} \leq H$: Lottery A is preferred and lottery A is played for payoff.

- If a subject states a untrue indifference probability x_{stated} that is higher than her actual preferred indifference probability x_{true}, i.e. $x_{true} < x_{stated}$, the following three cases could occur:

  i) $H < x_{true} < x_{stated}$: Lottery B is preferred and lottery B is played for payoff.

  ii) $x_{true} \leq H < x_{stated}$: Lottery B is played for payoff even though lottery A is preferred.

  iii) $x_{true} < x_{stated} \leq H$: Lottery A is preferred and lottery A is played for payoff with the probability H anyway.

When subjects are asked for their indifference statements in stage 1, they do so without knowing the content of stage 2 of the experiment.

[24] The Becker-DeGroot-Marschak mechanism is often criticized for not revealing preferences truthfully (e.g. Karni and Safra, 1987; Cason and Plott, 2014). However, it is widely used in experimental economics, and a recent study by Burchardi et al. (2021) shows both a high mechanism comprehension and optimal bidding performance of subjects.

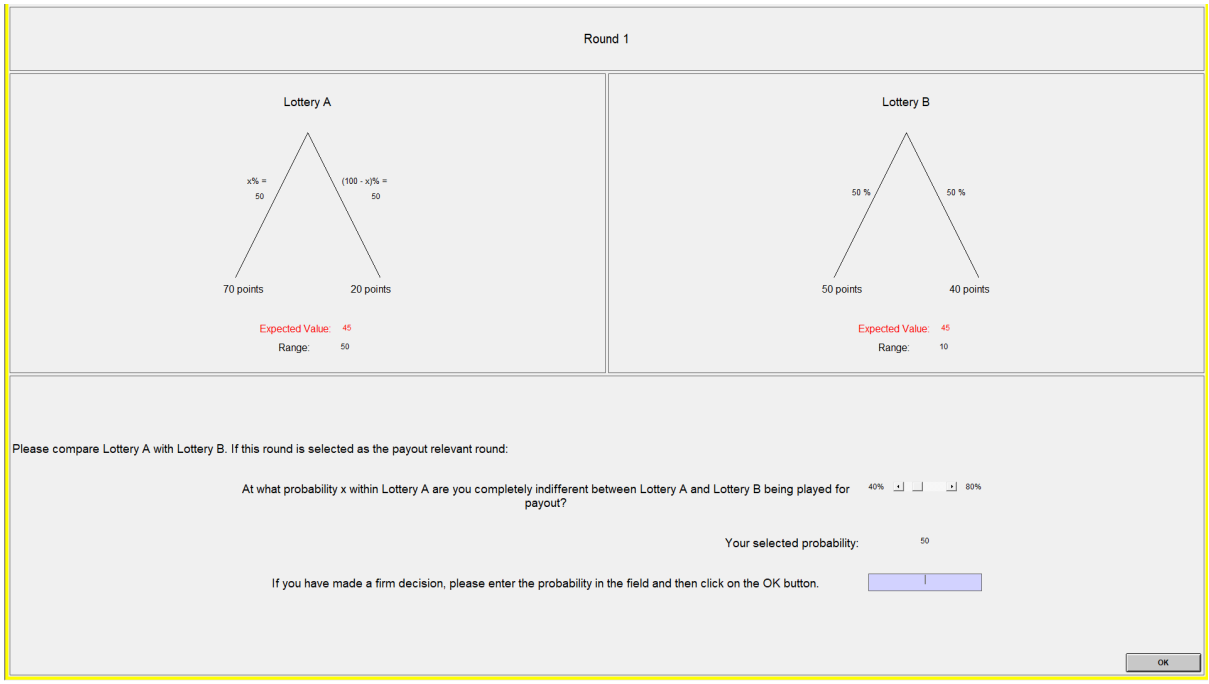


Figure 5.2: Presentation of lottery pairs (screen section screenshot)

5.2 Stage 2: The Decision Right

5.2.1 Willingness-to-Pay for the Decision Right

Based on subjects' indifference statements from stage 1, the following stage 2 aims to measure the *intrinsic value of a decision right*. In stage 2 of the experiment, subjects are presented with the same eight lottery pairs as in stage 1, but now including subjects' *individual indifference probability* $\underline{x}$ within lottery A for each respective round. Thus, according to indifference statements from stage 1, in each round of stage 2, each subject sees a lottery pair consisting of two individually equally preferred lotteries. To avoid confusion, the eight lottery pairs are presented in the same manner as in stage 1, but in a randomized round order within each block which differs from stage 1. Subjects have to again compare lotteries A and B in each round of stage 2. They have to now state for each round whether they would like to buy the right to choose themselves one of the two lotteries. Subjects know that the decision right they can buy will give them the right for that round to decide themselves whether lottery A or lottery B will be played for payoff. Subjects can either state that they do not want to buy the decision right ("Option 1" in the experiment) or that they do want to buy the decision right ("Option 2" in the experiment). If the latter applies, subjects have to indicate their *WTP*, in terms of a *maximum purchase price* for the decision right, in the interval from 1 to 20 points. Subjects know that the price of the decision right will be deducted as a fee from stage 2 payoff at the end of the experiment.

The WTP for the decision right is incentive compatible elicited by means of the Becker-DeGroot-Marschak mechanism (Becker et al., 1964). Only at the end of the stage 2, two rounds of stage 2 are randomly selected for the execution of the decision right (and thus for payoff), one round from the gains block and one round from the losses block. To determine whether the decision right is bought for each of these two rounds (in case the subject chose Option 2), the computer draws a random number P from the interval $P \in [1, 20]$ for each round separately, and compares it to the stated maximum purchase price of that round. If the drawn random number P is higher than the maximum purchase price *(P > WTP)*, the decision right could not be bought. If the random number P is less than or equal to the maximum purchase price *(P ≤ WTP)*, the decision right is bought, with P operating as the price of the decision right. Thus, subjects have no incentive to state a price higher or lower than the actual price they are maximum willing to pay for the decision right in each round.

5.2.2 Execution of the Decision Right

After subjects have made their decision on their WTP for the decision right in each round in stage 2, the execution phase of the decision right follows directly afterwards.

Self. Subjects are presented with their individually and randomly selected round from the gains block and their individually and randomly selected round from the losses block (i.e. the two payoff relevant rounds from stage 2) on two successive screens. On the screen, subjects are informed first, about the selected round from a block, second, about whether they were successful to buy the decision right for that round (or else whether they decided not to buy it) and, third, (if applicable), about the price of the decision right. Owners of the decision right can now choose which of the two lotteries (lottery A or lottery B) should be played for payoff, and see their decision again on a subsequent screen. Subjects who either chose not to buy the decision right or were not successful to buy the decision right instead see which of the two lotteries is selected for payoff (either by nature or by another participant), so the decision right is not associated with any informational advantage. In total, a subject has to take up to two decisions for herself.

As other participant. At the beginning of stage 2, in all three treatments, each of the subjects is assigned another participant from the experiment in each of the two blocks, and vice versa. The matching procedure ensures, first, that two subjects are not matched with each other, and second, that the assigned participant in the gains block is different from the assigned participant in the losses block, and vice versa.

In the execution stage, subjects see for each of the two blocks, in addition to their own two individually and randomly selected rounds, the respective individually and randomly selected round of the respective other participant to whom they are assigned as the

other participant (for a z-Tree screenshot, see instructions in Appendix C). Subjects are informed that the two rounds and the lotteries within these two rounds can differ from their own selected two rounds.

In treatments *Human Agent (No Info)* and *Human Agent (Info)*, subjects have to now decide on behalf of the respective other participant to whom they are assigned which of the two lotteries should be played for payoff for the other participant, but only in the event the other participant were not successful to buy or chose not to buy the decision right. In the event the other participant is successful to buy the decision right, there is nothing further for the subject to decide.

In treatment *Human Agent (Info)*, subjects are informed about their own and the other participant's risk score which are elicited in Part I of the experiment when selecting one of the two lotteries on her behalf. This procedure is explained in the instructions so that subjects vice versa know that the other participant, who will potentially decide for them, will do so with information about their risk score. Importantly, subjects know that their decision will have only payoff relevant consequences for the respective other participant, but not for themselves, and accordingly vice versa (i.e. a subject knows that the other participant who will potentially decide for her will do so without having payoff relevant consequences herself).

To make all three treatments as consistent as possible, the following applies in treatment *Nature*: If the other participant is successful to buy the decision right, subjects have to state for the selected round of the other participant to whom they are assigned which of the two lotteries they would choose if they were in the other participant's place. Subjects know that this decision has no payoff relevant consequences for them or the other participant. If the other participant is not successful or chose not to buy the decision right, there is nothing further to do. In total, a subject has to take up to two additional decisions.

5.3 Intrinsic Value Measurement

The probability statement $\underline{x}$, which is elicited in stage 1 of the experiment, represents the individual indifference probability that produces indifference between lottery A (A) and lottery B (B):

$$\underline{x} : A \sim B. \tag{5.2}$$

The individual indifference probability $\underline{x}$ is elicited eight times, i.e. for eight different lottery pairs in a total of eight rounds in stage 1: $\underline{x}_{\mathrm{lp}}$ with $lp := \{1, 2, 3, 4, 5, 6, 7, 8\}$. Applying the individual indifference probability $\underline{x}_{\mathrm{lp}}$ from stage 1 in stage 2 of the experiment ensures that the two lotteries A and B of a lottery pair lp are individually equally preferred in each round of stage 2. Stage 2 contains the same eight lottery pairs as stage 1.

Thus, in each round of stage 2, the expected utility (EU) from lottery A equals the expected utility from lottery B:

$$EU(A) = EU(B). \tag{5.3}$$

Furthermore, due to indifference, the instrumental value of a decision right (V_{ins}) that enables an individual to decide between lottery A and lottery B is zero:[25]

$$\begin{aligned} &EU(A) = EU(B) \Leftrightarrow CE(A) = CE(B) \\ &\Rightarrow V_{\text{ins}} = |CE(A) - CE(B)| = 0. \end{aligned} \tag{5.4}$$

In stage 2, in each round, an individual can buy a decision right D with monetary value *V(D)*, where *V(0)=0*. Remember, in the experiment, the decision right is the right to decide for oneself for the respective round which of the two lotteries will be played for payoff. The individual has to choose between Option 1 (i.e. not buying the decision right) and Option 2 (i.e. buying the decision right). In the former case of *non-decision* (i.e. choosing Option 1), the individual receives no decision right. In the latter case of *decision* (i.e. choosing Option 2), assuming the individual is successful in buying the decision right (otherwise the former case of *non-decision* applies), the individual receives the decision right, and has to pay the cost of the decision right *c(D)*.[26] It is assumed that an individual chooses Option 2, i.e. to buy the decision right, as soon as the net utility (U) of buying the decision right is at least as high as not buying the decision right:

$$U(V(D) - c(D)) \geq U(0). \tag{5.5}$$

Hence, *V(D)* $\geq$ *c(D)*, and the maximum purchase price the individual is willing to pay for the decision right (WTP_{D}) is:

$$WTP_{\text{D}} = c(D) = V(D). \tag{5.6}$$

Thus, in general, WTP_{D} is a measure of the value of a decision right. With reference to Section 2.1, the value of a decision right is the sum of its instrumental value and its intrinsic value. Due to (5.4), the following equation holds:

$$WTP_{\text{D}} = V(D) = V_{\text{ins}} + V_{\text{int}} = V_{\text{int}}. \tag{5.7}$$

[25] The instrumental value of a decision right is defined as the difference between the value of the most preferred option and the value of the expected or default option. In this experiment, each of the *two* available options without default consists of a lottery. The value of each lottery is determined by its certainty equivalent (CE). 5.4 is subject to the assumption that the least preferred option equals the expected option. However, due to $CE(A) = CE(B)$, also in any other case $V_{\text{ins}} = 0$ in this experiment.

[26] $c(D) \in C$ with $C := \{1, 2, ..., 19, 20\}$ experimental points. Thus, the cost of a decision right is at least one point. Furthermore, as also $WTP_{\text{D}} \in C$, the decision space is discrete.

Consequently, WTP_{D}, or WTP, is a measure of the *intrinsic value* of a decision right. Therefore, an individual with only instrumental preferences for a decision right should state a WTP of zero, or more precise, choose Option 1. However, if an individual chooses Option 2, and states a WTP for a decision right, this can only be traced back to intrinsic considerations that underlie the decision right itself.

Because subjects in stage 2 are not explicitly aware that they are facing lottery pairs for which they have previously stated indifference, this emphasizes the intrinsic nature underlying a decision right. Furthermore, this approach (i) reduces the risk of an experimenter demand effect, (ii) prevents that untrue instrumental concerns are exogenously incited and, (iii) avoids unnecessary confusion and suspicion among subjects. The neutral framing allows an intrinsic desire for a decision right to emerge.

The following two facts are also worth mentioning. First, if a subject chooses Option 1 in the experiment, WTP is set to zero.[27] This experiment aims to measure the positive intrinsic value of a decision right. The existence of a negative intrinsic value cannot be identified with this experimental design. Strictly speaking, this means that a WTP of zero can imply both, that a decision right is not valued at all or that it potentially has a negative intrinsic value. However, in the analysis and interpretation of the results of the experiment, a WTP equal to zero is equated to no intrinsic value, or no intrinsic valuation.

Second, the two-stage experimental design of Bartling et al. (2014) also builds on the elicitation of indifferences between two lotteries. The first stage of their experiment constitutes of a principal-agent delegation game in which the principal indirectly has to decide between keeping or delegating a decision right to an agent. The decision right enables to implement one project out of a set of two projects, where each project defines a lottery that is either preferred by the principal or the agent. The principal has to take two decisions. She has to decide on the minimum effort level she requires from the agent so that she is willing to delegate the decision right. This effort level represents the success probability of the chosen lottery and is costly to the holder of the decision right. Furthermore, the principal has to choose one project alternative and has to determine her own effort level for the chosen project, or the chosen lottery. In this way, a principals' indifference point is elicited between keeping or delegating a decision right to the agent, respectively between the control and the delegation lottery. The intrinsic value is measured indirectly by comparing certainty equivalents for the control and delegation lottery, which are elicited in the second stage in a neutral decision-frame.

In a reversed approach, my experiment elicits indifference points between two lotteries in the first stage in a neutral decision-frame, to directly measure the intrinsic value in the second stage by means of WTP to obtain the decision right to decide between equally preferred lotteries. As a consequence, decision rights in Bartling et al. (2014) carry an instrumental value, while decision rights in my experiment do not.

[27] As a subject is not willing to expend cost on the decision right, $V(D) = 0 = WTP_{\mathrm{D}}$ applies.

5.4 Treatments

5.4.1 Structural Determinants (Within-Subjects Design)

To examine the effect of different types of decisions on the intrinsic valuation of the related decision right, I follow the approach of Bartling et al. (2014) by systematically varying the round parameters. Table 5.1 displays the lottery pairs for each round in stage 1 and 2. In the experiment, the order of rounds is randomized between subjects within each block and each stage. The order of blocks (gains/losses vs. losses/gains) is randomized between sessions. The 2 x 4 rounds vary with respect to three structural determinants, i.e. *stake size*, *risk*, and the *domain of outcomes*.

	Domain of Outcomes								**Stake Size**	**Risk**
	Gains Block				Losses Block (Safe Amount: 250)					
	Lottery A		Lottery B		Lottery A		Lottery B			
	High	Low	High	Low	High	Low	High	Low		
	x	*(1-x)*	0.5	0.5	*x*	*(1-x)*	0.5	0.5		
Round 1	70	20	50	40	-180	-230	-200	-210	low	high
Round 2	105	25	95	35	-145	-225	-155	-215	low	low
Round 3	140	40	100	80	-110	-210	-150	-170	high	high
Round 4	210	50	190	70	-40	-200	-60	-180	high	low
Round 5	*140*	*40*	*100*	*80*	*-145*	*-225*	*-155*	*-215*		
Willingness-to-pay for decision right: 0 to 20 points										

Table 5.1: Lotteries and Parameters of the Experiment

Stake Size. Firstly, the *stake size*, or the level of outcomes, differs between 'low stakes' and 'high stakes'. Net outcomes in high-stake rounds (rounds 3 and 4) are twice as high as net outcomes in low-stake rounds (rounds 1 and 2). The distinction between low and high stakes captures the idea that decisions can differ in their importance.

In the domain of gains, decisions over high gains (high stakes) naturally imply greater consequences for the decision-maker than decisions over low gains (low stakes), and are thus more important decisions. With reference to Section 3.2.1, as it seems in this experimental context more likely that individuals prefer to take over responsibility for more important decisions themselves, the intrinsic valuation of decision rights over high gains decisions is expected to be higher than over low gains decisions. Vice versa, in the domain of losses, the feeling of large-scale consequences is typically associated with high losses (low stakes). Thus, in the domain of losses, decisions in high losses rounds imply more importance. However, in the domain of losses, the aversiveness of lotteries generally increases with stake size (Kahneman and Tversky, 1979, p. 279), where a preference

to shift the responsibility for a decision seems more likely. Therefore, in both domains, intrinsic valuation is expected to increase with high stakes (high gains and low losses).

Risk. Secondly, the *risk* involved in a decision differs between 'low risk decision' and 'high risk decision' rounds. Risk is measured as the ratio of ranges of lottery A and lottery B, where the difference between the high and the low outcome of a lottery defines the range of that lottery: $risk = (B_{high} - B_{low})/(A_{high} - A_{low})$. The idea for this round parametrization, likewise to stake size, builds upon Bartling et al. (2014). In their experiment, however, the authors use the relative difference between lottery outcomes, computed similarly to the above, to examine the conflict of interest between principal and agent. In this experiment, the closer the ratio is to 1, the relatively closer together the ranges of the two lotteries, and consequently the lower is the risk involved in the decision between lottery A and lottery B. While rounds 1 and 3 involve high risk decisions ($risk=0.2$), rounds 2 and 4 involve low risk decisions ($risk=0.75$).

The risk of a decision, respectively the risk involved in a decision, is reflected in the diversity of options (in terms of outcomes) over which the decision is taken. However, it is not clear from the literature review in Section 3.2.2 whether higher risk, or more diversity, increases or decreases the intrinsic value of the related decision right. On the one hand, higher risk is supposed to be perceived as aversive and threatening, in this way causing a responsibility shift for a high risk decision. On the other hand, less diverse outcomes or more similar options, thus less risk, can enhance the difficulty of a decision, therefore likewise leading to a preference for shifting responsibility for low risk decisions.

Domain of Outcomes. Finally, lottery pairs are situated in the *domain of gains* (rounds 1 to 4 in the gains block) and in the *domain of losses* (rounds 1 to 4 in the losses block). In rounds within the domain of gains, lottery pairs are associated with positive lottery outcomes. In rounds within the domain of losses, subjects receive a safe amount of 250 points and lottery pairs are associated with negative lottery outcomes. Importantly, when the safe amount is taken into account, the lottery pairs are equal in both blocks, but just presented in a different frame (for example in round 1, the high outcome in lottery A is 70 points, likewise to the losses block when the safe amount is taken into account: 250 point - 180 points = 70 points). In this way, WTP for a decision right cannot only be directly compared between both domains. The distinction between gains and losses by means of a frame aims to compare especially the valuation of decision rights in the context of desirable outcomes (gains) and undesirable outcomes (losses).

Building upon the literature review in Section 3.2.3, it can be assumed that decisions in the domain of gains are more desirable than decisions in the domain of losses, where for the latter responsibility is likely to be shifted. Thus, intrinsic valuation is expected to be higher in the gains domain than in the losses domain.

As mentioned before, Bobadilla-Suarez et al. (2017) also examine intrinsic valuation in the domain of gains and in the domain of losses. In their experiment, by means of subjects' decisions to keep or to delegate a choice, the authors calculate individual indifference points as the expected value at which a subject would delegate the choice with 50 percent probability, separate for both domains. These delegation indifference points, estimated by means of a mixed effects model while controlling for loss aversion and risk aversion, are compared to an objective expected value of a rational decision-maker. The difference, that is additionally corrected by a subjects' self-perceived accuracy statement, yields a measure of the control premium for choice, or a measure of the intrinsic value for choice. Using a different approach, my experiment allows to examine the effect of solely the decision frame (gain or loss) in which outcomes are presented on the valuation of decision rights. Furthermore, my experiment applies elicited indifference points, in contrast to estimated indifference points.

All in all, this round parametrization allows to distinguish intrinsic valuation for three different types of decision rights, namely decision rights over (i) important decisions, (ii) risky decisions, and (iii) desirable decisions. Stage 1 of the experiment consists of four rounds per block, while stage 2 consists of five rounds per block. In an additional round 5 in stage 2 in each block, the lottery pair includes an actual preference for one lottery (i.e. lottery B) by subtracting 10% from the individual indifference probability x in lottery A. In this way, this round in each block of stage 2 allows to control for differences in WTP for a decision right including non-instrumental and instrumental advantages.

5.4.2 Internal Motivations (Between-Subjects Design)

The between-subjects treatment structure allows to study the internal causes motivating the intrinsic valuation of decision rights, with each treatment variation testing one motive, i.e. a *preference for self-determination*, a *preference for non-interference* and an *aversion to paternalism*. This approach is closely related to the treatment structure of Ferreira et al. (2020), and thus allows to better compare internal motivations for intrinsic valuation in an individual and a social decision-making context. I nevertheless follow Neri and Rommeswinkel (2017) in their terminology with regard to the *preference for non-interference*, as this characterization (compared to the term *desire for independence* used by Ferreira and colleagues) is closer to the notion of negative freedom as 'freedom from', which is the main idea behind my treatment *Human Agent (No Info)*.

If subjects do not obtain the decision right in stage 2, either because they do not want to buy the decision right ("Option 1") or because they cannot successfully buy it, subjects know that the following will apply when deciding between the two options.

In treatment *Nature*, chance decides on behalf of the subject whether lottery A or lottery B is played for payoff. More exact, the computer randomly chooses one of the two lotteries for payoff, whereby subjects face ambiguity over the probabilities with which the computer will choose one of the two lotteries.

In treatment *Human Agent (No Info)*, another participant in the experiment decides on behalf of the subject whether lottery A or lottery B is played for payoff. Similar to *Nature*, the probability of which lottery the other participant will choose is ambiguous. This decision is not payoff relevant for the other participant.

In treatment *Human Agent (Info)*, too, another participant from the experiment decides on behalf of the subject which of the two lotteries is played for payoff. Yet, this treatment differs from *Human Agent (No Info)* with respect to information on risk attitudes that (i) a subject receives about the other participant potentially deciding on her behalf when she states her WTP for the decision right, and (ii) vice versa, the other participant receives about the subject she potentially decides for during the execution phase of the decision right.

In Part I of the experiment, risk attitudes are elicited. This allows to classify the risk attitude of a subject on a scale from 0 to 10, with 0 = "subject is highly risk averse" and 10 = "subject is highly risk loving". In the instructions for stage 2, subjects are explained that the higher a person's risk score, the more risk loving that person is and vice versa.[28] On the decision screen in stage 2, a subject in *Human Agent (Info)* is informed about the risk attitude score of the other participant who will potentially decide on her behalf. For transparency, the subject is also informed about her own risk attitude score. Remember, the subject knows that the other participant's decision on her behalf has payoff relevant consequences only for her, not for the other participant herself. Furthermore, subjects know that the other participant will be informed about their risk attitude score during the execution phase.

Preference for Self-Determination. Differences in the level of intrinsic valuation across treatments provide insight into why decisions rights are intrinsically valued. The treatment *Nature* is constructed to examine an inward looking motivation. It focuses entirely on whether subjects want to actively and autonomously take decisions themselves. In case of a WTP for decision rights in this treatment, intrinsic valuation is traced back

[28]Risk attitudes in Part I are elicited based on the lottery-choice design by Holt and Laury (2002, 2005) in the modified version of Balafoutas et al. (2012). In the experiment, subjects' risk attitudes scores from 0 to 10 are based on the number of safe choices according to Holt and Laury (2002), but edited in reversed order to make the scale more intuitive for subjects. For example, if a subject makes zero safe choices, this subject is classified with a 10 as highly risk loving. Subjects' risk scores are additionally labeled on screen and in the instructions as follows: {0="highly risk averse", 1="risk averse", ..., 6="risk neutral", ... 10="highly risk loving"}. Note that the formally incorrect assignment of the "risk neutrality" label to a score of 6 (instead of 5) is due to a programming error. However, this error does not affect the score itself, the ranking of subjects' risk attitudes, or the matching procedure. Excluding subjects with a risk score of 5 and 6 from the data set does not qualitatively change the results.

to a *preference for self-determination*, the desire to personally cause and control one's outcomes.

Preference for Non-Interference. In *Human Agent (No Info)*, the focus is not on whether subjects want to take decisions themselves, but moreover and most importantly, whether subjects want to avoid the interference of others in their outcomes. Thus, this treatment examines an outward looking motivation. If subjects are willing to pay for decision rights in the face of decision-making by a human agent instead nature, intrinsic valuation in Human Agent (No Info) can be traced back to both, a *preference for self-determination* and a *preference for non-interference*, the desire for protection from the influence of others in one's outcomes. Consequently, a preference for non-interference will result in a higher WTP in Human Agent (No Info) compared to Nature. Vice versa, if the level of intrinsic valuation in Nature is higher than in Human Agent (No Info), this would imply an aversion not to human decision-making procedures, but instead, explicitly to non-human decision-making procedures (see, e.g., Keren and Teigen, 2010; Dietvorst et al., 2015).

Aversion to Paternalism. *Human Agent (Info)* highlights a further aspect to the aversion to depend on another person's behavior, namely the aversion to being patronized by others. Whereas in Human Agent (No Info) subjects face ambiguity about the other person, in Human Agent (Info) subjects are able to form beliefs about the other person and her decision based on the information on the other person's risk scores, or risk attitudes. Remember, as indifference prevails between the two lotteries of a round, the information about risk attitudes should not affect the decision whether to buy a decision right. Nevertheless, subjects can potentially feel a sense of paternalism triggered by the additional information. This feeling may arise either because of a reluctance to be imposed to preferences of others (if the other person decides according to her own risk attitude) or because of a feeling that someone else might know what is potentially best for oneself (if the other person decides according to the risk attitude of the subject for whom she is deciding).

Ambuehl et al. (2021), for example, find that paternalistic behavior is best explained by an ideals-projective paternalism, i.e. the paternalist behaves as if she assumes that her own preferences are relevant to others. In this sense, the direction of expectations (the belief about how the other person would potentially decide) and the accordance of risk scores (non convergent or convergent risk scores) do not play a role in the occurrence of an *aversion to paternalism*, the pronounced feeling of violation of autonomy and negative freedom in the light of a perceivable paternalist.

In this experiment, the aversion to paternalism is based solely on the feeling of having something forced on oneself by another person who is perceivable as a paternalist through

information relevant to the decision context which can be associated with one's welfare. If such an aversion to paternalism is a motive behind intrinsic valuation, then this should result in a higher WTP in Human Agent (Info) compared to Human Agent (No Info).

Table 5.2 summarizes the potential motivations that are present in each of the three treatments. As noted above, Ferreira et al. (2020) implement a comparable treatment structure to separate preferences for self-reliance from preferences for independence. The authors apply the principal-agent delegation game adopted from Bartling et al. (2014) as their basis treatment, where intrinsic valuation can be caused by both former mentioned motives in addition to a preference for power. In a second treatment, the human agent is replaced by a bot in form of a computer program, which enables to study the mere effect of preferences for self-reliance. In a third treatment, the bot makes the decision for the passive human agent. By a comparison to the basis treatment, preferences for independence can be separated, which can cause intrinsic valuation in the basis but not in the third treatment. Paternalism a possible motivation is not considered. Furthermore, two of their treatments apply a social decision-making context while one treatment uses an individual decision-making context. In contrast, all of the treatments in my experiment take place in an individual decision-making context.

Neri and Rommeswinkel (2017) follow a different approach. In their 2-player-group experiment, a decision right in all of their three treatments provides non-interference of another human agent, in this case the group member. Preferences for power are elicited in a within-subjects design (i.e. the holder of the decision right can/cannot determine the outcomes of her group member), while the second treatment serves to control for inequality aversion. By means of reducing the option set from two options to one option in the third treatment, the authors are able to examine preferences for freedom (of choice).

	Nature	**Human Agent (No Info)**	**Human Agent (Info)**
Internal motivations:			
Preference for Self-Determination	Yes	Yes	Yes
Preference for Non-Interference	No	Yes	Yes
Aversion to Paternalism	No	No	Yes

Table 5.2: Treatments

5.5 Alternative Explanations and Further Motivations

In the course of the experiment and in addition to the main part, *control measurements* are collected to examine whether attitudes towards risk and losses, or biases in decision-making can serve as alternative explanations to an intrinsic valuation and cause a non-instrumental valuation of decision rights. Furthermore, selected *items from psychological scales* are included into the *post-experimental questionnaire* to study whether certain individual characteristics allow inferences about intrinsic valuation. An overview can be found in Table 5.3. A detailed description is given in the following. For an overview of definitions, I refer to the glossary in the Appendix (see Table A.1).

Controls	**Method**	**Source**
	Control Measurements	
Risk Attitudes	Incentivized	Holt and Laury (2002, 2005); Balafoutas et al. (2012)
Loss Aversion / Regret Aversion	Incentivized	Fehr et al. (2013); Bartling et al. (2014)
Illusion of Control	Hypothetical	Charness and Gneezy (2010)
Ambiguity Aversion	Hypothetical	Trautmann et al. (2008)
Compound Lottery Aversion	Hypothetical	Slovic and Lichtenstein (1968a,b)
	Questionnaire Items	
Locus of Control (Internal)	Questionnaire	Levenson (1972, 1974)
Locus of Control (External)	Questionnaire	Levenson (1972, 1974)
Desirability of Control	Questionnaire	Burger and Cooper (1979)
Autonomy	Questionnaire	Weinstein et al. (2012); Burger and Cooper (1979)
Magical Thinking	Questionnaire	Eckblad and Chapman (1983)

Table 5.3: Controls

5.5.1 Control Measurements

The experiment includes two incentivized (risk attitudes and loss aversion) and three unincentivized measures (illusion of control, ambiguity aversion, and compound lottery aversion) to analyze whether WTP for a decision right can be explained by causes other than an intrinsic valuation.[29]

[29] A test of social preferences (based on the double price-list technique developed by Kerschbamer, 2015, and applied, for example, in Balafoutas et al., 2012) was also part of Part IV. Because this was included in the experiment only for comparability with other possible treatments, this measure is not included below or in the data analysis.

Risk attitudes. Since subjects are confronted with risky lotteries when deciding whether to buy a decision right, *risk attitudes* can potentially play a role in their behavior, notwithstanding the fact that indifference prevails between the two lotteries of each lottery pair.[30] Therefore, in Part I of the experiment, risk attitudes are elicited based on the lottery-choice design by Holt and Laury (2002, 2005) in the modified version of Balafoutas et al. (2012) and as applied in Paetzel et al. (2014). Even though risk attitudes are also revealed by determining indifference points in Part II, the lottery-choice design is used to obtain a standardized measure of subjects' risk attitudes. Furthermore, this test simplifies the classification of subjects' risk attitudes with respect to *Human Agent (Info)*.

In the experiment, subjects have to decide in a series of ten binary choices between a secure payment 12.5 x z, $z = \{1, 2, ..., 10\}$ and a lottery (125, 0.5; 0, 0.5). The corresponding *risk index* is measured by $R{=}\tilde{z}/10$, with $\tilde{z}$ indicating the binary choice task number where a subject chooses the secure payment for the first time, and R ranging from 0.1 (highly risk averse) to 1 (the secure payment is chosen only if it stochastically dominates the lottery). Thus, smaller values of R reflect a higher degree of risk aversion. A rational subject should switch from the lottery to the secure payment only once or always choose the secure payment. If a subject switches more than once or in the wrong direction, R is set equal to 0.5. In this part of the experiment, one decision is randomly chosen for payoff.

Loss Aversion/ Regret Aversion. *Loss Aversion* (identified by Kahneman and Tversky (1979, p. 279) as the fact that "losses loom larger than gains") can be a potential explanation for why WTP differs between decision rights over gains and decision rights over losses. To control for this fact, subjects' degree of loss aversion is measured in Part IV of the experiment, based on the lottery task design of Fehr et al. (2013), originally developed by Fehr and Goette (2007) and also applied in Bartling et al. (2014). While Bartling et al. (2014) explicitly use the lottery task design to elicit individual's degree of loss aversion, Fehr et al. (2013) use choices from the lottery task as an indicator of subjects' degree of regret aversion. In this way, moreover, conclusions can be drawn if the degree of regret aversion not just causes lower levels of WTP in the losses block compared to the gains block, but in general has an effect on the valuation of a decision right. In this experiment, in contrast to Fehr et al. (2013) however, regret aversion would supposed to lead to lower levels of valuation (as the literature on decision-avoidance points in this direction).[31]

[30] For example the uncertainty effect, i.e. "individuals value a risky prospect less than its worst possible realization" (Gneezy et al., 2006, p. 1283), is assumed to be a result of risk aversion arising from a distaste of uncertainty (Simonsohn, 2009). Such a distaste of uncertainty can potentially explain why subjects are willing to pay for decision rights. Somewhat opposite is the risk-seeking behavior associated with the utility of gambling (Conlisk, 1993; Diecidue et al., 2004), which would result in a reluctance to pay for decision rights to some extent.

[31] Another class of reference-dependent preferences, which is related to but different from regret aversion, is disappointment aversion (Bell, 1985a; Loomes and Sugden, 1986). Disappointment describes "a

In the experiment, subjects have to decide for 6 lotteries whether or not to participate in the lottery. In each lottery, subjects can win 35 points with a probability of 50%, but can lose LP points with a probability of 50%, with $LP = \{15, 20, 25, 30, 35, 40\}$. The amount of LP at which a subject does not want to participate in the lottery anymore marks the degree of her loss (or regret) aversion.[32] The loss aversion index LA in this experiment is measured by the number of lotteries a subject participates in before switching to no participation, with LA ranging from 1 (participation in all 6 lotteries), 2 (participation in lotteries LP $\leq$ 35), and so on, to 7 (participation in no lottery). Thus, higher values of LA reflect a higher degree of loss aversion. A subject should switch from participation to no participation only once, or always choose either participation or no participation. If a subject switches more than once or in the wrong direction, LA is set to 3.5. In this part of the experiment, one lottery is randomly chosen for payoff. If a subject decided not to participate in that lottery, the payoff is 0.

Illusion of Control. *Illusion of Control* describes the "expectancy of a personal success probability inappropriately higher than the objective probability would warrant" (Langer, 1975, p. 313). The presence of an illusion of control in this experiment could lead to the belief that the probability of success, or the probability of receiving the high lottery outcome, is higher if one chooses a lottery oneself. Thus, illusion of control could lead to an increased valuation of the decision right. To prevent the emergence of an illusion of control by design, the lottery pairs in the experiment are presented as transparent, unspectacularly and neutrally as possible, with both lotteries of a lottery pair promising a high and a low outcome. Nevertheless, to control whether the valuation of a decision right is to some extent caused by an illusion of control, subject's illusion of control is elicited by an hypothetical lottery scenario at the end of the experiment whose essential feature is based on Charness and Gneezy (2010). Note that this control test is also applied in Bartling et al. (2014).

In the experiment, subjects should imagine a lottery (winning 10 Euro with 50% probability, winning 0 Euro with 50% probability), whereby the outcome of the lottery is determined by a roll dice. According to Charness and Gneezy (2010), subjects' illusion of control is elicited by their WTP to personally roll the dice instead of the computer. Therefore, subjects have to state first, who they would prefer to roll the dice (computer or

psychological reaction to an outcome that does not match up to expectations" (Bell, 1985a, p. 1). If an anticipated disappointment aversion (i.e. the fear of losing in the self-chosen lottery) is a motivation in this experiment, this would likewise lead to an undervaluation of decision rights rather than to an overvaluation.

[32]Note that all lotteries with LP $\leq$ 35 are fair gambles. A subject who rejects these fair gambles can be classified as being loss or regret averse, assuming a reference-dependent utility function (see Fehr et al., 2013). I follow Fehr et al. (2013) in using the accepted lottery with the largest possible loss for computing the degree of loss or regret aversion. Note however that the original version of the test uses different stakes, ranging from CHF 2 to CHF 7.

self) and second, their WTP for rolling the dice personally (between 0 and 5 Euro). The illusion of control index *IC* in this experiment is measured by the WTP to roll the dice personally of those subjects who would prefer to roll the dice personally. The higher the WTP, the higher is *IC*, and thus the degree of an illusion of control. If a subject prefers the computer to roll the dice, *IC* is set to *0*.

Ambiguity Aversion. Ownership of a decision right prevents *ambiguity* with respect to the lottery played for payoff. Ambiguity describes a situation of low confidence in the assignment of probabilities and of vague probability judgements that lead individuals to prefer reasonable probabilities over unsure probabilities, i.e. *ambiguity aversion* (Ellsberg, 1961, p. 660). *Ambiguity aversion* in this experiment could cause subjects to buy a decision right to avoid ambiguous lottery outcomes, as subjects can only form vague probability judgements about which of the two lotteries will be selected for payoff if the decision right is not present. To rule out ambiguity aversion as an alternative explanation to the intrinsic valuation of decision rights, subjects' ambiguity aversion is elicited by a second hypothetical lottery scenario based on the Ellsberg twocolor choice task by Trautmann et al. (2008). Because ambiguity is reduced in *Human Agent (Info)* compared to *Human Agent (No Info)*, ambiguity aversion as a confounder should also be reflected in higher valuations of decision rights in *Human Agent (No Info)*. The design of Trautmann et al. (2008) is chosen here because it also involves, in part, a hypothetical statement request.

In the slightly modified scenario of this experiment, subjects face two urns, a risky urn where the composition of balls is known and an ambiguous urn where the composition of balls is unknown. Subjects first have to state which urn they would prefer to determine the outcome of a lottery (winning 15 Euro if a certain ball color is drawn, winning 0 Euro otherwise). Second, they have to indicate how much they are willing to pay (between 0 and 15 Euros) to participate in the lottery (i) if the ball is drawn from the risky urn and (ii) if the ball is drawn from the ambiguous urn. Subjects' degree of ambiguity aversion is elicited by the difference between the WTP for the risky urn and the WTP for the ambiguous urn. The ambiguity aversion index *AA* is measured by the additional WTP for the risky urn when the risky urn is preferred, with a higher value of *AA* reflecting a higher degree of ambiguity aversion. If the ambiguous urn is preferred or a subject is indifferent between urns, *AA* is set to *0*.

Compound Lottery Aversion. Finally, a third hypothetical lottery scenario based on Slovic and Lichtenstein (1968a,b) is applied to control whether *compound lottery aversion* has an effect on the valuation of decision rights in this experiment. When presented with a two-stage compound lottery and the equivalent simple lottery in which the probabilities of the two stages of the compound lottery have been multiplied out, decision-makers should be indifferent (Harrison et al., 2015, p. 33). However, if "compound risks are

valued differently than corresponding reduced simple risks" (so-called compound risk attitudes according to Abdellaoui et al., 2015, p. 1306) in the sense that simple risks are preferred over compound risks, I define this attitude as compound lottery aversion. Harrison et al. (2015, p. 43) define compound risk aversion in almost the same way, namely as the behavior avoiding a compound lottery over a simple lottery or the equivalent simple lottery of the compound lottery when offered a binary choice between the two lotteries.

In this experiment, subjects who exhibit a compound lottery aversion might show an increased valuation of the decision right because the decision right not only avoids compound risk (more precise, the risk of the lottery selected for payoff combined with the risk of the lottery outcome achieved), but simultaneously leads to a reduction from compound risk or ambiguity to simple risk. This argument is similar to the previous argument on ambiguity aversion. Abdellaoui et al. (2015) also correlate compound risk attitudes and ambiguity attitudes. According to the authors "compound risk is reduced to simple risk by multiplication of probabilities, and ambiguity is reduced to simple risk through assignment of subjective probabilities" (Abdellaoui et al., 2015, p. 1306).

To elicit subjects' degree of compound lottery aversion, the third hypothetical lottery scenario includes two lotteries, a compound lottery consisting of two draws and the equivalent simple lottery of the compound lottery consisting of only one draw. In this scenario, subjects have to state, first, which of the two lotteries they would prefer and second, how much they would like to play each of the lotteries on a five-point Likert scale (very much,...,not at all). The lottery structure and the elicitation method of preferences is adapted from the duplex-gamble design by Slovic and Lichtenstein (1968a,b). Although the authors do not mention compound risk attitudes, this design is applied here first, because of the simple implementation as a hypothetical scenario and second, because the lottery includes both gains and losses. The corresponding compound lottery aversion index *CL* is measured by the additional preference level for the simple lottery when the simple lottery is preferred over the compound lottery. Comparably, Abdellaoui et al. (2015) measure and define "the compound risk premium (for a given compound lottery) as the certainty equivalent for the corresponding reduced lottery minus the certainty equivalent for the compound lottery" (Abdellaoui et al., 2015, p. 1309f). If the compound lottery is preferred or a subject is indifferent between lotteries, *CL* is set to *0*.

5.5.2 Questionnaire Items

The post-experimental questionnaire includes socio-demographic questions on gender, age, field of study, year of study and risk self-assessment, as well as selected items from psychological scales to measure attitudes on locus of control (internal and external), desirability of control, autonomy, and magical thinking.

Items on *internal and external locus of control* (5 items in total) are taken from Levenson (1972, 1974). Levenson's I, P and C Scales (Internal, Powerful Others and Chance) are chosen here because first, this scales represent an extension of Rotter's (1966) Internal-External control scale. Second, they enable to differentiate between powerful others and chance or fate, which corresponds to the treatment structure of this experiment. According to Levenson (1972, 1974), internal control denotes the belief in having personal control over one's life, while external control denotes the belief that powerful others, chance or fate are in control. Strong internal control beliefs might be an indicator of why decision rights are intrinsically valued, whereas high external control beliefs of why not.

Closely related to this concept is *desirability of control*. According to Burger and Cooper (1979, p. 381), desirability of control reflects the motivation "to control the events in one's life". Because an individual's level of desirability of control may help to explain the intrinsic desirability to obtain decision rights, 3 items from Burger and Cooper's Desirability of Control Scale are used to measure the level of control motivation (Burger and Cooper, 1979).

To separate control motives from *autonomy* motives for the intrinsic valuation of decision rights, 4 items from the Index of Autonomous Functioning designed by Weinstein et al. (2012) are also included into the questionnaire. This index theoretically builds on Self-Determination Theory (Deci and Ryan, 1985, 2000) and measures autonomy using three subscales, i.e. authorship/self-congruence, interest-taking, and susceptibility to control.

Finally, to control for beliefs on *magical thinking*, 2 items from Eckblad and Chapman's Magical Ideation Scale complete the questionnaire (Eckblad and Chapman, 1983).

To ensure consistency and to avoid confusion among the subjects when answering the questionnaire, a six-point Likert scale is implemented for all items. However, care is taken to ensure that the scale used does not deviate significantly from the original scales. A factor analysis (principal-component) with oblique promax rotation revealed subsequent to the experiment that the attitude towards autonomy is best represented by a mixture of items from two different scales (see Table D.2). Otherwise, factor analysis confirmes that the post-experimental questionnaire is able to test the five intended attitudes.[33]

[33]The post-experimental questionnaire also included one item on ambiguity tolerance, taken from Budner's scale of tolerance-intolerance of ambiguity (Budner, 1962). However, because the measure of ambiguity aversion resulting from Part IV of the experiment is more detailed and also more valid with respect to the revealed-preferences approach, this measure is used for data analysis.

5.6 Working Hypotheses

Since instrumental concerns are eliminated by design, the WTP for a decision right can be traced back solely to intrinsic concerns underlying the valuation of a decision right. In adjustment to the experimental design, I rewrite the working hypothesis as follows:

Working Hypothesis 1 (Existence) $WTP > 0.$

The *importance of a decision* (in terms of stake size), *risk of a decision* (in terms of involved risk), and *desirability of outcomes* (in terms of the domain of outcomes) are three structural determinants of a decision that are expected to affect the intrinsic value of the related decision right, and thus WTP, as follows:

Working Hypothesis 2.1 (Stake Size) $WTP_{high\ stakes} > WTP_{low\ stakes}.$

Working Hypothesis 2.2 (Risk) $WTP_{low\ risk} \neq WTP_{high\ risk}.$

Working Hypothesis 2.3 (Domain of Outcomes) $WTP_{gains} > WTP_{losses}.$

Differences in the level of intrinsic valuation resulting from different decision-making contexts provide information why decision rights are intrinsically valued. Each of the three treatments is designed to test a different motive. With respect to WTP, I hypothesize:

Working Hypothesis 3.1 (Self-Determination) $WTP_{in\ each\ treatment} > 0.$

Working Hypothesis 3.2 (Non-Interference) $WTP_{Human\ Agent} > WTP_{Nature}.$

Working Hypothesis 3.3 (Paternalism) $WTP_{HA\ (Info)} > WTP_{HA\ (No\ Info)}.$

5.7 Procedure

I conducted the experiment from April to June 2019 in the WiSo experimental laboratory of the University of Hamburg. The experiment was programmed with z-Tree (Fischbacher, 2007) and subjects were recruited using hroot (Bock et al., 2014). One experimental session included 18 subjects and lasted approximately 110 minutes. I conducted 2 sessions

of treatment *Nature* (N), 2 sessions of treatment *Human Agent (No Info)'* (HAno) and 3 sessions of treatment *Human Agent (Info)* (HAinfo) in randomized order. The data analysis includes in total 107 subjects (46% male and 54% female).[34] Sample heterogeneity between treatments appears with respect to three control variables, i.e. the risk index (N vs. HAinfo: $t = -2.026$, $p = 0.047$), the loss aversion index (N vs. HAinfo: $t = 1.785$, $p = 0.079$), and the autonomy score (N vs. HAinfo: $t = -2.129$, $p = 0.037$).[35] Written instructions for each part of the experiment were given to the subjects just before the start of each part and read aloud. At the beginning of the experiment, subjects were informed that the experiment consisted of 4 parts without being told what each part would involve. To ensure that each subject fully understood the experiment, control questions were asked initially to Part II and Part III. One experimental point converted to 0.05 Euro. Subjects earned in sum of the four parts on average 27.16 Euro including a 5.00 Euro show-up fee.

[34]Due to a programming error, one session of *Human Agent (Info)* is excluded from the analysis. Furthermore, due to a twisted number in the z-Tree code for one subject, one subject from *Human Agent (No Info)* is also deleted from the data set for analysis.

[35]Note that the *Bonferroni correction* for multiple-comparison test (see Miller, 1981) as a more conservative test results in the following p-values: N vs. HAinfo: $p = 0.141$ for the risk index; N vs. HAinfo: $p = 0.237$ for the loss aversion index; N vs. HAinfo: $p = 0.111$ for the autonomy score. Thus, according to this method, the assumption of sample heterogeneity can be rejected with respect to all control variables.

6

Results

This chapter presents the results of the experiment and is organized as follows. First, in Section 6.1, I examine whether decision rights in this experiment have an intrinsic value. Remember, in this experiment, the WTP for a decision right is a measure of the intrinsic value. Next, in Section 6.2, I focus on the level of intrinsic valuation and analyze in more detail (i) how intrinsic valuation is affected by structural determinants of the decision, (ii) what internal motives underlie intrinsic valuation, and (iii) whether alternative explanations to an intrinsic value can explain the non-instrumental valuation of decision rights. Finally, in Section 6.3, I present robustness checks. Note that in the following analysis all regressions include control variables mentioned in Section 5.5. Summary statistics of all controls are presented in Table D.1. To avoid multicollinearity, the risk index R and the score for *desirability of control* are excluded from the analysis (see also Table B.1 for more details).

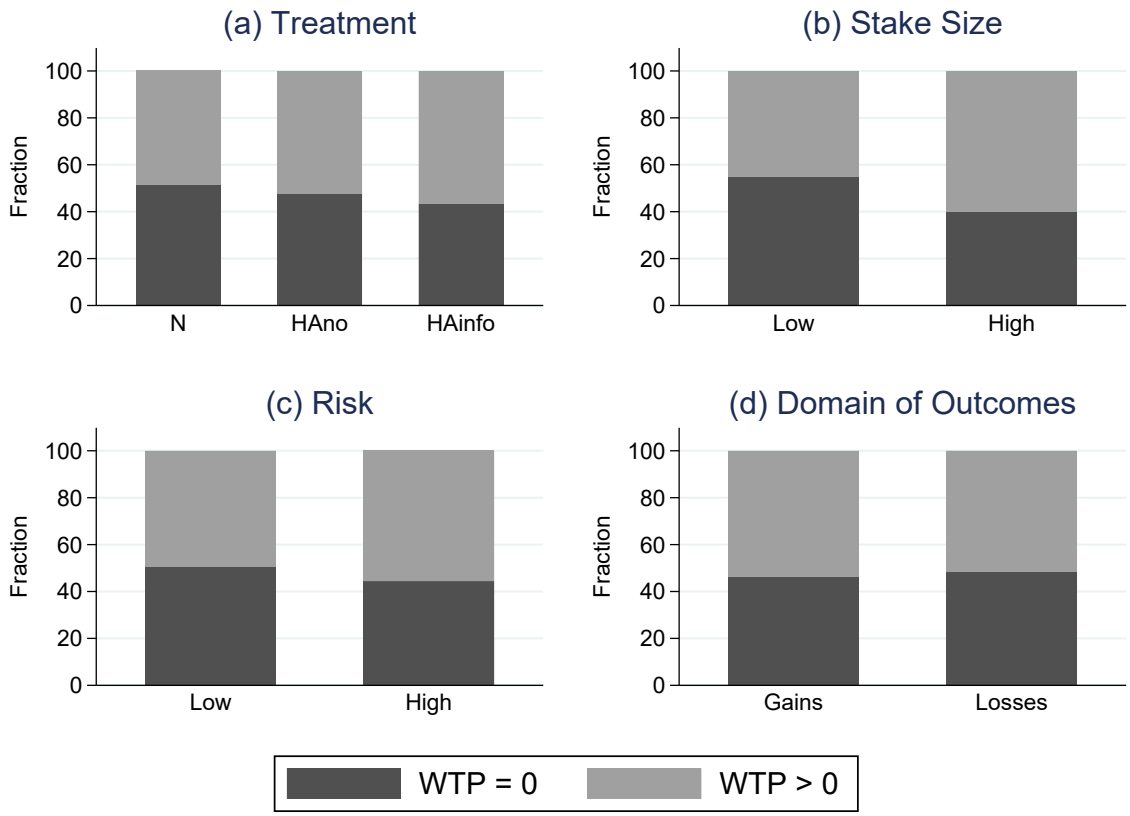
6.1 Existence of an Intrinsic Value

Across all rounds and treatments ($n = 856$, 107 subjects in 8 rounds), WTP is greater than zero in 52.45% of observations. A one-sample t-test rejects the hypothesis that the average WTP per subject of all 8 rounds (5.48 points) is equal to zero ($p < 0.01$). In addition, separate t-tests confirm that WTP in each of the 8 rounds is significantly different from zero in all 3 treatments ($p < 0.01$ for all rounds).[36] In line with Hypothesis 1, this leads to the first conclusion that decision rights, on average, have intrinsic value.

The fact that 83.18% of subjects are willing to pay for the decision right only in certain rounds (11.21% (5.61%) of subjects are never (always) willing to pay) suggests that intrinsic valuation depends on the parameters of the experiment. Figure 6.1, which displays the share of positive WTP statements (i.e. $WTP > 0$) separately by treatment variables, confirms this assumption.

[36] Alternatively, performing a paired-sample signtest –based on a binomial distribution– to test whether WTP is significantly different from zero yields the same result: $p < 0.01$ (one-sided test) for all rounds.

Figure 6.1: WTP by treatment variables between-subjects and within-subjects



Notes: Share of observations with a positive WTP. n = 288 (280) for bars *N* and *HAinfo* (*HAno*) in (a), n = 428 for each bar in (b), (c), and (d).

To verify whether structural determinants of the decision (i.e. stake size, risk and domain of outcomes) have an effect for decision rights to have an intrinsic value, a chi-squared test is performed (Table B.2). Stake size has a strong effect ($p = 0.000$, p-value 1-sided Fisher's exact = 0.000) and risk has a mild effect ($p = 0.065$, p-value 1-sided Fisher's exact = 0.038) on WTP being greater than zero. There is no evidence that the domain of outcomes has an effect on WTP ($p = 0.538$, p-value 1-sided Fisher's exact = 0.292). These results indicate that while intrinsic valuation is equally likely in the gains as in the losses domain, the probability that decision rights have an intrinsic value depends strongly on stake size and mildly on risk.

Furthermore, data indicates that the presence of a human agent in the decision-making process also causes WTP to occur more frequently, in other words, leads to that decision rights are more often assigned an intrinsic value. Although the probability of decision rights having an intrinsic value increases with the interference of others, a chi-squared test slightly rejects that a human agent has a significant effect on whether WTP is greater than zero ($p = 0.157$, p-value Fisher's exact = 0.154; HAno and HAinfo pooled: $\chi^2 = 2.57$, $p = 0.109$, p-value 1-sided Fisher's exact = 0.063).

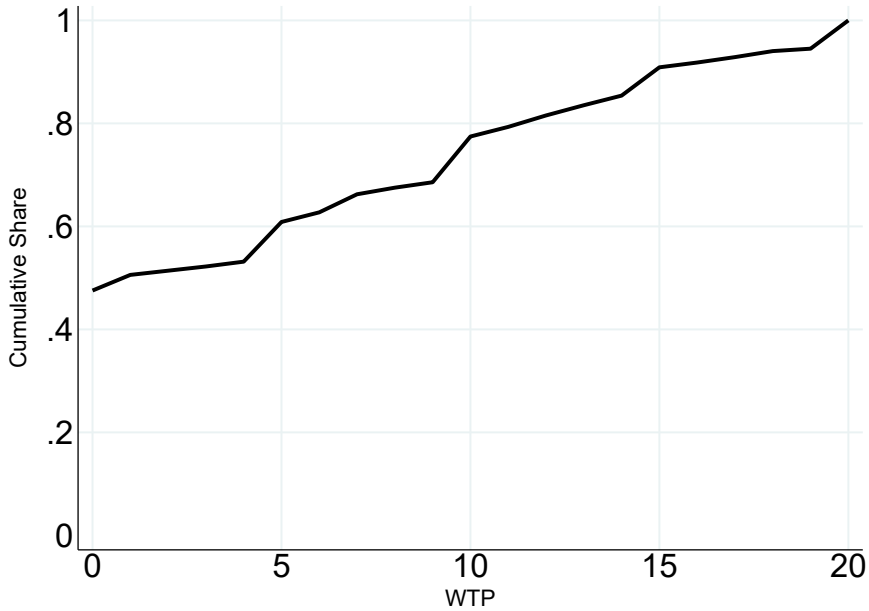
Model	I	II	I(pool)	II(pool)
Human Agent (No Info)	0.08	0.17	-	-
	(0.30)	(0.21)		
Human Agent (Info)	0.22	0.36	-	-
	(0.29)	(0.33)		
Human Agent (pooled)	-	-	0.15	0.26
			(0.28)	(0.24)
Stake Size (High)	0.50***	0.50***	0.50***	0.50***
	(0.09)	(0.09)	(0.09)	(0.09)
Risk (High)	0.21***	0.21***	0.21***	0.21***
	(0.06)	(0.06)	(0.06)	(0.06)
Domain (Losses)	-0.07	-0.07	-0.07	-0.07
	(0.13)	(0.13)	(0.13)	(0.13)
Intercept	-0.36	-0.68	-0.36	-0.64
	(0.32)	(0.66)	(0.32)	(0.61)
Human Agent (No Info) = Human Agent (Info)	$p = 0.628$	$p = 0.539$	-	-
Controls	No	Yes	No	Yes
Wald-chi2	298.83***	-	92.00***	-
N	856	856	856	856
Subjects	107	107	107	107

Notes: Results from a random-effects probit panel regression with session level cluster. Dependent variable is WTP as dummy variable. Baseline is *Nature* (gains, low stake size, low risk). Robust standard errors in parentheses. Controls: Order of Blocks, Gender, Economics Student, Loss Aversion Index, Illusion of Control Index, Ambiguity Aversion Index, Compound Lottery Aversion Index, Locus of Control (Internal), Locus of Control (External), Autonomy, Magical Thinking. Significance levels: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Table 6.1: Regression results (all subjects)

The results are confirmed by a random-effects probit panel regression presented in Table 6.1. The probability that WTP is not equal to zero, or that a decision right has an intrinsic value, increases significantly by 21% when risk is high ($p < 0.01$) and by 50% when stakes are high ($p < 0.01$). Still, interference of others seems to have no significant impact on whether decision rights have an intrinsic value. In both regressions, Model I and Model I(pool) with pooled data of treatments *Human Agent (No Info)* and *Human Agent (Info)*, the effect of a human agent is not significant. However, the regression analysis confirms that the probability of decision rights having an intrinsic value increases by 8% when an uninformed human agent can interfere ($p = 0.800$), and increases even more considerable by 22% for an informed human agent ($p = 0.457$). A Wald test yet rejects the hypothesis of a significant difference between *Human Agent (No Info)* and *Human Agent (Info)* ($p = 0.628$). Including all control variables in both regressions (Models II(pool) and II) does not change the results.

Figure 6.2: Intrinsic valuation across all rounds and all treatments



Notes: Intrinsic valuation displayed as cumulative share of WTP for a decision right across all rounds and all treatments. WTP from 0 to 20 points, n = 856.

Result 1 (Existence) *Decision rights are intrinsically valued, but not unconditional. Stake size and risk have a significant effect for decision rights to have an intrinsic value.*

6.2 Level of Intrinsic Valuation

Figure 6.2 provides an overview of the level of WTP across all rounds and treatments. When WTP is positive ($n = 449$), the average WTP amounts 10.44 points, which is 52.2 Eurocents or 6.53% of average earnings from Part III of the experiment. Moreover, the fact that subjects are willing to pay 10 or more points for the decision right in 22.55% of observations suggests that the size of the intrinsic value is economically relevant.

12 subjects are never willing to pay for a decision right in the experiment.[37] This suggest that these subjects, at least in this setting, do not intrinsically value decision rights. Because this experiment is particularly interested in examining the effects of the decision-making context and type of decision on the intrinsic value level, the following analysis focuses on subjects who exhibit a positive WTP in at least one round ($n = 95$, in the following referred to as *'Intrinsic Value Sample'*).

[37]There are 3 subjects in *Nature*, 4 subjects in *Human Agent (No Info)*, and 5 subjects in *Human Agent (Info)*. A chi-squared test confirms that the proportion of subjects never willing to pay is not significantly different between treatments ($p = 0.756$, p-value Fisher's exact = 0.809).

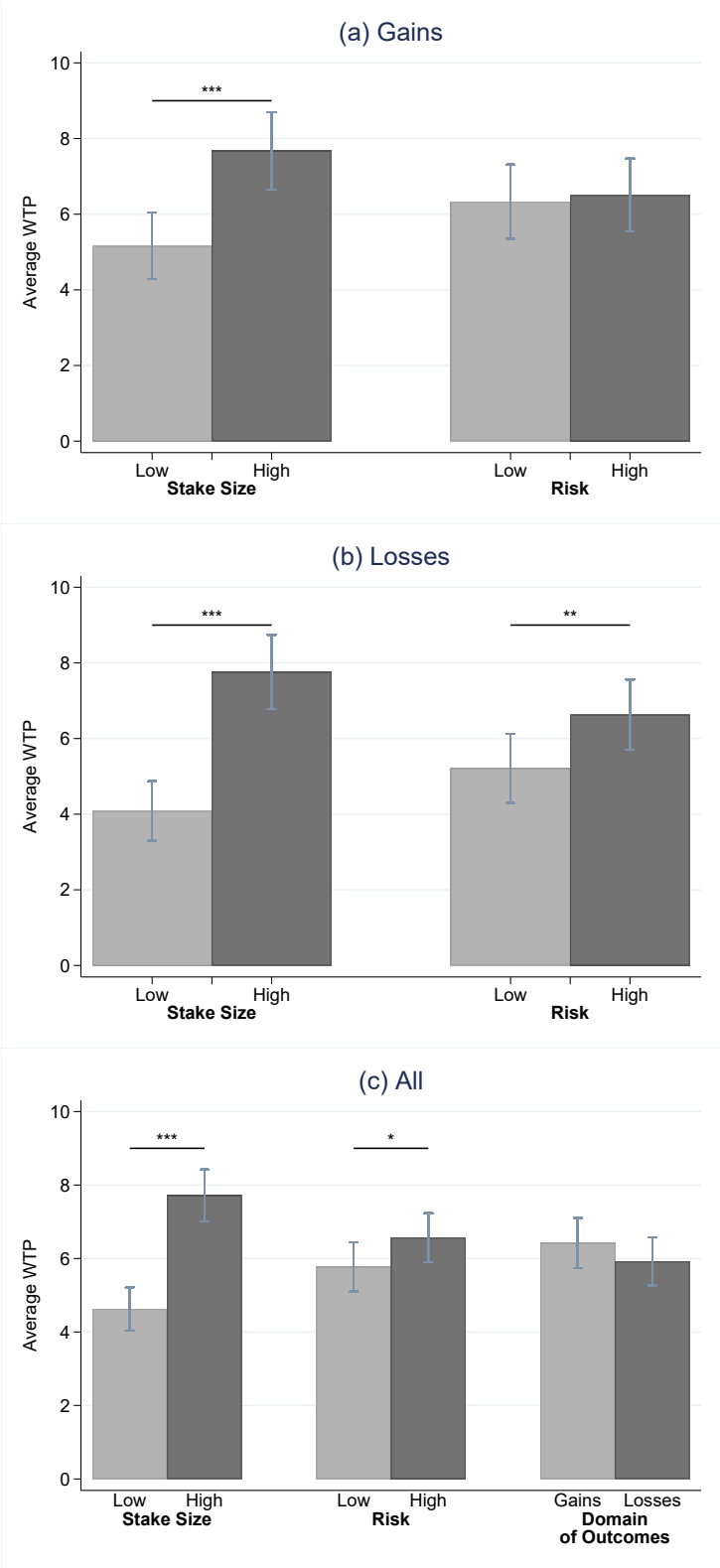
6.2.1 Structural Determinants of the Decision

Figure 6.3 confirms the effect of stake size also on the level of intrinsic valuation. The average WTP is significantly higher in high-stake rounds than in low-stake rounds (7.72 vs. 4.62, two-tailed t-test and Wilcoxon signed-rank test: $p < 0.01$). This highly significant effect holds both, for the domain of gains and even more strongly for the domain of losses. Thus, as hypothesized by Hypothesis 2.1, intrinsic valuation increases with high stakes, that is high gains and low losses. This suggests that while intrinsic valuation in the face of more important decisions increases in the domain of gains, in the *domain of losses* though, *intrinsic valuation decreases with more important decisions*, suggesting a preference for shifting responsibility for more important decisions over high losses.

In accordance with Hypothesis 2.2, also the risk involved in a decision does have a significant impact on the level of intrinsic valuation. In fact, average WTP in high risk decision rounds is significantly higher than in low risk decision rounds (6.57 vs. 5.77, two-tailed t-test: $p < 0.10$, Wilcoxon signed-rank test: $p < 0.05$). Intrinsic valuation apparently increases with decisions over a more diverse choice-set in terms of risk. Looking at the two domains separately, surprisingly, the significant effect of risk proves to be true only in the domain of losses (6.63 vs. 5.21, two-tailed t-test: $p < 0.05$, Wilcoxon signed-rank test: $p < 0.01$). Rieger et al. (2015) find evidence that individuals tend to be averse towards risk in gains while risk seeking in losses (*reflection effect*, Kahneman and Tversky, 1979). Although risk is considered differently here, the observation from this experiment is nonetheless in line with their findings. In turn, yet, this finding partly runs counter to the idea that the reflection effect is caused by a responsibility aversion in losses (Leonhardt et al., 2011; Tykocinski et al., 2017), as this would suggest a decision avoiding behavior, thus lower intrinsic value in high risk decisions in losses. Nevertheless, responsibility aversion in general associated with losses might still be a more subordinate motive, elicited by comparing behavior in gains and losses.

Contrary to Hypothesis 2.3, once again, WTP is not significantly higher in the domain of gains than in losses (6.42 vs. 5.92, two-tailed t-test: $p = 0.302$, Wilcoxon signed-rank test: $p = 0.427$). Undesirable decisions over losses do not cause intrinsic valuation to decrease significantly. Therefore, the desirability of a decision does not affect intrinsic valuation universally. Furthermore, a preference for shifting responsibility, at least with respect to the desirability of outcomes, is not a universal driver for intrinsic valuation. Note that the order in which the gains and the losses block were presented in the experiment between sessions has a significant effect on WTP (see Figure B.1). The average WTP for decision rights over gains is significantly higher when the gains block is presented after the losses block (4.94 vs. 7.93, two-tailed t-test and Mann-Whitney test: $p < 0.01$). However, for the intrinsic valuation of decision rights over losses, the order of blocks does not matter (5.82 vs. 6.03, two-tailed t-test: $p = 0.754$, Mann-Whitney test: $p = 0.669$).

Figure 6.3: Mean intrinsic valuation across treatments and by structural determinants (*'Intrinsic Value Sample'*)



Notes: Mean intrinsic valuation across treatments and by structural determinants of the decision (a) in the gains block, (b) in the losses block, and (c) in all rounds, using the *'Intrinsic Value Sample'*. n = 190 for each bar (a) and (b). n = 380 for each bar (c). Error bars represent 95% confidence intervals for the mean WTP. Asterisks denote the significance level of a two-tailed t-test (Welch test) on the equality of two means: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

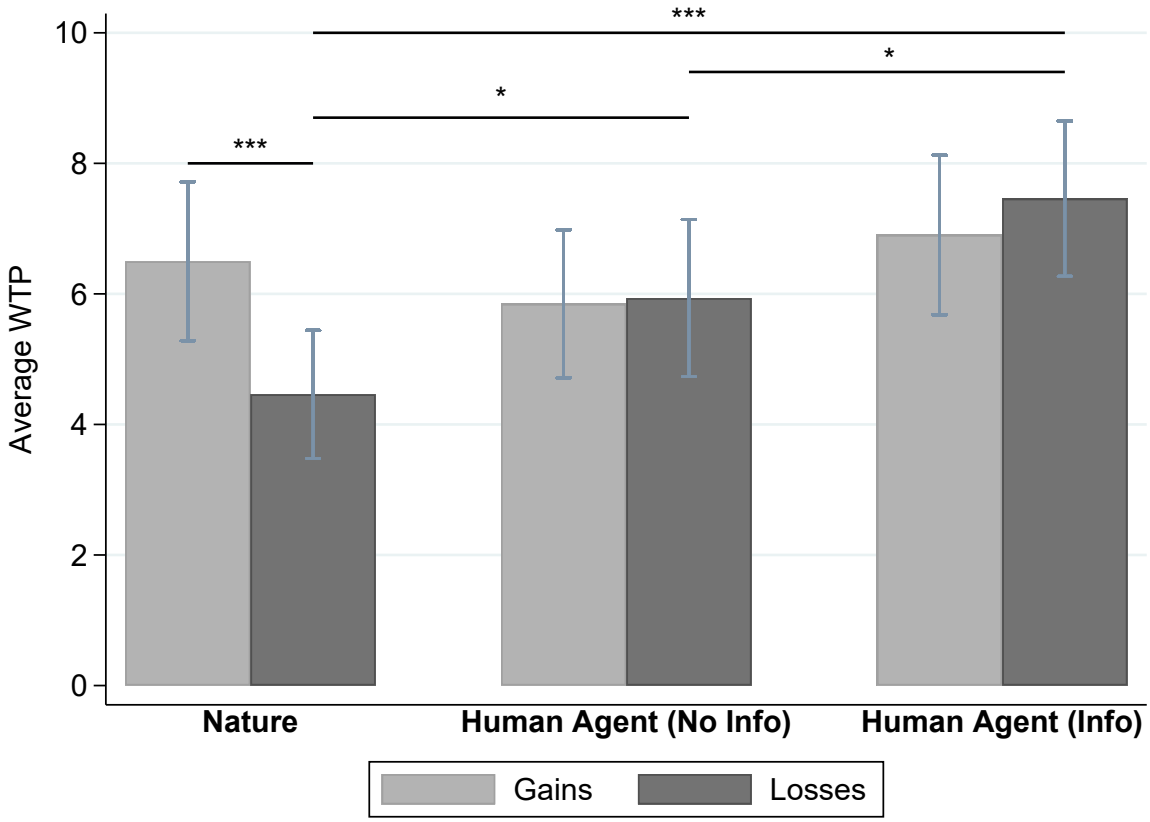
Result 2 (Structural Determinants: Stake Size and Risk) *The intrinsic valuation of decision rights increases significantly for decisions over high stakes (i.e. high gains and low losses) and for decisions over high risk in the domain of losses.*

Result 2 is especially interesting considering that Bartling et al. (2014) find evidence that the intrinsic value of decision rights is higher with lower conflict of interest between principal and agent. A low conflict of interest in their experiment is comparable to low risk in this experiment. As it seems, social risk affects intrinsic valuation negatively, while individual risk has a more positive impact. This suggests that responsibility in decision-making (either in a positive sense as a pursuit of responsibility or in a negative sense as an aversion to responsibility or a preference for shifting responsibility) is a motive for the intrinsic valuation of decision rights, but can manifest in opposite directions depending on the type of decision. However, a direct comparison of responsibility seeking behavior in an individual decision-making context vs. responsibility aversion in social decision-contexts might be interesting for future research.

Analyzing the interaction between domain of outcomes and treatment variable between-subjects, data reveals a surprising finding. Once interference of others is excluded, the intrinsic valuation of decision rights over gains is significantly higher than over losses (see Figure 6.4). In treatment *Nature*, in line with Hypothesis 2.3, the average WTP is significantly higher in the domain of gains than in the domain of losses (6.5 vs. 4.46, two-tailed t-test and Wilcoxon signed-rank test: $p \leq 0.01$).[38] Put it differently, only in the presence of nature, decision rights over undesirable outcomes (losses) are significantly less intrinsically valued than decision rights over desirable outcomes (gains), and thus, desirability of outcomes determines intrinsic valuation. This finding is in stark contrast to Bobadilla-Suarez et al. (2017), who find the intrinsic control premium for choice to be similar in both domains, where nature (in form of computer a algorithm) is implemented as decision opponent. However, Wang et al. (2020), in line with my findings, find that subjects show a significantly lower preference for control when confronted with losses compared to gains, also with a computer as decision opponent. Interestingly, Wang et al. (2020) likewise to my experiment, only manipulate the choice frame within outcomes are presented. This might suggest that solely presenting outcomes as undesirable outcomes weakens the intrinsic valuation of the related decision right, at least in the presence of chance.

[38] Analyses of the effect of *stake size* and *risk* per treatment confirms the strong significant effect of high stakes for all three treatments (N: 4.20 vs. 6.77; HAno: 4.31 vs. 7.47; HAinfo: 5.39 vs. 8.98; two-tailed t-test and Wilcoxon signed-rank test: $p < 0.01$ for all). However, with respect to risk, the effect of high risk turns insignificant (N: 5.77 vs. 6.57, $p = 0.188$ (0.047); HAno: 5.70 vs. 6.08, $p = 0.650$ (0.461); HAinfo: 6.71 vs. 7.65, $p = 0.274$ (0.212); two-tailed t-test, Wilcoxon signed-rank test in parentheses).

Figure 6.4: Mean intrinsic valuation per treatment and by block (*'Intrinsic Value Sample'*)



Notes: n = 132 (for each bar N), n = 124 (for each bar HAno and HAinfo). Error bars represent 95% confidence intervals. Asterisks denote the significance level of a two-tailed t-test (Welch test) on the equality of two means: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Result 3 (Structural Determinants: Domain of Outcomes)
Decision rights over losses have a significantly lower intrinsic value than those over gains if nature (in terms of chance) is involved in the decision situation, or if interference of others is excluded.

The results are confirmed by a random-effects tobit panel regression that is presented in Table 6.2. WTP increases significantly by 5.37 points if stakes are high ($p < 0.01$) and by 1.56 points if risk is high ($p < 0.05$). Including control variables into the regression (Model IV) does not change the results. Furthermore, while the effect of the domain of outcomes is not significant per se, controlling for an interaction effect between treatment and domain of outcomes (Model V) shows that WTP decreases significantly by 4.10 points ($p < 0.01$) in *Nature* if decisions have to be made over losses instead of gains. Separate regressions for the gains block (Model VI) and the losses block (Model VII) support (i) the stronger effect for high stakes in the domain of losses (4.41 vs. 6.34 points), (ii) the

significant effect of high risk in the domain of losses ($p < 0.05$), and (iii) the significant effect of order of blocks ($p < 0.01$) in the domain of gains.

Finally, controlling for regret aversion in the losses block (Model VII) reveals that regret aversion has no significant impact on WTP ($p = 0.825$, Loss Aversion Index). Thus, not explicitly regret aversion, but rather a general responsibility aversion in the presence of unpleasant decisions seems to explain lower levels of intrinsic valuation in *Nature*. This in turn suggests that a preference for shifting responsibility for unpleasant decisions seems to be a motive also outside of social decision-making contexts (see Hamman et al., 2010; Coffman, 2011; Bartling and Fischbacher, 2012; Oexl and Grossman, 2013), but only in the presence of nature. Blame shifting to human agents does not occur in the individual decision-making context applied here.

6.2.2 Internal Motivations

Result 3 shows that it is worth analyzing the internal motivations for intrinsic valuation separately by domain of outcomes. In the domain of gains, the level of intrinsic valuation is not affected by interference of others. As can be seen in Figure 6.4, the average WTP is not significantly different between treatments (6.50 vs. 5.85 vs. 6.90, N vs. HAno: $p = 0.437$ (0.563); N vs. HAinfo: $p = 0.644$(0.567); HAno vs. HAinfo: $p = 0.211$ (0.274); two-tailed t-test, Mann-Whitney test in parentheses). Also, the regression analysis that is presented in Table 6.2 proofs the statistically non-significant effect of a human agent on WTP in the domain of gains (Model VI). Consequently, with respect to the domain of gains, only Hypothesis 3.1 is confirmed, while Hypotheses 3.2 and 3.3 must be rejected. This finding is perfectly in line with Ferreira et al. (2020). It provides further evidence that the intrinsic valuation of decision rights derives first and foremost from the internal desire to personally cause and control one's outcomes. This result contributes also to the literature examining worker's performance and motivation (Falk and Kosfeld, 2006; Charness et al., 2012; Ziegelmeyer et al., 2012; Sloof and von Siemens, 2021) who find individuals to react positively (negatively) towards decisions to grant (restrict) decision authority. However, it somewhat contrasts with Burdin et al. (2018), who find no clear evidence for the importance of autonomy in explaining reactions to abstaining from control. A possible explanation could be that not autonomy alone, but the granting of autonomy as a gift by the employer, leads to an increase of motivation in a work environment. It suggests that fulfilling employees' desire for self-determination by means of delegating decision rights may be one reason why employees are motivated and positively (negatively) reciprocate the granting (denial) of decision autonomy.

Result 4 (Self-Determination) *In the domain of gains, intrinsic valuation derives only from a preference for self-determination.*

Model	III	IV	V	VI Gains	VII Losses
Human Agent (No Info)	1.32	2.45	0.37	0.60	4.09**
	(1.66)	(1.54)	(1.78)	(1.75)	(1.77)
Human Agent (Info)	3.52**	4.57***	2.13	2.37	6.44***
	(1.66)	(1.62)	(1.85)	(1.84)	(1.86)
Stake Size (High)	5.37***	5.36***	5.36***	4.41***	6.34***
	(0.75)	(0.75)	(0.75)	(1.09)	(1.00)
Risk (High)	1.56**	1.55**	1.55**	0.60	2.53**
	(0.75)	(0.75)	(0.74)	(1.08)	(0.99)
Domain (Losses)	-1.03	-1.02	-4.10***	-	-
	(0.75)	(0.75)	(1.29)		
Human Agent (No Info) x Domain (Losses)	-	-	4.26**	-	-
			(1.82)		
Human Agent (Info) x Domain (Losses)	-	-	4.97***	-	-
			(1.81)		
Order of Blocks (Losses first)	-	3.33***	3.36***	5.52***	1.11
		(1.29)	(1.29)	(1.48)	(1.47)
Female	-	-2.62**	-2.63**	-3.32**	-2.25
		(1.26)	(1.26)	(1.44)	(1.44)
Illusion of Control	-	0.30	0.29	1.56*	-1.27
		(0.81)	(0.81)	(0.92)	(0.97)
Locus of Control (Internal)	-	1.92**	1.91**	1.35	2.50**
		(0.89)	(0.89)	(1.02)	(1.02)
Locus of Control (External)	-	-1.82**	-1.82**	-2.03**	-1.64*
		(0.83)	(0.83)	(0.96)	(0.94)
Intercept	-1.17	-4.66	-3.17	1.62	-11.14
	(1.35)	(6.53)	(6.57)	(7.49)	(7.47)
Human Agent (No Info) = Human Agent (Info)	$p = 0.188$	$p = 0.177$	$p = 0.337$	$p = 0.328$	$p = 0.189$
Controls	No	Yes	Yes	Yes	Yes
Wald-chi2	60.63***	84.14***	92.08***	49.60***	72.34***
n	760	760	760	380	380
Subjects	95	95	95	95	95

Notes: Results from a random-effects tobit panel regression (lower limit: 0, upper limit: 20). Dependent variable is WTP. Baseline is *Nature* (gains, low stake size, low risk) in Models III, IV and V and *Nature* (low stake size, low risk) in Models VI and VII. Standard errors in parentheses. Controls: Economics Student, Loss Aversion Index, Ambiguity Aversion Index, Compound Lottery Aversion Index, Autonomy, Magical Thinking. Significance levels: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Table 6.2: Main regression results (*'Intrinsic Value Sample'*)

In the domain of losses (see Figure 6.4), average WTP increases significantly with the presence of a (paternalistic) human agent (4.46 vs. 5.94 vs. 7.46, N vs. HAno: $p = 0.062$ (0.062); N vs. HAinfo: $p = 0.000$ (0.000); HAno vs. HAinfo: $p = 0.076$ (0.081); two-tailed t-test, Mann-Whitney test in parentheses). Regression analysis (Model VII) provides further evidence that intrinsic valuation increases significantly by 4.09 points in *Human Agent (No Info)* ($p = 0.021$) and even by 6.44 points in *Human Agent (Info)* ($p = 0.001$) compared to *Nature*. A Wald test yet rejects the hypothesis of a significant difference between *Human Agent (No Info)* and *Human Agent (Info)* ($p = 0.189$).[39] However, the fact that average WTP across all rounds is significantly higher in *Human Agent (Info)* than in *Human Agent (No Info)* (5.89 vs. 7.18, $p = 0.032$ (0.040), two-tailed t-test, Mann-Whitney test in parentheses) indicates that paternalistic tendencies cause intrinsic valuation to increase. In line with findings from other experiments (Kataria et al., 2014; Lübbecke and Schnedler, 2020; Ackfeld and Ockenfels, 2021), this suggests that individuals do react averse to paternalistic tendencies, though Hypothesis 3.3 cannot be supported. One reason might be that paternalism, as modeled in this experimental design, is a rather weak form of paternalism. Subjects might not have perceived the human agent as a paternalist. Another reason might be that aversion to paternalism, the pronounced feeling of violation of autonomy and negative freedom, is predominantly caused by feelings of violation of autonomy rather than by feelings of violation of negative freedom. This would explain the significant effect of *Human Agent (Info)* in Models III to V in contrast to the non-significant effect of *Human Agent (No Info)*. Future research is necessary to further explore the possible role of paternalism as a motive behind intrinsic valuation.

With respect to the domain of losses, Hypotheses 3.1 and 3.2 are confirmed, whereas Hypothesis 3.3 has to be rejected. In line with Neri and Rommeswinkel (2017), a preference for non-interference seems to be a motive behind intrinsic valuation, but in this context only in the domain of losses. A relatively high level of intrinsic valuation in *Nature* leads nevertheless to the conclusion that a preference for self-determination is the major motive behind intrinsic valuation. Nonetheless, data gives evidence to the fact that intrinsic valuation, at least in this setting, is motivated by an aversion to human decision-making procedures rather than by an aversion to non-human decision-making procedures (see also Ferreira et al., 2020, p. 116), like for example algorithm aversion (Dietvorst et al., 2015).

Result 5 (Non-Interference and Paternalism) *In the domain of losses, a preference for non-interference in addition to a preference for self-determination motivates intrinsic valuation. Intrinsic valuation appears to increase with paternalistic tendencies, though not significantly.*

[39] Also for Models III to VI, a Wald test rejects the hypothesis of a significant difference in WTP between *Human Agent (No Info)* and *Human Agent (Info)*.

Looking at Result 3 and Result 5 together, it seems that, likewise to trust decisions (Bohnet and Zeckhauser, 2004; Bohnet et al., 2008; Humphrey and Mondorf, 2021), individuals are more likely to 'trust' nature than human agents with respect to decision-making over undesirable outcomes. This is also consistent with Dwenger et al. (2018), who find that individuals exhibit preferences for randomization, though in their study in the light of an important decision. Moreover, this finding supports Li et al. (2020), who suggest that social ambiguity, rather than betrayal aversion, is a motive in trust decisions. Social ambiguity in turn, i.e. the behavior to treat acts by human, also in the absence of strategic interactions, differently than acts of nature, which do not involve human agency and free will (Li et al., 2020, p. 273), has strong analogy to a preference of non-interference.

Considering Result 4 and Result 5 together, both findings strongly support that intrinsic valuation is first and foremost motivated by a preference for self-determination in this experiment. A preference for non-interference too, seems to be causal for intrinsic valuation, but just in the domain of losses and not as important as a preference for self-determination. While an aversion to paternalism is not found to be a significant motive, data nevertheless confirms that intrinsic valuation increases with paternalistic tendencies of a human agent.

6.2.3 Controls

To analyze whether the level of WTP is robust to biases in decision-making (i.e. loss or regret aversion, illusion of control, ambiguity aversion, and compound lottery aversion), a Spearman rank correlation test is performed between the average WTP per subject and the respective control measure. As can be seen from Table B.3, there is no support for a significant correlation between the variables, with the exception of a mild correlation between the illusion of control index and average WTP in the domain of gains (Spearman's $\rho = 0.1799$, $p = 0.081$). The fact of no significant correlation between the average WTP per subject and subjects' risk index (Spearman's $\rho = -0.0471$, $p = 0.650$) furthermore rules out that preferences for gambling (vice versa the uncertainty effect) lead intrinsic valuation to decrease (increase) as risk-seeking (risk-avoidance) leads not to a significant lower (higher) intrinsic value.

Regression analysis (Table 6.2) too, confirms that only illusion of control has a mild impact on the level of WTP in the domain of gains ($p = 0.088$), whereby none of the control measures has a significant impact on the existence of an intrinsic value (Table 6.1). Sloof and von Siemens (2017) find that illusion of control can explain overvaluation of decision authority. Thus, illusion of control appears to be not completely negligible in the context of decision rights. However, in Sloof and von Siemens (2017) subjects hold preferences over options to choose from, in contrast to my experiment. This suggests that preferences might play a role for an illusion of control in the context of decision rights.

In sum, as none of the control measures can credibly serve as an alternative explanation for the non-instrumental valuation of decision rights in this experiment, intrinsic valuation is the key explanation for a positive WTP in this experiment.[40]

Result 6 (Controls) *In this experiment, intrinsic valuation is not affected by loss or regret aversion, ambiguity aversion, or compound lottery aversion, and only mildly affected by illusion of control in the domain of gains.*

Finally, two interesting findings related to subjects' characteristics are worth noting. First, females exhibit a significantly lower WTP than males (-2.62, $p = 0.038$, Model IV). Men have a higher intrinsic valuation of decision rights than women in this experiment, in line with the findings of Ertac et al. (2020). Second, internal and external locus of control beliefs correlate significantly with intrinsic valuation. WTP increases significantly for subjects holding beliefs in having personal control over one's life (1.92, $p = 0.031$, Model IV), while WTP decreases significantly for subjects believing that rather powerful others or chance are in control (-1.82, $p = 0.028$, Model IV).

6.3 Robustness Checks

Robustness of the above results are discussed in the following. In a nutshell, robustness checks show first, that WTP or the intrinsic value measured in this experiment is (i) consistent, (ii) comparable in level to other experiments and therefore presumably valid, and (iii) only weakly explained by instrumental concerns. Second, data supports robustness of the main treatment effects to indifference probability statements and especially to risk preferences in *Human Agent (Info)*. It is not the specific information about risk attitudes per se, but the aversion to paternalism triggered by the information that is causal for increasing intrinsic valuation in *Human Agent (No Info)*. Finally, the unincentivised measurement of control variables does not appear to be a concern.

6.3.1 Intrinsic Value Measure

Concerning the intrinsic value measure, data supports first of all internal consistency in the measurement of intrinsic value. Similar to Bartling et al. (2014, p. 2026), I calculate *Cronbach's Alpha* (Cronbach (1951); see Table C.1). A value of 0.79 for Cronbach's Alpha confirms a strong correlation between WTP statements in the eight rounds of this experiment. In addition, a value of 0.76 allows the same conclusion for indifference

[40] This conclusion also holds for risk aversion as (i) risk attitudes, too, do not correlate with average WTP ($\rho = -0.0471$, $p = 0.650$), and (ii) running regression analysis with the risk index R instead of the loss aversion index LA shows that risk attitudes have no significant impact on WTP in all models.

probability statements, and thus for internal consistency of the indifference probability measure.

Furthermore, the average relative intrinsic value in this experiment, which accounts for 6.60% of average expected lottery prizes, is comparable to other experiments (i.e. Owens et al., 2014; Sloof and von Siemens, 2017). This fact adds additional robustness to the intrinsic value measure in this setting. The relative intrinsic value (12.57% if $WTP > 0$) is measured as WTP in relation to the average expected earning from lottery A and lottery B averaged across all rounds ($n = 856$; $n = 449$ if $WTP > 0$). Owens et al. (2014) report a control premium of 8% to 15% of average earnings. Sloof and von Siemens (2017) find an authority premium of 8% of average earnings. Thus, similar to the latter findings, my findings confirm an intrinsic value that tends to be at the lower bound (see also Sloof and von Siemens, 2017, footnote 6).

The following two facts moreover contradict the concern that instrumental motives rather than intrinsic considerations may have played an important role in subjects' WTP statements. More precisely, they largely contradict the assumption that untrue indifference probability statements in stage 1 could have led to decision rights having an instrumental value in stage 2, which in turn caused increasing WTP statements.

First, comparing WTP from the two rounds that contained an actual preference for one of the two lotteries (rounds 5 in each block) with the two corresponding rounds that did not, there are no significant differences in average WTP (5.14 vs. 5.49, $p = 0.576$ (0.453), two-tailed t-test, Wilcoxon signed-rank test in parentheses, *'Full Sample'*), also running separate tests per block. Though WTP increases with instrumental advantages of the related decision right, instrumental concerns seemingly play no significant role for the valuation of decision rights here. Moreover, this finding runs counter to the assumption that overpricing of high-amount lotteries, which can be observed in the context of preference reversals (Slovic and Lichtenstein, 1968b; Tversky et al., 1990), can serve as an explanation for positive WTP statements in this experiment (as also discussed by Bartling et al., 2014, p. 2030f). Remember, since in rounds 5 subjects' indifference probability minus 10% is applied, an overpricing of lottery A in stage 1 of the experiment in form of a too high (untrue) probability statement should result in a lower WTP in rounds 5 compared to the corresponding rounds including subjects' (stated) true probability statements. The findings show, however, that the reverse occurs in the experiment.

Second, a Spearman rank correlation test supports that average WTP per subject and average indifference probability per subject are not significantly correlated (Spearman's $\rho = 0.110$, $p = 0.258$, *'Full Sample'*). Computing correlation by domain of outcomes, however, reveals a moderate positive correlation in the domain of losses (Spearman's $\rho = 0.204$, $p = 0.035$, *'Full Sample'*). To test in general whether higher indifference probabilities lead to an increase in WTP, the main regression analysis presented in Table 6.2 is performed with *indifference probability* as control variable. Results presented

in Table C.2 indeed show that indifference probability has a significantly positive effect on WTP, but only with small effect sizes. Therefore, despite the previous findings, instrumental concerns related to WTP cannot be completely ruled out.

Interestingly, the average indifference probability per subject is significantly correlated with subjects' degree of loss aversion (Spearman's $\rho = 0.254$, $p = 0.008$, *'Full Sample'*). As this is the case in both domains (Gains: $\rho = 0.256$, $p = 0.008$; Losses: $\rho = 0.230$, $p = 0.017$), an explicit loss aversion cannot explain this result. Rather, regret aversion seems to be the driving motive and to affect behavior. Remember, Fehr et al. (2013) apply the loss aversion index LA as a proxy for subjects' degree of regret aversion. Regret describes the negative feeling that individuals experience if they reflect how much better their position could have been if they had chosen differently (Loomes and Sugden, 1982, p. 808). In this sense, it seems, a higher degree of regret aversion reflects in higher indifference probability statements in the experiment, and thus in a risk avoiding behavior (as higher indifference probability statements reflect higher risk aversion). This moderating effect is further supported computing correlation between the loss or regret aversion index and the risk index (see Table B.1, *Pearson's* r = -0.411, $p = 0.000$). The more regret averse a subject, the less (more) risk seeking (risk averse) is the subject. Computing the correlation between the average indifference probability per subject and subjects' risk attitudes, there is however no significant correlation averaging over all rounds (Spearman's $\rho = -0.136$, $p = 0.163$, *'Full Sample'*). Differentiating between the two blocks, there is only a significant correlation in the gains block, where more risk aversion leads to higher indifference statements (Gains: $\rho = -0.204$, $p = 0.035$; Losses: $\rho = -0.022$, $p = 0.824$). Taken together, this leads to the assumption that regret aversion, operating indirectly through indifference probabilities, has a weak moderating effect on the valuation of decision rights. However, further research is needed to clarify this effect.

6.3.2 Treatment Effects

With respect to the robustness of treatment effects, Table C.3 confirms that effects between treatments, and especially between domain of outcomes in *Nature*, are not due to differences in the level of average indifference probabilities or can be explained by the reflection effect. Only in *Human Agent (No Info)*, average indifference probabilities in the gains block are significantly higher than in the losses block if a non-parametric test is performed ($p = 0.016$, Wilcoxon signed-rank test, p-value two-tailed t-test = 0.121), which would underestimate possible effects concerning the domain of gains.

Furthermore, regression analysis based on average WTP per subject as dependent variable (see Table C.4) and on the *'Full Sample'* (see Table C.5) largely confirms results from main regression presented in Table 6.2. Thus, the main treatment effects are robust to aggregation of the variable WTP and sample size.

To test whether the stronger treatment effect for *Human Agent (Info)* compared to *Human Agent (No Info)* is specifically due to the other participant's risk preferences, a Spearman rank correlation test is performed. Results confirm that both, correlation between average WTP per subject and risk score of the other participant (Gains: Spearman's $\rho = -0.068$, $p = 0.694$; Losses: Spearman's $\rho = 0.244$, $p = 0.152$, $n = 36$), and correlation between average WTP per subject and absolute differences in risk scores between subject and other participant (Gains: Spearman's $\rho = 0.285$, $p = 0.092$; Losses: Spearman's $\rho = -0.108$, $p = 0.533$, $n = 36$) are, if at all, barely significant. This gives support to the fact that not the specific information on risk attitude per se, but rather the aversion to paternalism triggered by the information on risk scores that is causal for an increasing intrinsic valuation in *Human Agent (No Info)*.

6.3.3 Control Measurements

A final concern may be related to the unincentivised elicitation of control measurements and thus to the stated preferences approach applied within the three hypothetical scenarios on illusion of control, ambiguity aversion and compound lottery aversion.

In experimental economics, there is clearly no dispute over the dominance of the revealed preference approach and using financial incentives resulting from incentive-compatible methods to validly examine individual behavior (for a review on incentives in economics see, e.g., Camerer and Hogarth, 1999, Hertwig and Ortmann, 2001, or Cox and Sadiraj, 2019). However, Hascher et al. (2021) do find evidence that an unincentivized valuation task does not perform worse than it's incentivized version. Moreover, the authors conclude from different contributions in economic literature that using no incentives can by justified under given circumstances (Hascher et al., 2021, p. 1465). Likewise, Voslinsky and Azar (2021) argue that asking hypothetical questions and providing no incentives can still be useful as long as subjects have no incentives to lie about their preferences.

Of all 107 subjects, {10, 7, 3} subjects made inconsistent statements regarding {illusion of control, ambiguity aversion, compound lottery aversion}, which is quite tolerable. In total, 89 of 107 subjects (83.18%) gave consistent statements in all unincentivised scenarios. However, running main regressions with missing values for these subjects does not change the main results on a large scale. While the compound lottery aversion index *CL* turns significant in the probit regression ($p = 0.019$ in Model II(pool); $p = 0.020$ in Model II), a Spearman rank correlation test still rejects the hypothesis of a significant correlation between average WTP per subject and the compound lottery aversion index.

7

Discussion and Conclusion

Before concluding this dissertation with a brief summary and some final remarks, this chapter first, elaborates on the motives for intrinsic valuation in light of the results of the experimental study. Second, it points out two limitations when interpreting the results of the experiment. Third, the experiment is critically discussed. Lastly, implications and suggestions for future research are given.

Motives. When looking at the motives behind the intrinsic valuation of decision rights in this experiment, the following three remarks should be taken into consideration. First, there might be concerns that a preference for non-interference is underestimated as a motive behind intrinsic valuation. This would be the case if individuals in treatment Nature exhibit an aversion to randomization in addition to a preference for self-determination. However, it should be noted that first of all, the literature points in the direction that individuals show preferences for randomization (e.g. Agranov and Ortoleva, 2017; Dwenger et al., 2018; Lin and Reich, 2018) rather than an aversion to randomization. Furthermore, also Ferreira et al. (2020), who point out the same concern and argument (see Ferreira et al., 2020, p. 116), and whose experimental set-up is comparable to this experimental study, find no evidence in this direction. Ultimately, the intersection of an aversion to randomization and a preference for non-interference might be interpreted as a universal *preference for freedom*, i.e. the reluctance to delegate a decision both to chance as a decision device and to another person. Whereas a preference for self-determination can then be seen as a more inward looking motivation for the valuation of decision rights, a preference for freedom is a more outward looking motivation.

Second, when comparing the results of this experimental study to other experiments, it must be noted that different results regarding the motives underlying the intrinsic valuation should be interpreted in light of the specific experimental methodology and of the specific characteristics of a decision right applied in the different experiments (as also noted by Ferreira et al., 2020, p. 112). Decision rights can be valued for both, the *pure entitlement* or ability to decide and the actual *act of decision-making*. In experiments so

far, to the best of my knowledge, the obligation to make or execute a decision explicitly follows the retainment or obtainment of a decision right. Hence, it is of interest for future research to study intrinsic valuation just to be entitled with a decision right, similar to the valuation of participation rights (see here Frey and Stutzer, 2005). Regarding the act of decision-making, in turn, decision rights can be intrinsically valued both for the right to *make* a decision (in the sense to cause or being responsible for a decision) and for the right to *execute* a decision (in the sense to control or implement a decision).[41] Ferreira et al. (2020), who study the latter aspect of decision rights, suggest that "a desire for self-reliance –the desire to implement a decision already taken– crowds out independence" (Ferreira et al., 2020, p. 112). The results of this study indicate, at least for the gains domain, that such a crowding out also occurs if decision rights enable to make *and* to execute a decision, as this is the case in this experiment. In other words, in this experimental context, a desire for self-determination also crowds out independence. Since locus of control beliefs significantly correlate with intrinsic valuation in this experiment, it might be suggested that it is first of all the execution of a decision right, or the need for competence, that is responsible for decision rights to have an intrinsic value. In the domain of losses, however, this form of crowding out does not occur.

Neri and Rommeswinkel (2017) find a preference for freedom (of choice), i.e. an agent's preference that "his actions influence his own outcomes" (Neri and Rommeswinkel, 2017, p. 1), to be no motive behind intrinsic valuation. Following the terminology of this dissertation, a preference for freedom of choice can also be interpreted as the desire to *have* a choice, or to make a decision between at least two available options. Consequently, a preference for freedom of choice takes account for the fact that a decision right is being valued for providing choice. At the same time, a 'decision right' that does not fulfill a preference for freedom of choice cannot be associated with moral responsibility, and, strictly speaking, neither with social responsibility, as there is no choice.[42] This might be a reason why, at least for the domain of gains, Neri and Rommeswinkel find a preference for non-interference to be the sole motive behind intrinsic valuation and this experiment does not. The decision-making context, more specifically, the social responsibility component attached to a decision right implying freedom of choice in the experiment of Neri and Rommeswinkel could be a determining factor.[43]

[41] The distinction between these two functions of a decision right, i.e. to *make* and *execute* a decision, corresponds to the two components of a preference for self-determination, i.e. *autonomy* and *competence*, or, to personally *cause* and *control* one's outcomes.

[42] According to the definition of a decision right in this dissertation (see Chapter 2), a decision right only takes effect if there are at least two available options.

[43] As mentioned in Chapter 3, there are also contradictory results whether or not *preferences for power* (or likewise *preferences to act paternalistic*) motivate the intrinsic valuation of decision rights (see Neri and Rommeswinkel, 2017; Ferreira et al., 2020; Pikulina and Tergiman, 2020). Further research is needed to study whether preferences for, or, vice versa, an aversion to social responsibility is a motive behind intrinsic valuation. More precise, it would be of interest to examine whether the intrinsic value increases or decreases if a decision has consequences only for the decision-maker or for at least one other person.

A third and last objection to consider is whether decision rights, because they meet a particular preference, can be said to have intrinsic value. Strictly speaking, this type of valuation is again instrumental, yet non-monetary, in the sense of decision rights being valued for the sake of something else. However, it is important to note that in the literature, and also in this dissertation, the crucial distinction between the instrumental and the intrinsic value of a decision right is the distinction between the value derived from the outcome of a decision related to a decision right (the instrumental value) and the decision right itself (the intrinsic value).

Limitations. When interpreting the results of this experiment, the following two limitations should be noted. First, the highly significant and strong effect of high stakes on the level of intrinsic valuation may result from the fact that in high-stake rounds the decision right, in relative terms, is less costly. Subjects might have adjusted their WTP upwards with higher stakes in prospect due to relatively lower cost. If this was the case, it would suggest that the intrinsic value of a decision right is strongly sensitive to the relative cost of a decision right. However, it is especially worth to mention that monetary cost concerns are not solely responsible for intrinsic valuation in this experiment, as decision rights are consistently intrinsically valued in all eight rounds (bootstrap test on the hypothesis that $WTP = 0$: $p < 0.01$ for all rounds, $n = 95$; see also Figure C.1). Nevertheless, it appears that the size of the intrinsic value relates to the level of outcomes achievable through a decision, supporting the initial assumption, i.e. that the intrinsic value is conditional on the type of decision, or the type of outcomes over which the decision is taken.

Second, despite controlling for alternative explanations and the robustness checks performed, I cannot rule out that confusion among subjects in reporting indifference probabilities and WTP may have played a role for their decision-making, as the experiment is rather demanding and requires a high level of concentration. Yet, this strengthens the approach to ask subjects for indifference and WTP statements without explicitly informing them that stages 1 and 2 comprise the same lotteries. Subjects can evaluate their WTP for a decision right unadulterated by an experimenter demand effect or additional confusion caused by suspicion. Overall, however, the results demonstrate that subjects' behavior in this experiment is by no means random. Also, it should be emphasized that the results of this experiment do not stand alone, but should be interpreted together with comparable findings from other experiments (e.g. Bartling et al., 2014; Owens et al., 2014; Neri and Rommeswinkel, 2017; Ferreira et al., 2020). Taken together, the experimental evidence strongly supports the assumption that decision rights have an intrinsic value.

General Criticism. Looking at the experiment from a broader perspective, the following three points are worth mentioning. First, in this experiment, it is arguable how meaningful or autonomous the choice that results from a decision right is, as it is a choice between

equally preferred options. As discussed in Section 3.3.1, however, decision rights over equally preferred options do fulfill a preference for self-determination, respectively, entail autonomous choices from an intrinsic point of view. Moreover, it should be emphasized that acknowledging these choices as autonomous choices does not mean justifying a form of paternalism that preserves autonomy by providing equal alternatives to choose from. Rather, the purpose of this experiment is to highlight that even in decision situations between equally preferred options, where only a minimum level of autonomy is available, individuals still prefer to make a decision themselves.

Second, another point of criticism could be directed at the comparability of behavior in the first stage (elicitation of indifferences) and second stage (willingness-to-pay for the decision right) of this experiment. While in stage 1, two options are evaluated against each other, stage 2 includes an additional meta-choice to buy the decision right, and thus to decide whether or not to decide oneself for one of the options. According to the Non-Comparability Problem (Bernheim and Taubinsky, 2018), this meta-choice in stage 2 provides an additional experience of choosing which results in the non-comparability of the decision problems in stages 1 and 2.[44] Related, Sunstein (2014) notes that "choosing not to choose is itself a form of choice, and perhaps an active (and intrinsically desirable) one" (Sunstein, 2014, p. 9). If this were the case, and the additional decision right that enables choosing (not) to choose is already intrinsically valuable, then the intrinsic value of decision rights measured in this experiment would be underestimated, as the intrinsic value of the meta-choice decision right is not captured. Vice versa, if the decision-maker derives a disutility from the meta-choice, and makes the meta-choice to choose, or decides to state a positive WTP for being enabled to choose, this might be motivated by feelings of regret or guilt for not having taken the opportunity to choose. Indeed, this could have been the case in this experiment and cannot be excluded as an explanation for a positive WTP. However, in this experimental setting, feelings of guilt for not having taken the responsibility to decide might be mitigated due to the individual decision-making context. Furthermore, the results of this study indicate that regret is no motive for behavior in the second stage of the experiment.

Third, it is important to keep in mind that research on the intrinsic valuation of decision rights should be seen in contrast to the literature examining satisfaction with outcomes depending on whether individuals are choosers or nonchoosers (see, e.g., Botti and Iyengar, 2004), and also to the literature that studies whether or not the decision-making process shapes preferences (see, e.g., Egan et al., 2010; Sharot et al., 2010).

Implications. The results of this experimental study support the assumption that the intrinsic value is an integral part of the economic value of a decision right. The

[44]For further discussions on choice-set dependent preferences, see Kőszegi and Rabin (2008) or Sen (1993a).

consideration of the intrinsic component is important for organizations and politics when granting or limiting decision authority under welfare aspects. Employee well-being, or individual welfare, appears to depend not only on the outcome of a decision, but also on the active involvement in the decision-making process itself. Especially for certain types of decisions (i.e. important decisions over desirable outcomes and decisions over undesirable outcomes involving diverse outcomes) and in certain decision-making contexts (i.e. a context involving a (paternalistic) human agent where a decision over an undesirable outcome has to be taken), individuals in particular intrinsically value to take their own decision and dislike to shift the responsibility for an outcome. For economic analysis in general, this experimental study implies that the intrinsic value of a decision right is a crucial component of individual utility. Even in the absence of instrumental benefits, individuals derive utility from decision rights. For future research it could be of interest to study whether the intrinsic value attached to a decision right affects the subsequent decision. For example, it can be hypothesized from the literature on public good games (Dal Bó et al., 2010; Sutter et al., 2010) that contributions to a public good might increase with the intrinsic value attached to the decision right over the individual contribution. Similarly, it would be interesting to analyze whether an intrinsic value of decision rights in social decision-making contexts leads to more or less prosocial decisions.

Final Remarks

All in all, the aim of this dissertation was to study the intrinsic valuation of decision rights in an individual decision-making context. As the results of this experimental laboratory study show, decision rights on average have an intrinsic value. Furthermore, the size of the intrinsic value is economically relevant. This not only strongly supports the previous findings from social decision-making contexts on the intrinsic value of decision rights (e.g. Bartling et al., 2014), but it is also an indication that it is important to include procedural utility concerns and procedural preferences into an economic analysis (see Frey et al., 2004; Bolton et al., 2005; Chlaß et al., 2019). Furthermore, since intrinsic valuation in this experiment is measured by means of the willingness-to-pay for a decision right, intrinsic valuation seemingly results not just from the desire to retain decision authority, but is also a manifestation of the desire to obtain decision authority.

Biases in decision-making cannot credibly serve as an alternative explanation to intrinsic valuation in this experimental study. However, the results emphasize that the size of the intrinsic value of a decision right is context-dependent on certain decision types, which is also indicated by findings from other areas (e.g., conflicting team decisions: Buffat et al., 2020, blame shifting: Bartling and Fischbacher, 2012, decision avoidance: Beattie et al., 1994, Dwenger et al., 2018).

The reason why decision rights are intrinsically valued in this experiment seems to be first and foremost a preference for self-determination, in line with the findings of Ferreira et al. (2020). Likewise to the notation of positive freedom (e.g. Sen, 1988), the results indicate that individuals intrinsically seek decision authority, particularly as an expression of an internal desire to be actively involved in the process that leads to an outcome. Thus, in the first place, neither the aversion to human nor to non-human decision-making processes seem to be a motivation behind intrinsic valuation, but primarily the aversion to not being able to make a decision oneself. Interestingly, however, in the context of undesirable outcomes and in support of Neri and Rommeswinkel (2017), a preference for non-interference of others additionally motivates intrinsic valuation in this experiment, which appears to amplify with paternalistic tendencies. This suggests, comparable to trust decisions (Bohnet and Zeckhauser, 2004; Bohnet et al., 2008), that individuals are willing to pay a premium for decision rights over losses to avoid human decision-making, consequently to preserve negative freedom (e.g. Berlin, 1969) in light of undesirable decisions.

To summarize, the intrinsic value of a decision right has to be assessed together with the related decision-making context and type of decision, and not detached from it. Future research might therefore determine the effects of decision types other than those studied here (either in an individual or social decision-making context) in order to better understand the behavioral systematics behind the valuation of economic decision rights. Particularly interesting would be to concentrate on the role of paternalism.

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Appendix

Appendix A

Definitions and Literature

A.1 Glossary

	Definition	Source
Algorithm Aversion	The tendency that "people are reluctant to use superior algorithms that they know to be imperfect."	Dietvorst et al. (2018, p. 1156)
Ambiguity Aversion	Aversion to a situation of low confidence in the assignment of probabilities and of vague probability judgements that lead individuals to prefer reasonable probabilities over unsure probabilities.	Ellsberg (1961, p. 660)
Autonomy	"Self-governance, or rule by the self."	Ryan and Deci (2006, p. 1562)
Aversion to Human Decision-making	see Preference for Non-Interference	-
Aversion to Non-Human Decision-making	see Algorithm Aversion/ Aversion to Randomization	-
Aversion to Paternalism	The pronounced feeling of violation of autonomy and negative freedom in the light of a perceivable paternalist.	Own definition
Aversion to Randomization	Aversion to delegate a decision to explicitly chance as a decision device.	Own definition
Competence	The need to feel effective and to achieve valued outcomes within the environment.	Self-Determination Theory by Deci and Ryan (1985, 2000), see also White (1959)
Compound Lottery Aversion	The fact that simple risks are preferred over compound risks.	Based on Abdellaoui et al. (2015), Harrison et al. (2015)
Decision Aversion/ Decision Avoidance	Tendency to "prefer to avoid making decisions".	Beattie et al. (1994, p. 130)

continued

	Definition	Source
Decision Right	The right to decide (for oneself), that entitles to make and execute a decision.	Own definition
Desirability of Control	The motivation "to control the events in one's life".	Burger and Cooper (1979, p. 381)
Desirability of a Decision	Reflection of the desirability of outcomes over which a decision is taken, i.e. desirable outcomes in terms of gains and undesirable outcomes in terms of losses.	Own definition
Disappointment Aversion	Aversion to disappointment, i.e. the "psychological reaction to an outcome that does not match up to expectations".	Bell (1985a, p. 1)
Economic Value of a Decision Right	The economic value of a decision right is the sum of its instrumental value and its intrinsic value.	Own definition
External Locus of Control	The belief of individuals that "their destinies are beyond their own control and are determined by fate, chance, or powerful others".	Levenson (1972, p. 261)
Framing Effect	"Different choices caused by phrasing the same outcomes as though they were gains versus phrasing them as though they were losses".	Fagley (1993, p. 451)
Freedom of Choice	"[T]he opportunity for choice".	Pattanaik and Xu (1990, p. 272)
Illusion of Control	The "expectancy of a personal success probability inappropriately higher than the objective probability would warrant."	Langer (1975, p. 313)
Importance of a Decision	Reflection of stake sizes over which a decision is taken.	Own definition
Instrumental Value of a Decision Right	The difference between the value of the most preferred option and the value of the expected or default option.	Own definition
Internal Locus of Control	The belief of individuals that "they exercise control over their lives".	Levenson (1972, p. 261)
Intrinsic Value of a Decision Right	The value of having the right to make and execute a decision.	Own definition
Libertarian Paternalism	"[A]n approach that preserves freedom of choice but that authorizes both private and public institutions to steer people in directions that will promote their welfare."	Thaler and Sunstein (2003, p. 179)

continued

	Definition	Source
Loss Aversion	The attitude towards changes in welfare relative to a reference point that is described by the fact that "losses loom larger than corresponding gains", and to react "more sensitive to losses than to gains".	Tversky and Kahneman (1991, p. 279), Köbberling and Wakker (2005, p. 120), see also Kahneman and Tversky (1979)
Magical Ideation/ Magical Thinking	The "belief in forms of causation that by conventional standards are invalid."	Eckblad and Chapman (1983, p. 215)
Moral Responsibility	"[A] person is morally responsible for what he has done only if he could have done otherwise."	Frankfurt (1969, p. 829)
Negative Freedom	The degree to which an activity of an individual is not being prevented or interfered with by others.	Berlin (1969, p. 122)
Non-Libertarian Paternalism	Form of paternalism that forecloses choice.	Sunstein and Thaler (2003, p. 1185)
Omission Bias	"[T]he preference for harm caused by omissions over equal or lesser harm caused by acts."	Baron and Ritov (2004, p. 74)
Paternalism	"[T]he interference with a person's liberty of action justified by reasons referring exclusively to the welfare, good, happiness, needs, interests or values of the person being coerced."	Dworkin (1972, p. 65)
Personal Autonomy	The notion "whereby a person is autonomous with respect to her desires, actions, or character to the extent that they originate in some way from her motivational set".	Taylor (2005, p. 1)
Personal Responsibility	A "sense of ownership of the outcome", or, in general, also of a decision that leads to an outcome.	Botti and McGill (2006, p. 212)
Positive Freedom	The ability and the extent with regard to "what a person can choose to do or achieve".	Sen (1988, p. 272)
Preference for Freedom	Reluctance to delegate a decision both to chance as a decision device and to another person.	Own definition
Preference for Freedom (of Choice)	Preference of an agent that "his actions influence his own outcomes".	Neri and Rommeswinkel (2017, p. 1)
Preference for Independence	"[A] desire for independence from the interference of another person."	Ferreira et al. (2020, p. 110)

continued

	Definition	Source
Preference for Non-Interference	The desire for protection from the influence of others in one's outcomes.	Own definition in line with Neri and Rommeswinkel (2017) and Ferreira et al. (2020)
Preference for Power	The "desire to affect the payoffs and/or be able to decide on behalf of someone else."	Ferreira et al. (2020, p. 111), similiar to Neri and Rommeswinkel (2017)
Preference for Randomization	Preference to delegate a decision to a chance device. *Note: In other contexts, a preference for randomization can also manifest in the behavior to intentionally randomize one's choices (i.e. deliberate randomization).*	Based on Agranov and Ortoleva (2017), Dwenger et al. (2018)
Preference for Self-Determination	The desire to personally cause and control one's outcomes.	Own definition
Preference for Self-Reliance	The "desire to implement one's decision".	Ferreira et al. (2020, p. 110)
Preference for Shifting Responsibility	The desire to shift the responsibility for an outcome and to avoid certain types of decisions.	Own definition
Procedural Utility	"Procedural utility means that people not only value actual outcomes, i.e., the what, but also the conditions and processes that lead to these outcomes, i.e., the how."	Frey et al. (2004, p. 377)
Reflection Effect	The reflection effect states that individuals are risk averse in the domain of gains and risk seeking in the domain of losses.	Based on Kahneman and Tversky (1979, p. 268)
Regret Aversion	Aversion to regret, i.e. the negative feeling an individual experiences if he "reflect[s] on how much better his position would have been, had he chosen differently".	Loomes and Sugden (1982, p. 808)
Risk Attitudes	In terms of Expected Utility Theory: Attitude towards risk that is associated with a positive (negative) risk premium and a concave (convex) utility function for risk averse (loving) individuals, that leads to a risk avoiding (seeking) behavior.	Own definition
Risk of a Decision	Reflection of diversity of options (in terms of outcomes) over which a decision is taken.	Own definition inspired by Bartling et al. (2014)
Social Ambiguity	Behavior to "treat acts by humans, also in the absence of strategic interactions, differently than acts of nature, which do not involve human agency and free will."	Li et al. (2020, p. 273)

continued

	Definition	Source
Stake Size	Level of outcomes.	Based on Bartling et al. (2014)
Uncertainty Effect	"[I]ndividuals value a risky prospect less than its worst possible realization."	Gneezy et al. (2006, p. 1283)
Utility of Gambling	"[P]eople process risky choice options in a different manner than safe ones, because of an intrinsic utility for the presence or absence of risk."	Diecidue et al. (2004, p. 241)

Table A.1: Overview of central definitions (in alphabetical order)

A.2 Literature Synopsis

Support	Rejection
Intrinsic Value	
- Decision Rights: Bartling et al. (2014) - Worker's Performance: Falk and Kosfeld (2006) - Self-Employment: Benz and Frey (2008) - Procedural Preferences: Chlaß et al. (2019) - Participation Rights: Frey and Stutzer (2005) - Choice in Psychology: Leotti et al. (2010) - Freedom of Choice: Sen (1988) - Liberty: Mill (1859)	- Efficiency in Social Dilemmas: Fleiß and Palan (2013) - Detrimental Effects of Choice: Botti and Iyengar (2006)
Structural Determinants	
Stake Size	
- Decision Rights (+): Bartling et al. (2014) - Importance (+): Keren and Teigen (2010) - Importance (-): Dwenger et al. (2018) - Regret (-): Zeelenberg and Pieters (2007)	- Methodological evidence: Camerer et al. (2003)
Risk	
- Similarity of Options (+): Agranov and Ortoleva (2017) - Difficulty and Regret (+): Zeelenberg and Pieters (2007) - Difficulty and Decision Avoidance (+): Anderson (2003) - Diversity and Meaningful Choice (+): Baujard (2007) - Gambling (+): Diecidue et al. (2004) - Negative Perceptions (-): Weber et al. (2002) - Negative Emotions (-): Loewenstein et al. (2001)	- Differentiability of Options: Botti and McGill (2006)
Domain of Outcomes (Losses)	
- Loss Aversion (-): Gächter et al. (2022) - Regret (-): Zeelenberg and Pieters (2007)	- Decision Rights: Bobadilla-Suarez et al. (2017)

continued

Support	Rejection
- Negative Emotional Reactions (-): Botti and Iyengar (2006) - Blame Shift (-): Bartling and Fischbacher (2012) - Reflection Effect (-): Leonhardt et al. (2011) - Loss Frame (-): Wang et al. (2020)	
Motives	
Self-Determination	
- Decision Rights: Ferreira et al. (2020) - Self-Determination Theory: Deci and Ryan (1985) - Autonomy: Taylor (2005) - Positive Freedom: Sen (1988) - Algorithm Aversion: Dietvorst et al. (2018) - Randomization Aversion: Keren and Teigen (2010)	- Decision Rights: Neri and Rommeswinkel (2017) - Tyranny of Choice: Schwartz (2000) - Decision Aversion: Beattie et al. (1994) - Randomization Preferences: Dwenger et al. (2018)
Non-Interference	
- Decision Rights: Neri and Rommeswinkel (2017) - Betrayel Aversion: Bohnet and Zeckhauser (2004) - Negative Freedom: Berlin (1969)	- Decision Rights: Ferreira et al. (2020) - Preference Human Decision-Making: Gogoll and Uhl (2018)
Paternalism Aversion	
- Negative Reactions to Paternalism: Lübbecke and Schnedler (2020) - Non-Paternalistic Behavior: Ackfeld and Ockenfels (2021) - Institutional Choice: Dal Bó et al. (2010)	- Libertarian Paternalism: Thaler and Sunstein (2003) - Preferences for Power: Pikulina and Tergiman (2020) - Paternalistic Behavior: Ambuehl et al. (2021) - Efficiency in Social Dilemmas: Fleiß and Palan (2013)

Table A.2: Literature Synopsis

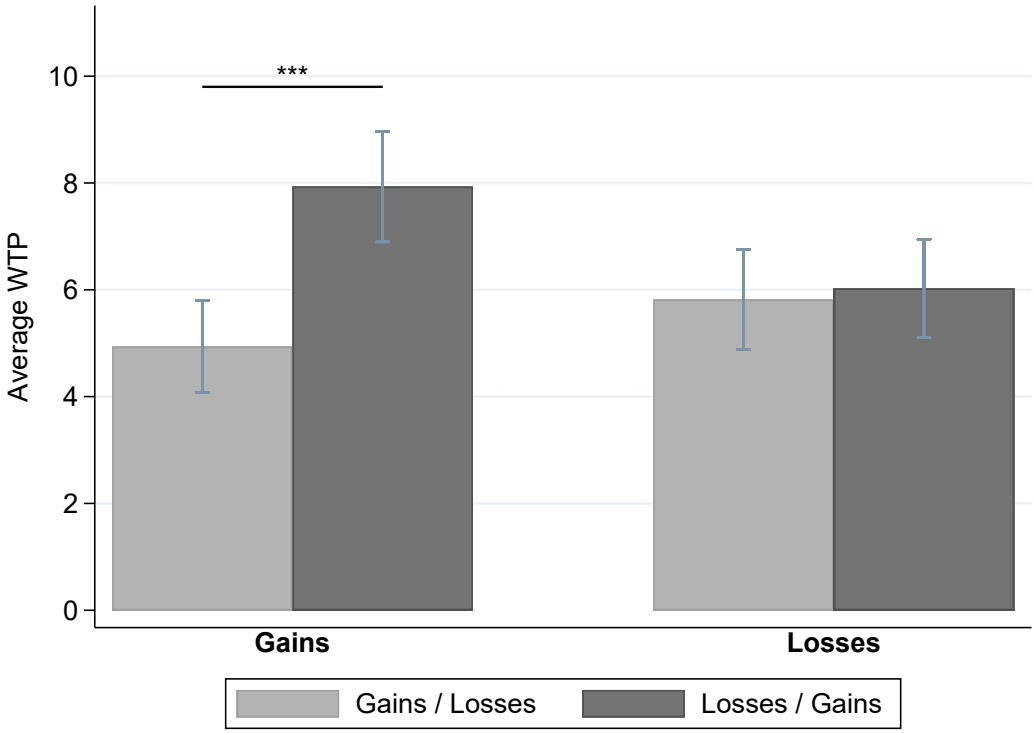
Notes: The table summarizes literature strands (including one important contribution) supporting (column *Support*) and rejecting (column *Rejection*) the assumption that (i) decisions rights have an intrinsic value (Hypothesis 1), (ii) the intrinsic value is affected by structural determinants of the related decision (Hypothesis 2), and (iii) self-determination, non-interference, and paternalism aversion are motives for intrinsic valuation. With regards to structural determinants, *(+)* denotes a positive correlation and *(-)* denotes a negative correlation between the respective determinant and the intrinsic value.

Appendix B

Results: Additional Main Figures and Tables

B.1 Main Figures

Figure B.1: Mean intrinsic valuation by domain of outcomes and order of blocks (*'Intrinsic Value Sample'*)



Notes: Mean intrinsic valuation by domain of outcomes and order of blocks (gains/losses vs. losses/gains), using the *'Intrinsic Value Sample'*. n = 192 for each bar gains/losses and n = 188 for each bar losses/gains. Error bars represent 95% confidence intervals for the mean WTP. Asterisks denote the significance level of a two-tailed t-test (Welch test) on the equality of two means: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

B.2 Main Tables

	G	ES	R	LA	IC	AA	CL	LoC(I)	LoC(E)	DoC	Aut	MT
G	1.000											
ES	-0.073	1.000										
	(0.458)											
R	-0.079	0.047	1.000									
	(0.421)	(0.632)										
LA	0.152	-0.126	**-0.411**	1.000								
	(0.118)	(0.196)	**(0.000)**									
IC	0.039	0.112	0.052	-0.035	1.000							
	(0.692)	(0.251)	(0.597)	(0.717)								
AA	-0.067	0.051	-0.078	0.028	0.144	1.000						
	(0.494)	(0.603)	(0.425)	(0.777)	(0.140)							
CL	0.057	**0.239**	0.007	0.065	**0.161**	0.095	1.000					
	(0.563)	**(0.013)**	(0.942)	(0.507)	**(0.098)**	(0.331)						
LoC(I)	0.115	-0.070	0.054	-0.155	**-0.180**	-0.051	-0.085	1.000				
	(0.240)	(0.472)	(0.581)	(0.111)	**(0.063)**	(0.602)	(0.385)					
LoC(E)	0.057	**0.166**	0.151	-0.071	-0.060	-0.091	0.141	**-0.273**	1.000			
	(0.559)	**(0.088)**	(0.120)	(0.466)	(0.537)	(0.350)	(0.148)	**(0.004)**				
DoC	-0.055	-0.100	0.097	-0.063	-0.024	0.106	-0.100	**0.232**	-0.115	1.000		
	(0.573)	(0.305)	(0.319)	(0.518)	(0.805)	(0.279)	(0.303)	**(0.016)**	(0.237)			
Aut	0.096	-0.123	-0.057	0.120	-0.132	0.016	-0.151	**0.177**	-0.013	**0.280**	1.000	
	(0.323)	(0.206)	(0.562)	(0.218)	(0.175)	(0.873)	(0.120)	**(0.068)**	(0.893)	**(0.004)**		
MT	0.054	0.094	0.038	0.106	**0.220**	0.025	0.131	**-0.219**	0.096	**-0.257**	**-0.183**	1.000
	(0.581)	(0.335)	(0.694)	(0.278)	**(0.023)**	(0.794)	(0.179)	**(0.024)**	(0.326)	**(0.007)**	**(0.059)**	

Notes: The table reports *Pearson's r*. p-values in parentheses. G: Gender, ES: Economics student, R: Risk index, LA: Loss aversion index, IC: Illusion of control index, AA: Ambiguity aversion index, CL: Compound lottery aversion index, LoC(I): Locus of control (internal), LoC(E): Locus of control (external), DoC: Desirability of control, Aut: Autonomy, MT: Magical thinking.

Table B.1: Results of a pairwise correlation test between control variables

	Stake Size		**Risk**		**Domain of Outcomes**		**Treatment**		
	Low	High	Low	High	Gains	Losses	Nature	Human Agent (No Info)	Human Agent (Info)
WTP = 0	236	171	217	190	199	208	148	134	125
WTP > 0	192	257	211	238	229	220	140	146	163
χ^2	19.79***		3.41*		0.38		3.70		
n	856		856		856		856		

Notes: The table displays the existence of an intrinsic value by means of WTP as dummy variable (0: No WTP, 1: WTP > 0). The analysis is based on stake size (first column), risk (second column), domain of outcomes (third column), and treatment (forth column). Pearson's chi-squared is based on a chi-squared test testing for the effect of the different within and between treatment variables on the existence of an intrinsic value (WTP > 0). Significance levels: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Table B.2: Existence of an intrinsic value

	Nature	Human Agent (No Info)	Human Agent (Info)	Gains	Losses	All
Risk Index	-0.2728	0.2034	-0.2471	-0.1486	0.0598	-0.0471
	(0.1245)	*(0.2725)*	*(0.1802)*	*(0.1507)*	*(0.5646)*	*(0.6504)*
Loss Aversion Index	0.1584	0.1848	-0.1339	0.0645	-0.0364	0.0159
	(0.3788)	*(0.3195)*	*(0.4727)*	*(0.5349)*	*(0.7259)*	*(0.8783)*
Illusion of Control Index	0.0288	0.1412	0.0806	0.1799*	-0.0894	0.0606
	(0.8737)	*(0.4485)*	*(0.6666)*	*(0.0811)*	*(0.3890)*	*(0.5599)*
Ambiguity Aversion Index	0.0082	-0.0246	0.0695	-0.0522	0.1048	0.0349
	(0.9639)	*(0.8954)*	*(0.7102)*	*(0.6151)*	*(0.3122)*	*(0.7369)*
Compound Lottery Aversion Index	0.0934	-0.1728	0.0855	-0.0050	0.0127	-0.0115
	(0.6052)	*(0.3525)*	*(0.6474)*	*(0.9613)*	*(0.9024)*	*(0.9118)*
Subjects	33	31	31	95	95	95

Notes: Results from a Spearman rank correlation test on the correlation between the average WTP per subject and the respective index. The table reports Spearman's rank correlation coefficient ρ and p-values in parentheses. Significance levels: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

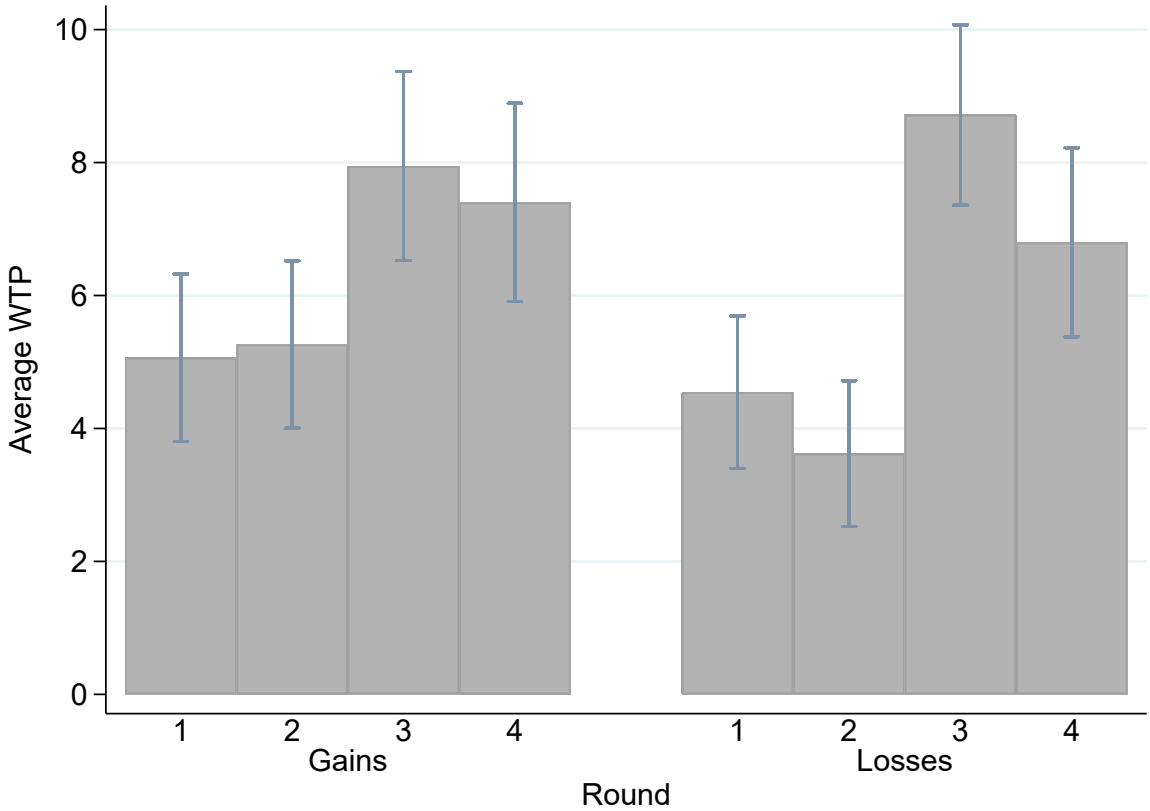
Table B.3: Correlation results (*'Intrinsic Value Sample'*)

Appendix C

Robustness Checks: Additional Figures and Tables

C.1 Figures (Robustness Checks)

Figure C.1: Mean intrinsic valuation per round (*'Intrinsic Value Sample'*)



Notes: n = 95 for each bar. Error bars represent 95% confidence intervals for the mean WTP.

C.2 Tables (Robustness Checks)

	All	Nature	Human Agent (No Info)	Human Agent (Info)
WTP	0.7884	0.7975	0.7213	0.8307
Indifference Probability	0.7597	0.7589	0.7910	0.7488

Notes: The table reports Cronbach's Alpha for WTP and Indifference Probability as a measure of internal consistency across all 8 rounds (n = 107, *'Full Sample'*).

Table C.1: Cronbach's Alpha

Model	IV(IP)	VI(IP) Gains	VII(IP) Losses
Human Agent (No Info)	1.91	-0.37	4.19**
	(1.52)	(1.71)	(1.79)
Human Agent (Info)	3.73**	1.72	5.36***
	(1.60)	(1.79)	(1.87)
Stake Size (High)	5.05***	4.51***	5.41***
	(0.72)	(1.05)	(0.92)
Risk (High)	0.37	-0.88	1.74*
	(0.72)	(1.08)	(0.91)
Domain (Losses)	-0.89	-	-
	(0.71)		
Order of Blocks (Losses first)	3.86***	6.29***	1.39
	(1.28)	(1.45)	(1.48)
Indifference Probability	0.27***	0.25***	0.32***
	(0.04)	(0.05)	(0.05)
Female	-2.31*	-3.16**	-1.77
	(1.25)	(1.40)	(1.45)
Locus of Control (Internal)	1.88**	1.52	2.18**
	(0.88)	(0.99)	(1.02)
Locus of Control (External)	-1.82**	-1.98**	-1.70*
	(0.82)	(0.93)	(0.94)
Intercept	-20.47***	-14.30*	-27.14***
	(6.81)	(8.01)	(7.96)
Controls	Yes	Yes	Yes
Wald-chi2	140.37***	71.89***	112.46***
n	760	380	380
Subjects	95	95	95

Notes: Results from a random-effects tobit panel regression (lower limit: 0, upper limit: 20), using the *'Intrinsic Value Sample'*. Dependent variable is WTP. Baseline is *'Nature'* (gains, low stake size, low risk) in Model IV(IP) and *'Nature'* (low stake size, low risk) in Models VI(IP) and VII(IP). Standard errors in parentheses. Controls: Economics Student, Loss Aversion Index, Illusion of Control Index, Ambiguity Aversion Index, Compound Lottery Aversion Index, Autonomy, Magical Thinking. Significance levels: $*p \leq 0.10$, $**p \leq 0.05$, $***p \leq 0.01$.

Table C.2: Regression results (with Indifference Probability as control)

	All	Nature	Human Agent (No Info)	Human Agent (Info)	N = HAno	N = HAinfo	HAno = HAinfo
All Rounds	-	61.07	62.21	61.90	0.5009	0.6206	0.8600
					(0.3574)	(0.5319)	(0.7387)
Gains	62.06	61.03	63.78	61.42	0.1639	0.8411	0.2552
					(0.1394)	(0.6161)	(0.3196)
Losses	61.39	61.11	60.65	62.39	0.8029	0.4877	0.3625
					(0.9679)	(0.3980)	(0.5120)
Gains	0.5465	0.9631	0.1213	0.6222	-	-	-
= Losses	(0.2849)	(0.9561)	(0.0160)	(0.5556)			

Notes: The table reports the average indifference probability averaged over all treatments (column 1) and separate per treatment (columns 2 to 4) and p-values of a two-tailed t-test. p-values of a Mann-Whitney test (columns 5 to 7, between treatments) and of a Wilcoxon signed-rank test (Gains = Losses) in parentheses. All tests are performed on the average indifference probability per subject (per block), *'Full Sample'*.

Table C.3: Average Indifference Probabilities between Treatments

Model	III(Ave)	IV(Ave)	V(Ave)	VI(Ave) Gains	VII(Ave) Losses
Human Agent (No Info)	0.41	1.03	-0.02	0.14	2.28**
	(0.93)	(0.87)	(1.08)	(1.04)	(1.07)
Human Agent (Info)	1.73*	2.25**	0.88	1.01	3.81***
	(0.93)	(0.91)	(1.12)	(1.09)	(1.13)
Domain (Losses)	-	-	-2.51***	-	-
			(0.80)		
Human Agent (No Info) x Domain (Losses)	-	-	2.46**	-	-
			(1.14)		
Human Agent (Info) x Domain (Losses)	-	-	3.13***	-	-
			(1.14)		
Order of Blocks (Losses first)	-	1.76**	1.84**	3.11***	0.54
		(0.73)	(0.78)	(0.87)	(0.90)
Female	-	-1.77**	-1.82**	-2.12**	-1.54*
		(0.72)	(0.76)	(0.86)	(0.88)
Illusion of Control	-	0.31	0.31	1.08**	-0.55
		(0.46)	(0.49)	(0.55)	(0.58)
Locus of Control (Internal)	-	1.02**	1.06**	0.60	1.49**
		(0.51)	(0.54)	(0.61)	(0.62)
Locus of Control (External)	-	-1.07**	-1.08**	-1.25**	-0.92
		(0.47)	(0.50)	(0.56)	(0.57)
Intercept	5.48***	3.34	4.17	6.89	-0.74
	(0.65)	(3.66)	(3.92)	(4.39)	(4.49)
Controls	No	Yes	Yes	Yes	Yes
Wald-chi2	3.71	31.01***	39.52***	37.09***	29.06***
n	95	95	190	95	95
Subjects	95	95	95	95	95

Notes: Results from a random-effects tobit panel regression (lower limit: 0, upper limit: 20), using the *'Intrinsic Value Sample'*. Dependent variable is average WTP per subject in Models III(Ave) and IV(Ave), and average WTP per subject per block in Models V(Ave), VI(Ave) and VII(Ave). Baseline is *'Nature'* (gains, low stake size, low risk) in Models III(Ave) and IV(Ave) and *'Nature'* (low stake size, low risk) in Models V(Ave), VI(Ave) and VII(Ave). Standard errors in parentheses. Controls: Economics Student, Loss Aversion Index, Ambiguity Aversion Index, Compound Lottery Aversion Index, Autonomy, Magical Thinking. Significance levels: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Table C.4: Regression results (average intrinsic valuation)

Model	III(Full)	IV(Full)	V(Full)	VI(Full) Gains	VII(Full) Losses
Human Agent (No Info)	0.79	1.84	-0.24	0.07	3.65*
	(2.12)	(2.07)	(2.25)	(2.12)	(2.20)
Human Agent (Info)	2.35	3.34	0.89	0.98	5.66**
	(2.11)	(2.17)	(2.33)	(2.21)	(2.29)
Stake Size (High)	5.25***	5.23***	5.23***	4.28***	6.20***
	(0.74)	(0.74)	(0.74)	(1.07)	(0.99)
Risk (High)	1.54**	1.53**	1.53**	0.59	2.49**
	(0.73)	(0.73)	(0.73)	(1.06)	(0.97)
Domain (Losses)	-1.03	-1.02	-4.17**	-	-
	(0.73)	(0.73)	(1.28)		
Human Agent (No Info) x Domain (Losses)	-	-	4.32**	-	-
			(1.80)		
Human Agent (Info) x Domain (Losses)	-	-	5.01***	-	-
			(1.79)		
Order of Blocks (Losses first)	-	2.52	2.54	4.63***	0.54
		(1.71)	(1.71)	(1.75)	(1.80)
Illusion of Control	-	1.30	1.30	2.46**	-0.34
		(1.11)	(1.11)	(1.12)	(1.20)
Locus of Control (Internal)	-	1.29	1.28	0.69	1.93*
		(1.10)	(1.10)	(1.13)	(1.15)
Intercept	-2.69	-8.06	-6.56	-0.62	-14.90
	(1.65)	(8.73)	(8.75)	(8.97)	(9.19)
Controls	No	Yes	Yes	Yes	Yes
Wald-chi2	57.01***	69.10***	77.67***	39.00***	58.62***
n	856	856	856	428	428
Subjects	107	107	107	107	107

Notes: Results from a random-effects tobit panel regression (lower limit: 0, upper limit: 20). Dependent variable is WTP. Baseline is *'Nature'* (gains, low stake size, low risk) in Models III, IV and V and *'Nature'* (low stake size, low risk) in Models VI and VII. Standard errors in parentheses. Controls: Gender, Economics Student, Loss Aversion Index, Ambiguity Aversion Index, Compound Lottery Aversion Index, Locus of Control (External), Autonomy, Magical Thinking. Significance levels: $^{*}p \leq 0.10$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Table C.5: Main regression results (*'Full Sample'*)

Appendix D

Control Measurements and Questionnaire Items

D.1 Additional Tables

Subjects per treatment	
Nature	36 (2 sessions)
Human Agent (No Info)	35 (2 sessions)
Human Agent (Info)	36 (2 sessions)
Sociodemographic data	
Age (mean)	28
Male	45.79%
Economic students:	27.10%
Control Measurements	
Risk Aversion:	
- Self stated risk attitude (mean, -2: averse, 2: loving)	-0.15
- Holt & Laury risk index: $\overline{R}$ (0.1: averse, 1: loving)	0.48
Loss Aversion:	
- Loss aversion index: $\overline{LA}$ (1: not averse, 7: highly averse)	5.0
Illusion of Control:	
- Dice roll: Computer vs. Self	36.45% vs. 63.55%
- Dice roll Self: WTP = 0	33.82%
- Illusion of Control Index: $\overline{IC}$ (0: no illusion)	0.46
Ambiguity Aversion:	
- Urn 1 (unambiguous lottery)	71.96%
- Urn 2 (ambiguous lottery)	14.02%
- Indifferent	14.02%
- Ambiguity Aversion Index: $\overline{AA}$ (0: no aversion)	0.97
Compound Lottery Aversion:	
- Compound Lottery	54.21%
- Simple Lottery	23.36%
- Indifferent	22.43%
- Compound Lottery Aversion Index: $\overline{CL}$ (0: no aversion)	0.22
Questionnaire Scores (1: no agreement, 6: full agreement)	
Locus of Control Internal (mean)	4.44
Locus of Control External (mean)	3.16
Desirability of Control (mean)	4.37
Autonomy (mean)	4.62
Magical Thinking (mean)	2.60

Table D.1: Summary statistics of control measurements and questionnaire items

Final Score / Attitude	Questionnaire Item	Source
Locus of Control (Internal)	1. I can pretty much determine what will happen in my life.	Levenson (1972, 1974)
	2. My life is determined by my own actions.	Levenson (1972, 1974)
Locus of Control (External)	3. To a great extent my life is controlled by accidental happenings.	Levenson (1972, 1974)
	4. When I get what I want, it's usually because I'm lucky.	Levenson (1972, 1974)
	5. I feel like what happens in my life is mostly determined by powerful people.	Levenson (1972, 1974)
Desirability of Control	6. I enjoy making my own decisions.	Burger, Cooper (1979)
	7. I try to avoid situations where someone else tells me what to do.	Burger, Cooper (1979)
Autonomy	8. I often reflect on why I react the way I do.	Weinstein et al. (2012) - Interest-taking
	9. I prefer a job where I have a lot of control over what I do and when I do it.	Burger, Cooper (1979)
Magical Thinking	10. Numbers like 13 and 7 have no special powers.	Eckblad, Chapman (1983)
	11. Good luck charms don't work.	Eckblad, Chapman (1983)
Excluded	12. I strongly identify with the things that I do.	Weinstein et al. (2012) - Authorship/self-congruence
	13. My whole self stands behind the important decisions I make.	Weinstein et al. (2012) - Authorship/self-congruence
	14. I often pressure myself.	Weinstein et al. (2012) - Susceptibility to control
	15. What we are used to is always preferable to what is unfamiliar.	Budner (1962)

Notes: In the experiment, 15 statements are given on a 6-point Likert scale. The scoring per item is measured from 1 (strongly disagree) to 6 (strongly agree), and for items 10 and 11 from 6 (strongly disagree) to 1 (strongly agree). For the data analysis, based on a factor analysis (principal-component) with oblique promax rotation, items 1 to 11 (column 2) are cumulated to five scores (column 1), largely in accordance with the original scales (column 3). Items 12 to 15 (column 2) are excluded. The final score builds the average scoring points over all respective items, with a higher score indicating a higher accordance with the respective characteristic (1 = no accordance and 6 = full accordance). Questions appear in a slightly different order in the experiment and are asked in German. German translations of Levenson (1974) are taken from Krampen (1979), the remaining questions are based on own translations.

Table D.2: Questionnaire items and scores

D.2 Screen Instructions Hypothetical Scenarios

D.2.1 Illusion of Control

Please assume that you can participate in a lottery.

With a probability of 50% you can win 10 Euro in this lottery. With a probability of 50% you win nothing, thus 0 Euro. The outcome of the lottery is determined by the roll of a dice. If an even number (2, 4 or 6) is thrown, you will receive 10 Euro. If an odd number is rolled (1, 3 or 5), you receive 0 Euro.

1. Please indicate (purely hypothetically) which of the two options you prefer:
   - Option 1: *Let the computer throw the dice.*
   - Option 2: *Let me throw the dice myself.*
2. Without knowing the outcome of the lottery: How many Euro would you be willing to pay in advance to roll the dice yourself?
   Please enter an amount in Euro between 0 and 5 Euro. There are 10 cent steps possible.

D.2.2 Ambiguity Aversion

Imagine two urns. Urn 1 contains 50 white balls and 50 black balls. Urn 2 contains 100 white and black balls, whereas the composition of the balls is unknown. A ball is drawn. If this ball is white, the prize is 15 Euro. If this ball is black, the prize is 0 Euro.

1. If you had to choose an urn from which to draw the ball, which urn would it be?
   Urn 1, Urn 2, Indifferent
2. How many Euros would you be willing to pay to participate in a drawing from Urn 1 (you have the chance to win 15 Euro)?
   Please enter an amount in Euro between 0 and 15 Euro. There are 50 cent steps possible.
3. How many Euros would you be willing to pay to participate in a drawing from Urn 2 (you have the chance to win 15 Euro)?
   Please enter an amount in Euro between 0 and 15 Euro. There are 50 cent steps possible.

D.2.3 Compound Lottery Aversion

Imagine an urn filled with 50 red balls, 25 blue balls and 25 green balls. Imagine also the following two lotteries:

Lottery 1: Lottery 1 is composed of 2 drawings. If a blue or green ball is drawn in the first draw, the prize is 5 Euro, if a red ball is drawn, the prize is 0 Euro. Then, the drawn ball is put back into the urn and a second draw takes place. If a blue or green ball is drawn in the second draw, there is a loss of 5 Euro, if a red ball is drawn, there is a loss of 0 Euro. The payout from Lottery 1 is composed of Draw 1 and 2.

Lottery 2: Lottery 2 consists of only one draw. If a red ball is drawn, the win is 0 Euro, if a blue ball is drawn, the win is 5 Euro and if a green ball is drawn, there is a loss of 5 Euro.

1. Please indicate (purely hypothetically) how much you would like to play the two lotteries:
   - Lottery 1: *very much, much, neutral, not so much, not at all*
   - Lottery 2: *very much, much, neutral, not so much, not at all*
2. If you had to choose one of the two lotteries, which lottery would you choose?
   Lottery 1, Lottery 2, Indifferent

Appendix E

Instructions

E.1 Part 1

General Explanation for the Participants

Welcome to the experiment and thank you for your participation. You can earn money in this experiment if you read the instructions carefully and follow all of the rules. The money will be paid out to you immediately after the conclusion of the experiment. Throughout the entire experiment we will speak of points rather than Euros. These points will be converted according to the following exchange rate:

100 points = 5.00 Euro

Talking with other participants is not allowed throughout the entire experiment. If you have questions, please direct them at us. We will gladly answer your questions individually. Following this rule is very important. Otherwise the results of this experiment will have no scientific value.
Please take enough time to read the explanations and make your decisions. You cannot change the length of the experiment by making quick decisions, since you will always have to wait for the rest of the participants. This experiment consists of 4 parts, and each part will be explained one after the other. In each of the 4 parts of the experiment you can earn money. You receive 5 Euros as fixed payment. Depending on your decisions you can earn up to an additional 45 Euros. You will be paid individually and privately in cash after the experiment. The experiment is expected to take 120 minutes. The following will now explain the first part of the experiment.

Detailed Information for Part 1 of the Experiment

In the first part of the experiment we ask you to choose between two options, A or B, for each of 10 different situations. That means you have to choose between option A and option B a total of 10 times. Option A is always an ensured payment at a definite amount. Option B is always the same lottery. The table below shows the 10 situations and the choices for options A and B in each situation. The table will be shown to you either as it is below or in reverse order. How the table is presented to you is determined randomly.

Option A	Choice	Option B
12.5 sure.	A B	with 5/10: 125 ; with 5/10: 0
25 sure.	A B	with 5/10: 125 ; with 5/10: 0
37.5 sure.	A B	with 5/10: 125 ; with 5/10: 0
50 sure.	A B	with 5/10: 125 ; with 5/10: 0
62.5 sure.	A B	with 5/10: 125 ; with 5/10: 0
75 sure.	A B	with 5/10: 125 ; with 5/10: 0
87.5 sure.	A B	with 5/10: 125 ; with 5/10: 0
100 sure.	A B	with 5/10: 125 ; with 5/10: 0
112.5 sure.	A B	with 5/10: 125 ; with 5/10: 0
125 sure.	A B	with 5/10: 125 ; with 5/10: 0

OK

Example:

Option A in the 9th row reads: 112.5 points ensured. Option B in the 9th row reads: with 5/10: 125 points and with 5/10: 0 points. If you choose option A in the 9th row, then you are ensured to receive a payment of 112.5 points. If you choose option B in the 9th row, then you have a 5 out of 10 (50%) chance of receiving a payment of 125 points and a 5 out of 10 (50%) chance of receiving a payment of 0 points.

We ask you to choose between options A and B in each of the following 10 situations. Please compare between options A and B in each row and make your decision for each row by clicking A or B.

Payment Calculation from Part 1:

Your payment for this part of the experiment will be determined as follows: The computer randomly chooses 1 situation from the 10. Your decision in this situation is relevant for your payment. If for example you chose option B in row 2, then the lottery will be played, whereby you have a 5 out of 10 (50%) chance of receiving a payment of 125 points and a 5 out of 10 (50%) chance of receiving a payment of 0 points. You can imagine the playing of this lottery using an urn filled with 5 white and 5 black marbles. If a blindfolded person reaches into the urn and pulls out a white marble, then you receive a payment of 125 points. If the marble is black, then you receive 0 points. In the experiment 'pulling out a marble' is automated and executed through a computer.

The points will be converted according to the following exchange rate:
1 Point = 0.05 Euro (100 Points = 5 Euro).

If you now have any questions, please raise your hand. Someone will come to you in order to answer your questions. If you don't have any questions, then you can now start making choices on your screen.

E.2 Part 2

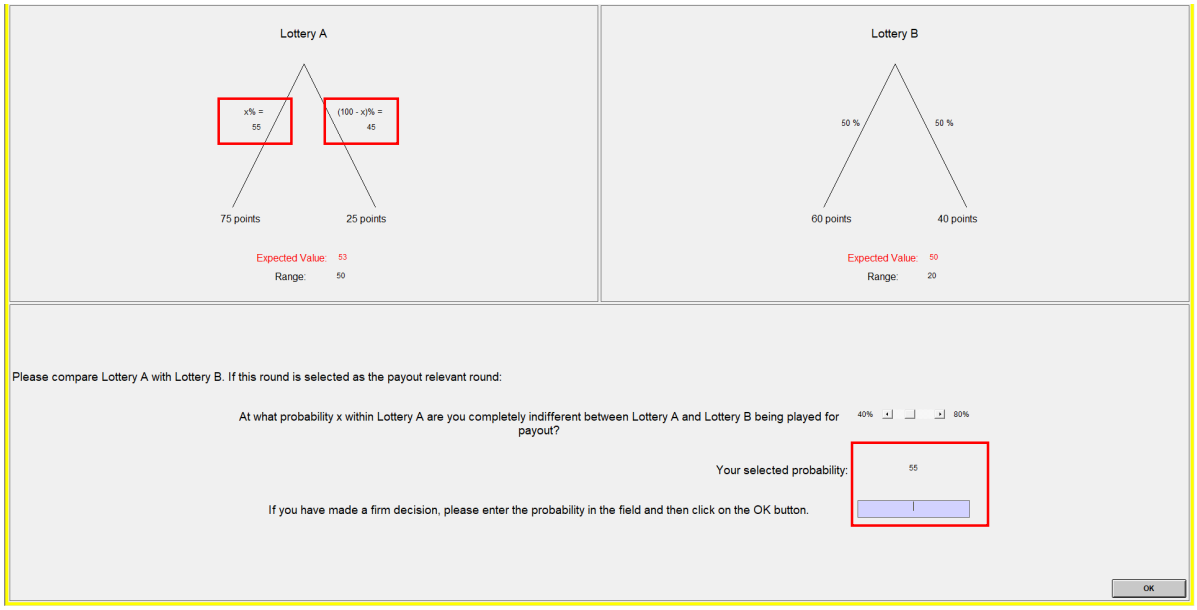
Thank you. The first part of the experiment is finished. In the second part of the experiment you can earn money again. The second part of the experiment has no effect on your payment from the first part of the experiment.

The second part of the experiment consists of 8 rounds that are divided into 2 blocks. Each of the two blocks consists of 4 rounds.

In each of the 8 rounds you will see two lotteries, Lottery A and Lottery B. The lotteries differ from each other as well as from round to round. Each of the two lotteries consists of two payments, each of which is possible with a certain probability. In Lottery B, payment 1 always has the possibility of 50% probability, and payment 2 has the corresponding probability of 50%. In Lottery A, the probabilities for payment 1 and payment 2 are unknown.

We ask you to compare Lottery A with Lottery B. Please tell us which probability both payments in Lottery A must have in order for you to be completely indifferent between Lottery A and Lottery B being played for payout.

The following is an example of one round in Block 1 and an example of one round from Block 2.



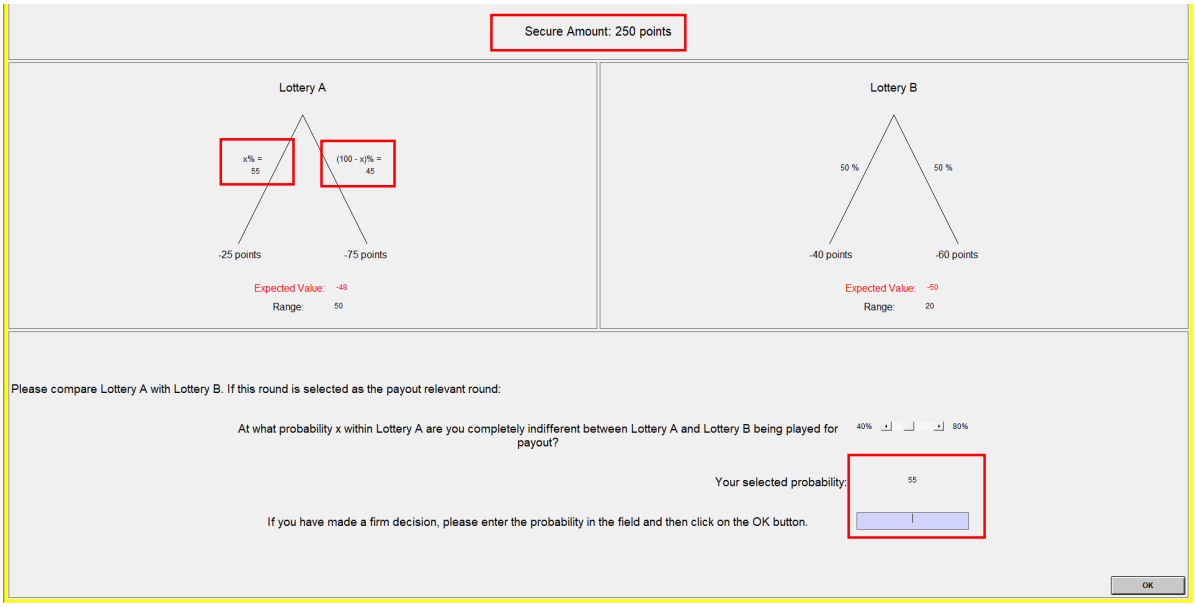
Example:

In Lottery B (right) you will receive a payment of 60 points with the probability of 50% or a payment of 40 points with the probability of 50%. In Lottery A (left) you will receive either a payment of 75 points with a probability of x% or a payment of 25 points with a corresponding probability of (100 – x)%.

- The expected value shows how high the average payment of a lottery is. This value depends on the probabilities as well as on the payments of the respective lotteries. The expected value itself however is not a possible payment from the lottery. It shows which payment is to be expected on average if many people were to play the game. In Lottery A, the expected value is 53 points at a probability of x=55%. In Lottery B, the expected value is 50 points. Both expected values are shown in red.

- The range shows additionally how wide the gap is between highest and lowest payment within a lottery. In Lottery A, the gap or range between the payment of 75 points and the payment of 25 points is 50 points. In Lottery B, the range between 60 points and 40 points is 20 points. The higher the lottery's range is, the higher that lottery's risk is.

By moving the slider, the probabilities within Lottery A change as well as the expected value of Lottery A. Please use the slider to indicate the probability x that means you are completely indifferent between Lottery A and Lottery B being played for payout, and then enter the probability in the box blow. That is, the probability at which you would prefer neither Lottery A nor Lottery B and find both lotteries equally appealing. This probability must be at least 40% and no more than 80%.



Example:

You receive an ensured amount of 250 points. Additionally, one of the two lotteries will be played. In both lotteries each payment will be subtracted from the ensured amount. In Lottery B (right) the amount of 40 points will be subtracted from your ensured amount with a probability of 50%, or else the amount of 60 points will be subtracted with a probability of 50%. The expected value (in red) in Lottery B is -50 points. That means on average 50 points will be subtracted from the ensured amount. The range in Lottery B is 20 points. In Lottery A (left) either the amount of 25 points with the probability of x% will be subtracted from your ensured amount, or the amount of 75 points with the probability of (100 – x)% will be subtracted. The expected value (in red) in Lottery A has a probability of x=55% -48 points. The range of Lottery A is 50 points.

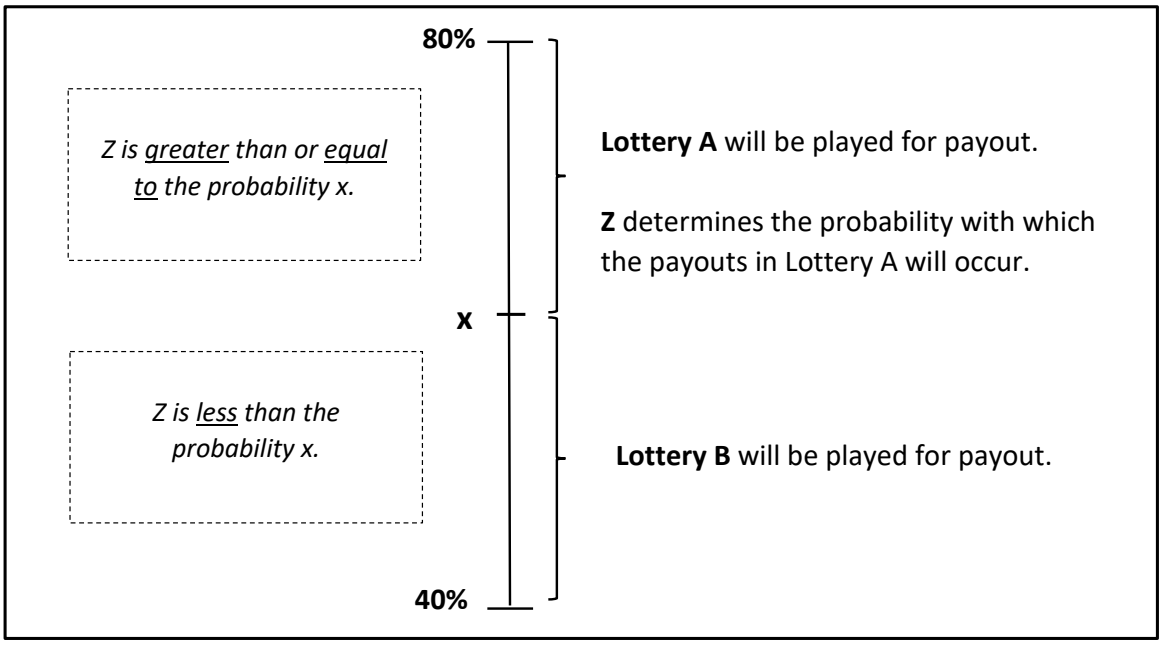
By moving the slider, the probabilities within Lottery A change as well as the expected value of Lottery A. Please use the slider to indicate the probability x that means you are completely indifferent between Lottery A and Lottery B being played for payout, and then enter the probability in the box blow. That is, the probability at which you would prefer neither Lottery A nor Lottery B and find both lotteries equally appealing. This probability must be at least 40% and no more than 80%.

Payment Calculation from Part 2:

Your payment from this part will be determined as follows:

The computer randomly selects 2 out of the 8 rounds: one round from Block 1 and one round from Block 2. Additionally, the computer randomly and individually selects a number Z between 40 and 80 for each of the two rounds. Each number in the interval between 40 and 80 can be chosen with the same probability. In order to determine whether Lottery A or Lottery B will be play and paid out, the randomly selected number Z will be compared with the probability x that you specified for this round:

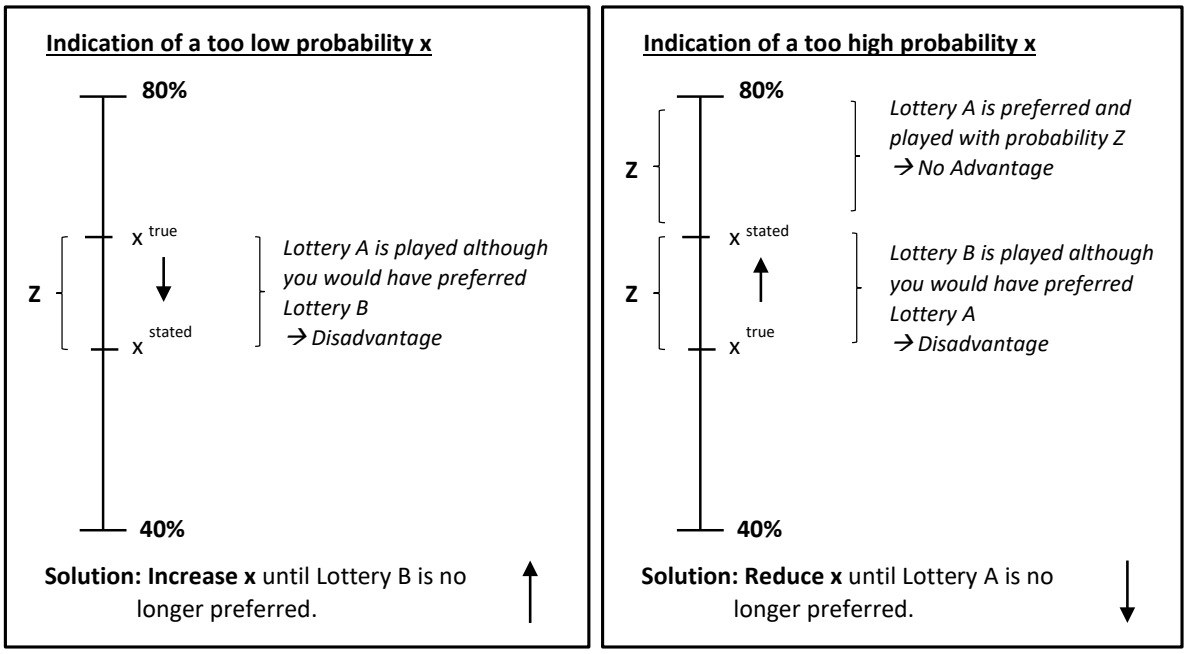
- If the number Z is less than the probability x you specified, Lottery B will be played for payout.
- If the number Z is greater than or equal to the probability x you specified, Lottery A will be played for payout. The number Z then also determines the probability with that you will receive the payouts in Lottery A.



This mechanism ensures that specifying an untrue probability x is of no advantage to you and may even have disadvantages. So, in each round, carefully check the probability that the payouts within Lottery A must be made, so that you do not have a preference for whether Lottery A or Lottery B is played.

You should proceed as follows:
Suppose that you are considering specifying a probability of x = 50%. You should ask yourself whether you would prefer one of the two lotteries in this case:

- If you preferred Lottery B, then you should increase the probability x until you do not prefer either of the two lotteries being played. At that exact point the following statement would apply: The probability of payout in Lottery A must be at least x so that I no longer prefer Lottery B. Specifying a probability that is too low creates a disadvantage because it could happen that Lottery A is played even though you would have preferred Lottery B.
- If you preferred Lottery A, you should reduce the probability x until you do not prefer either of the two lotteries being played. At that exact point the following statement would apply: The probability of payout in Lottery A must be at least x so that I no longer prefer Lottery A. Specifying a too high probability puts you at a disadvantage, because it could be the case that lottery B is played out although you would have preferred lottery A. Also, specifying a too high probability does not give you an advantage, because if Lottery A is played, the randomly selected number Z determines the probability of payouts in Lottery A. In this case, Z is always greater than or equal to probability x anyway.



With the probability x you should neither prefer Lottery A nor Lottery B.

Example:

If the round from Figure x is selected as relevant for payment and a probability of x = 55% has been specified, the following two situations can occur:

1. The computer randomly selects a number Z that is less than 55: Lottery B is played for payout. In Lottery B, you get a payout of 60 points with a 50% probability or a payout of 40 points with a 50% probability, as shown in Figure x.
2. The computer randomly selects a number Z that is greater than or equal to 55: Lottery A is played for payout. For example, if Z is 60, you get a payout of 75 points with a 60% probability (since Z = 60) or a payout of 25 points with the opposite probability of 40%.

Your total payout in this part of the experiment is determined as follows:

Payment from the relevant Lottery A or Lottery B from the randomly selected round in Block 1
+
Secure amount of 250 points minus payment from the relevant Lottery A or Lottery B from the randomly selected round in Block 2

The payout-relevant lottery is automated and carried out by the computer.

The points will be converted according to the following exchange rate:
1 Point = 0.05 Euro (100 Points = 5 Euro).

If you now have any questions, please raise your hand. Someone will come to you in order to answer your questions. If you don't have any questions, then you can now start making choices on your screen.

Control Questions

1. Assume that the probability x is x = 40%. Which statement about lottery A is true?
[The probability for 75 points is 40%. The probability for 25 points is 60%.]

2. Assume you specify a probability of x = 40%. Suppose this round is selected as payout relevant and the computer draws a number Z = 50. Which statement is true?
[Lottery A is played out for payout, as follows: The probability for 75 points is 50%. The probability for 25 points is 50%.]

3. Assume you specify a probability of x = 55%. Suppose this round is selected as payout relevant and the computer draws a number Z = 45. Which statement is true?
[Lottery B is played out for payout.]

4. How is your payout determined from this part of the experiment?
[The computer randomly selects one round from block 1 and one round from block 2. The payout is equal to the winnings from the payout relevant lottery A or lottery B per round.]

E.3 Part 3 [Treatment 'Human Agent (Info)']

Thank you. The second part of the experiment is over. In the third part of the experiment you can earn money again. The third part of the experiment has no effect on your payout from the first two parts of the experiment.

The third part of the experiment consists of 10 rounds, which are divided into 2 blocks. Each block contains 5 rounds.

For the duration of a block, an "other participant" will be randomly assigned to you. You will also be randomly assigned to an "other participant", whereby you will not be assigned to the participant who was assigned to you. In each of the two blocks, the "other participant" remains anonymous like you. The function of each "other participant" is explained in more detail below.

In each of the 10 rounds you will see two lotteries, Lottery A and Lottery B. The lotteries differ from each other and from round to round. In each of the 10 rounds you will have the opportunity to buy a decision right. This decision right gives you for the respective round the possibility to decide yourself between the two lotteries A and B. If you have bought the decision right for a round, you can decide yourself whether Lottery A or Lottery B should be played for payout. If you have not bought the decision right for a round, the "other participant" decides whether Lottery A or Lottery B will be played for you for payment.

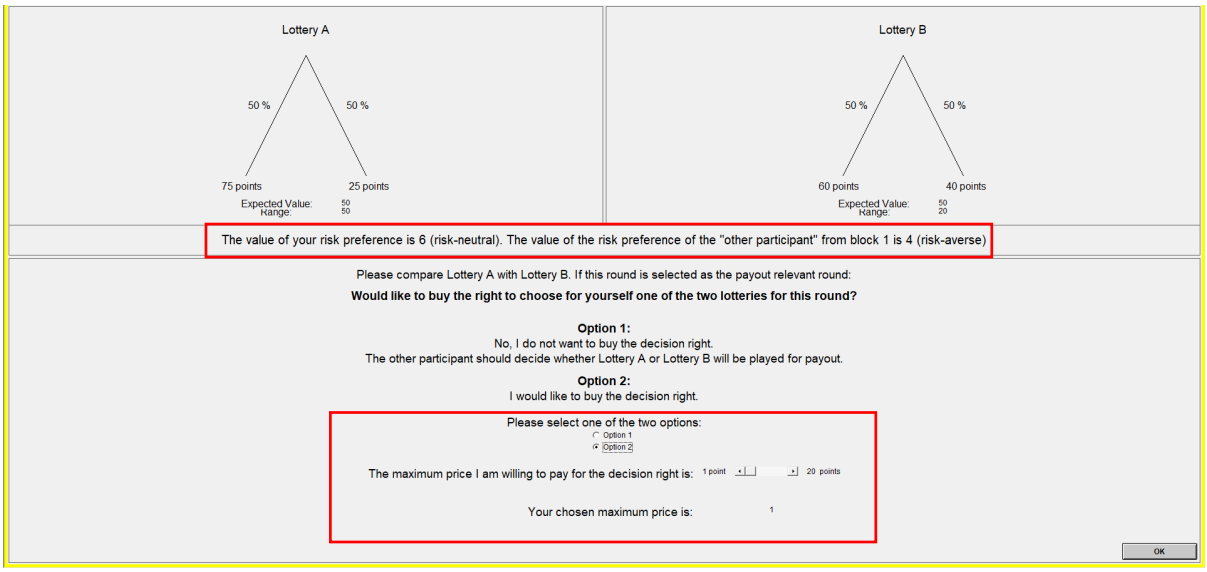
On the basis of part 1 of the experiment, your risk preference and the risk preference of the "other participant" could be determined (note: in each of the 2 blocks a different "other participant" is randomly assigned to you). The risk preference can be measured on a scale from 0 to 10, whereby

- 0 means that a participant greatly detests the risk.
- 6 means that a participant is neutral about the risk.
- 10 means that a participant loves risk very much.

That means the higher the value of the risk preference, the more a participant loves the risk. Conversely, the lower the value of the risk preference, the more the participant detests the risk.

We ask you to compare Lottery A with Lottery B and state whether you would like to buy the right to choose for yourself one of the two lotteries for the round.

The following is an example of a round from Block 1 and an example of a round from Block 2.

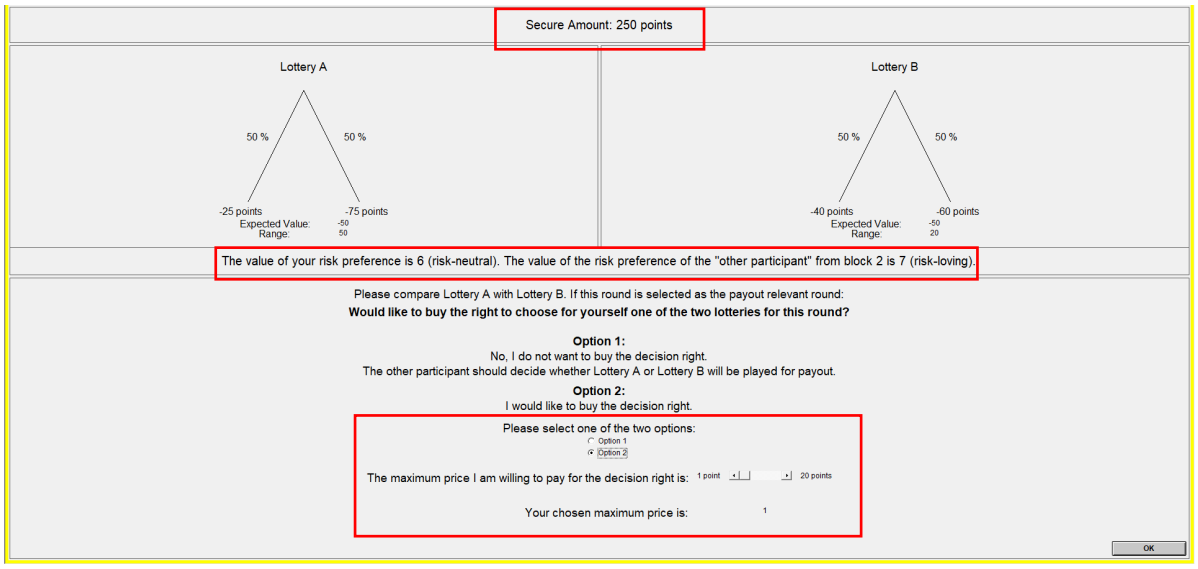


Example:

In Lottery A, you have a 50% probability of getting 75 points or a 50% chance of getting 25 points. The expected value in Lottery A is 50 points. The range in Lottery A is 50 points. Lottery B gives you a 50% probability of being paid 60 points or a 50% probability of 40 points. The expected value in Lottery B is 50 points. The range in Lottery B is 20 points. In this example, the value of your risk preference is 6 (risk-neutral). The value of the risk preference of the "other participant" from block 1 is 4 (risk-averse). You can now specify whether you want to buy the decision right for this round. You have 2 options:

Option 1: You do not want to buy the decision right. If this round is selected as a payout-relevant round, the "other participant" decides whether Lottery A or Lottery B will be played out for you. The decision of the "other participant" only has consequences for you, but not for the "other participant" herself. If you do not want to buy the decision right, select "Option 1" and then click the OK button.

Option 2: You want to buy the decision right. If you want to buy the decision right, choose "Option 2". Please use the slider to indicate the price in points between "1" and "20" that you are willing to pay for the decision right. If you have made a firm decision, click on the OK button. If this round is selected as a payment-relevant round, the decision right gives you the opportunity to decide yourself which of the two lotteries will be played for payout.



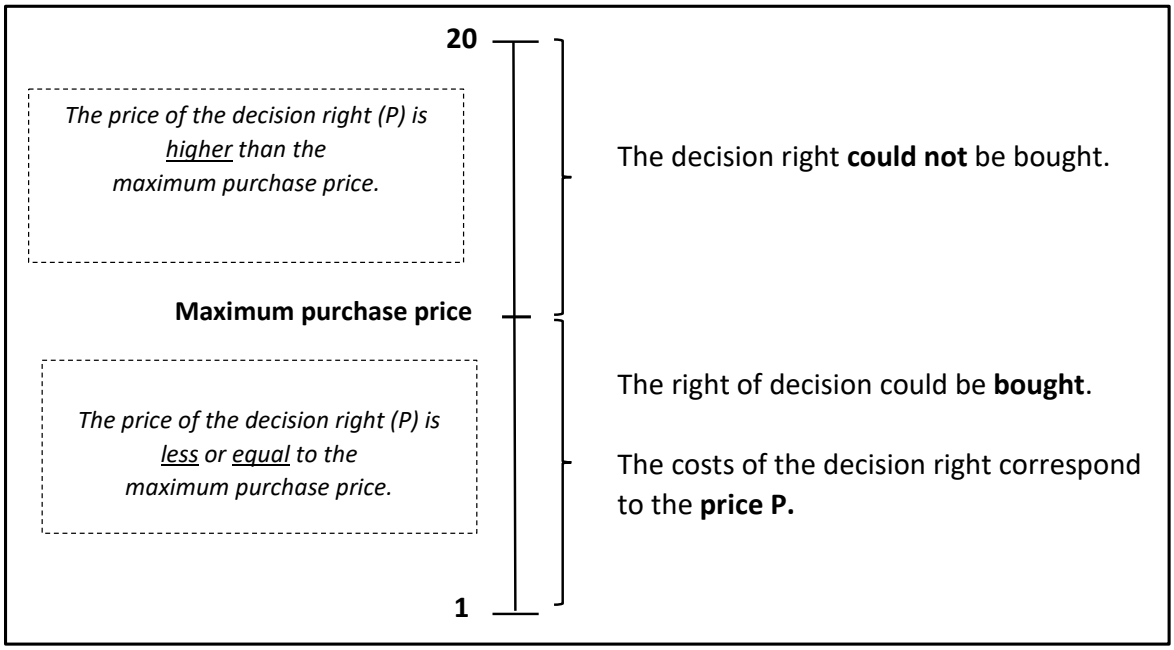
Example:

You will receive an ensured amount of 250 points. Additionally, one of the two lotteries will be played. In both lotteries, the respective payout is deducted from the safe amount. In Lottery A, an amount of 25 points will be deducted from your ensured amount with a 50% probability or an amount of 75 points with a 50% probability. The expected value in Lottery A is -50 points. The range in Lottery A is 50 points. Lottery B has a 50% probability that an amount of 40 points will be deducted from your ensured amount or a 50% probability that an amount of 60 points will be deducted. The expected value in Lottery B is -50 points. The range in Lottery B is 20 points. In this example like before, the value of your risk preference is 6 (risk-neutral). The value of the risk preference of the "other participant" from block 2 is 7 (risk-loving). You can now specify whether you want to buy the decision right for this round. You have the same 2 options as described above.

Purchase of the Decision Right

At the end of the 10 rounds, the computer randomly selects two rounds from the 10 rounds. A round from Block 1 and a round from Block 2. In addition, the computer randomly and individually selects a number P between 1 and 20 for each of the two rounds. Any number in the interval between 1 and 20 can be drawn with the same probability. This number P represents the price of the decision right in points in this round and is compared to your maximum purchase price:

- If your maximum purchase price is less than the price of the decision right, the decision right could not be bought.
- If your maximum purchase price is equal to or higher than the price of the decision right, then you have bought the decision right. The costs of the decision right correspond to the price of the decision right, i.e. the number P. The costs of the decision right are deducted from the profit from the payout-relevant lottery in this round.



For example, if you have specified a maximum purchase price of 17 points for a round, the following situations can occur:

- The computer randomly selects a number P equal to 18:
  Since the price of the decision right (18 points) is higher than your maximum purchase price (17 points), the decision right could not be bought.
- The computer randomly selects a number P equal to 10:
  Since the price of the decision right (10 points) is lower than your maximum purchase price (17 points), the decision right could be bought. The cost of the decision right is 10 points.

This mechanism ensures that it is of no advantage to you, and possibly even disadvantageous, to state an untrue maximum purchase price. So carefully check which maximum price you are willing to pay in each round.

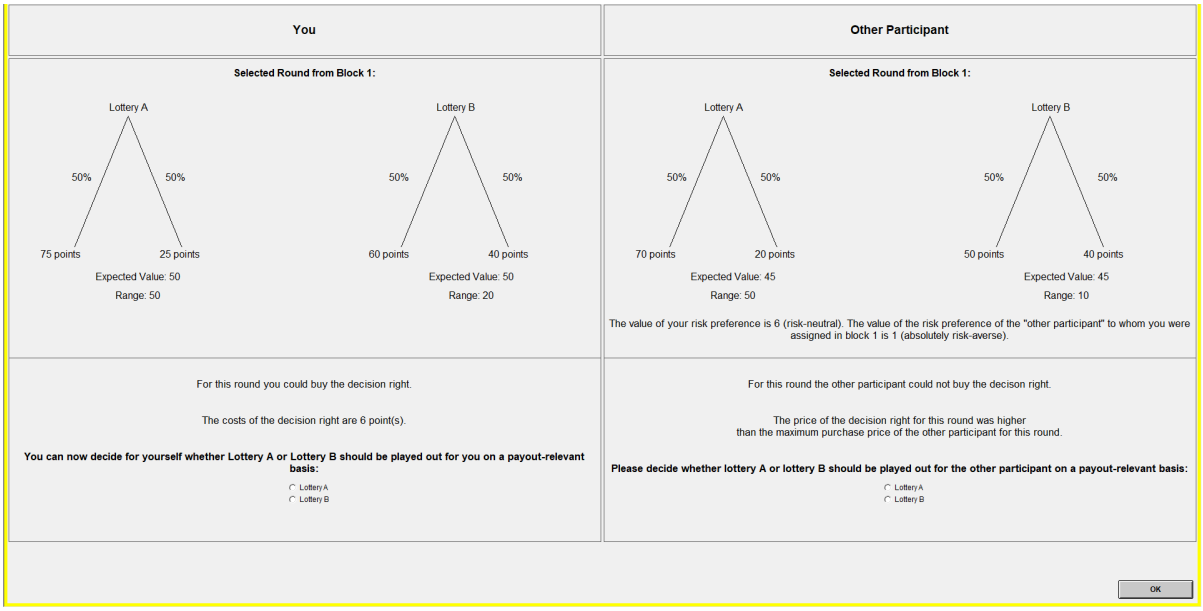
Execution of the Decision Right

At the end of the 10 rounds, you will be individually presented with the two rounds that the computer selected at random:

- If you were able to buy the decision right for this round, you can now decide yourself whether Lottery A or Lottery B should be played for payout. In addition, you will be informed of the costs of the decision right, which will be deducted from the winnings from the payout-relevant lottery.
- If you could not or did not want to buy the decision right for this round, the "other participant" decides whether Lottery A or Lottery B will be played for payout for you. This decision has no payout-relevant consequences for the "other participant". You will then be informed immediately about how the "other participant" decided and which of the two lotteries will be played for payout for you.

Additionally, you will be presented with the round that the computer randomly selected for the "other participant" to whom you were randomly assigned at the beginning of the experiment for the respective block. The randomly selected round of the respective "other participant" as well as lotteries A and B can differ from yours:

- If the "other participant" was able to buy the decision right for the round chosen for her, the "other participant" decides which of the two lotteries should be played for payout for her.
- If the "other participant" could not or did not want to buy the decision right for the round chosen for her, you decide whether Lottery A or Lottery B should be played for payout for the "other participant". This decision has no payout-relevant consequences for you.



Example:

For Block 1, the computer randomly selected a round for you and, independently of this, randomly selected a round for the "other participant" to whom you were randomly assigned at the beginning of the experiment.

You (left side of the screen): In this example, the decision right could be bought. The cost in this example is 6 points. You can now decide whether Lottery A or Lottery B should be played for payout.

"Other participant" (right side of the screen): In this example, the "other participant" could not buy the decision right, because the maximum purchase price of the "other participant" for this round was below the price of the decision right. In this example, the value of your risk preference is again 6 (risk-neutral). The value of the risk preference of the "other participant" to whom you were assigned in Block 1 is 1 (absolutely risk-averse). In this case, you decide whether Lottery A or Lottery B should be played out for payout for the "other participant". This decision has no payout-relevant consequences for you.

Calculating the Payout from Part 3:

Your payout in this part of the experiment is made up as follows:

Payout from the played Lottery A or Lottery B from a randomly selected round from Block 1
- (If applicable) costs of the decision right from this round
+
Secure amount of 250 points minus payment from the played Lottery A or Lottery B from a randomly selected round from Block 2
- (If applicable) costs of the decision right from this round

The payout-relevant lottery is automated and carried out by the computer.

The points will be converted according to the following exchange rate:
1 Point = 0.05 Euro (100 Points = 5 Euro).

If you now have any questions, please raise your hand. Someone will come to you in order to answer your questions. If you don't have any questions, then you can now start making choices on your screen.

Control Questions

1. Assume you state a price of 15 points for the decision right. Which of the following statements should then be true?
[If the price of the decision right is lower than or equal to 15 points, I want to buy the decision right.]

2. Assume you specify a maximum purchase price of 15 points. Assume this round is selected as a payout relevant round and the computer draws a number P = 10 for this round. Which statement is true?
[The decision right has been purchased for this round. The cost of the decision right is 10 points.]

3. Assume this round is selected as payout relevant. Suppose you bought the decision right at a price of 10 points and you choose lottery A. How is your payout from this round calculated?
[You will receive a payout of 75 points with 50% probability or a payout of 25 points with 50% probability. From this, 10 points are deducted for buying the decision right.]

4. The "other participant" who is randomly assigned to you has bought the decision right. Which of the following statements is true?
[The "other participant" decides for herself whether lottery A or lottery B is played out relevant to payout for the "other participant".]

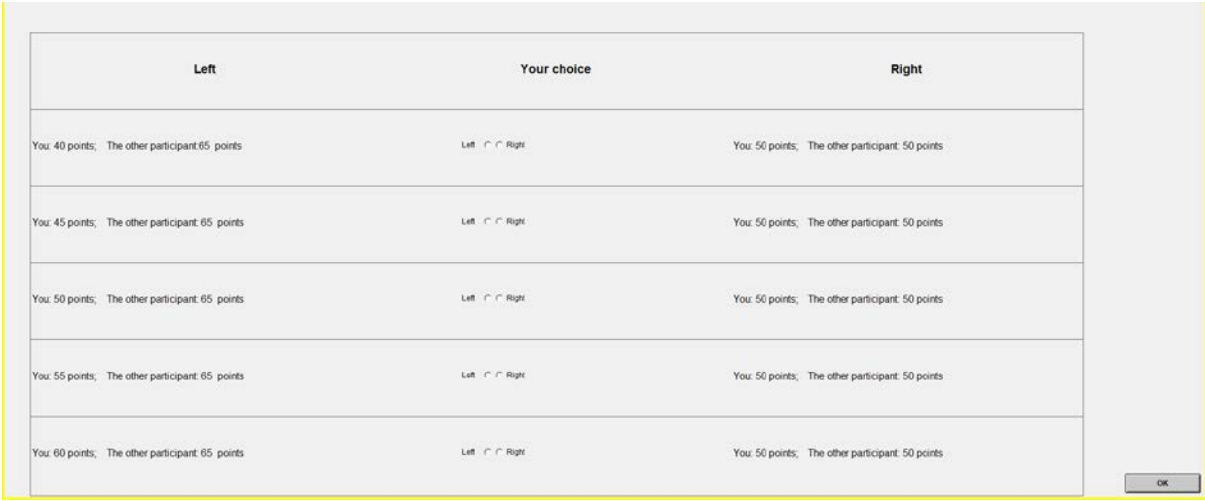
E.4 Part 4

Thank you. The first, second and third part of the experiment are over. We ask you to participate in the fourth part of the experiment. In this part you can earn money again. The fourth part of the experiment has no effect on your payout from the first three parts of the experiment.

Part 1

In the fourth part of the experiment we would first like to ask you to make 10 decisions. In each of these 10 decisions you form a group of 2 with an "other participant". The "other participant" remains anonymous like you. In each of the 10 decisions, the "other participant" is chosen randomly.

In the decisions you as an "active decision maker" must always decide between left and right, whereby the options left and right are always connected with a payout for yourself and a payout for the "other participant". The following is an example of the first five decisions in the figure below.



Left	Your choice	Right
You: 40 points; The other participant:65 points	Left Right	You: 50 points; The other participant: 50 points
You: 45 points; The other participant: 65 points	Left Right	You: 50 points; The other participant: 50 points
You: 50 points; The other participant: 65 points	Left Right	You: 50 points; The other participant: 50 points
You: 55 points; The other participant: 65 points	Left Right	You: 50 points; The other participant: 50 points
You: 60 points; The other participant: 65 points	Left Right	You: 50 points; The other participant: 50 points

OK

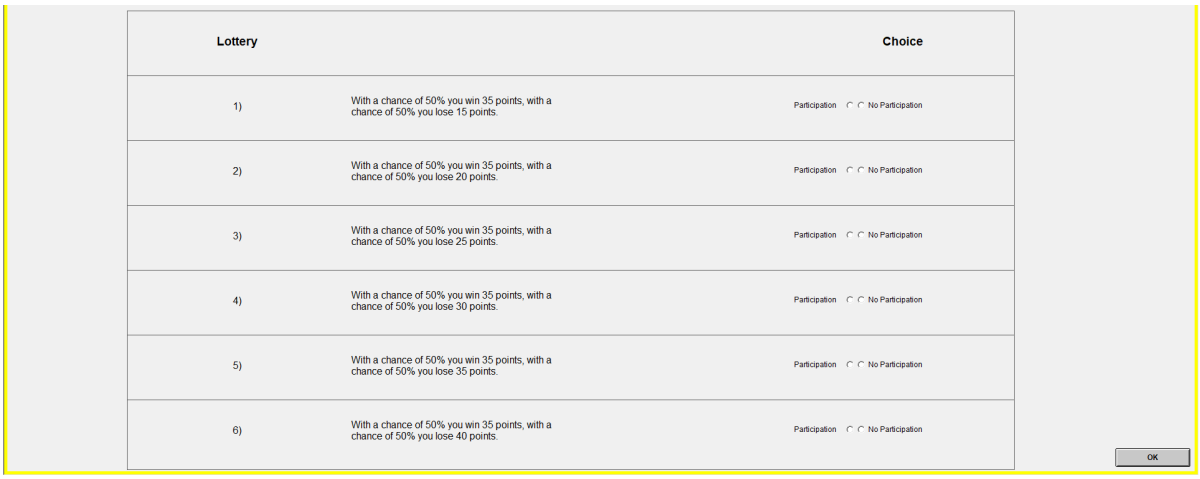
Example:

The option Left in the second line is: You 45 points, the "other participant" 65 points. The option Right in the second row is: You 50 points, the "other participant" 50 points. This means that if, for example, you select Left in the second row and this situation is randomly drawn as relevant to the payout, you will receive a payout of 45 points and the "other participant" will receive a payout of 65 points.

In the following, we ask you to choose for each of the 10 situations between the options Left and Right, which are presented in two blocks of 5 situations. Compare the option Left and Right row by row and choose each row by clicking Left or Right.

Part 2

After you have made the 10 decisions, you have the option to take part in 6 different lotteries. In Part 2 of the experiment, your decisions are only relevant for yourself. The 6 lotteries are shown in the figure below.



Lottery		Choice
1)	With a chance of 50% you win 35 points, with a chance of 50% you lose 15 points.	Participation No Participation
2)	With a chance of 50% you win 35 points, with a chance of 50% you lose 20 points.	Participation No Participation
3)	With a chance of 50% you win 35 points, with a chance of 50% you lose 25 points.	Participation No Participation
4)	With a chance of 50% you win 35 points, with a chance of 50% you lose 30 points.	Participation No Participation
5)	With a chance of 50% you win 35 points, with a chance of 50% you lose 35 points.	Participation No Participation
6)	With a chance of 50% you win 35 points, with a chance of 50% you lose 40 points.	Participation No Participation

OK

Example:

In Lottery 2 you have a 50% chance of winning 35 points and a 50% chance of losing 20 points.

We ask you to decide for each of the 6 lotteries whether you want to participate in the lottery or not.

Payment Calculation from Part 4:

Your total payment from this part of the experiment results from Part 1 and Part 2:

Part 1:

Your payout from this part of the experiment results from two partial payouts:

Payout as "active decision maker": At the end of the 4th part of the experiment, one of the 10 decision situations is randomly selected. For this decision situation, your left-right selection determines the payout for yourself as well as for the other participant assigned to you. According to the example in Figure 1 you would receive 45 points and the other participant 65 points.

Payout as "other participant": Following the same procedure, another participant in the experiment uses her left-right decisions to determine how high your payout as randomly assigned other participant is, without you being able to influence it yourself. However, it is ensured that there is no decision-making situation in which you and the other participant in the experiment are both "active decision-makers" and "other participants".

Part 2:

At the end of the fourth part of the experiment, one of the 6 lotteries is selected at random. If you have decided to participate in this lottery, the payout-relevant lottery will be played. The payout-relevant lottery is automated and carried out by the computer. If you win, your payout will be added to the payout of Part 1. If you lose, the loss will be deducted from the payout of Part 1. If you have decided against participating in this lottery, your payout from Part 4 of the experiment will only be that of Part 1.

The points will be converted according to the following exchange rate:
1 Point = 0.05 Euro (100 Points = 5 Euro).

After all participants have completed Part 1 and Part 2, there will be 3 hypothetical situations that follow, for each of which we ask you to answer 2 to 3 short questions. These are hypothetical answers that are not relevant to your payout. Nevertheless, we would like to ask you to answer these questions as truthfully and carefully as possible.

You will then be informed about the payouts from all four parts of the experiment and your total payout. This is followed by a short questionnaire. Then the payout is made in cash.

If you still have questions, please raise your hand. Someone will come to you to answer your question. If you have no further questions, you can now choose the various options left and right on the screen.

Thank you for your participation.