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LOSS AVERSION IN DECISIONS MADE FOR OTHERS VERSUS DECISIONS MADE FOR ONESELF

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Human beings display greater sensitivity towards losses than to gains on a variety of occasions. While this phenomenon, labeled as loss aversion, has been widely observed by many researchers, most of the existing studies are concerned with subjects making decisions for themselves. This study aims to examine whether loss aversion is reduced in a framework under which decisions are made by others so that the decision-maker is not bearing the consequences of his actions. A total of 131 responses from a within-subjects experiment were analyzed, in which participants had to make decisions both for themselves and for others. Overall, while moderate loss aversion was observed in both decision stages, the magnitude of which was comparable and not significantly different from each other. The results suggest that letting others than the consequence-bearer to make decisions is not effective at combatting loss aversion.

I. INTRODUCTION

The Expected Utility Theory (EUT), together with its rationality axioms formulated by John von Neumann & Oskar Morgenstern (1944), has made great contributions in the fields of decision-making theory under risk and uncertainty and still serves as a normative framework, according to which rational decision-makers should act (Tversky, 1975; Brooks & Egan, 2012). However, there are many circumstances in which the rationality axioms are systematically violated (Holt, 1986; Kahneman & Tversky, 1979; Tversky & Kahneman, 1986; 1992). In fact, while EUT might be the model that describes how people should act, it is often not helpful in predicting and fitting actual human behavior (Rabin, 2000). It is widely accepted that Prospect Theory, originally developed by Kahneman & Tversky (1979) and later added by a rank-dependent component (Tversky & Kahneman, 1992), serves as a better descriptive framework for human decision-making in an economic context (Levy, 1992; Brooks & Egan, 2012).

Prospect Theory entails two major breakaways from EUT. Firstly, it has been shown that the majority of human decision-makers suffers from probability weighting, meaning that probabilities are evaluated by decision-makers in a nonlinear way that does not resemble the true nature of chance (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992; Wu & Gonzalez, 1996; Gonzalez & Wu, 1999; Abdellaoui, 2000; Bleichrodt & Pinto, 2000). All these studies have confirmed the anomaly that small probabilities are mentally overweighted, while medium and large probabilities are underweighted. The fact that objective probabilities are furnished with subjective weights results in phenomenons such as the Certainty Effect (Tversky & Kahneman, 1992; Prelec, 1998). To put these observations into a

probability weighting function, this function would take an inverse-S-shaped course compared to the linear diagonal that would represent true probabilities as under EUT.

Furthermore, in a series of experiments, Kahneman & Tversky (1979) have shown that utility is derived from changes relative to a reference point rather than from the overall level of wealth, as implied by EUT. The authors concluded that "carriers of utility are changes of wealth, rather than final asset positions that include current wealth" (Kahneman & Tversky, 1979, pp. 273). The fact that utility is reference-dependent and defined through changes has been widely replicated and accepted by scholars (Tversky & Kahneman, 1991; Hardie, Johnson, & Fader, 1993; Kőszegi & Rabin, 2006; Wakker, 2010b), even by those who are critical to the limitations of Prospect Theory[1] (Sugden, 2003). Unlike EUT, under which the utility function, in most cases, takes a universally concave shape, Prospect Theory usually entails a utility function that is concave for gains and convex for losses, both relative to a reference point. This curvature satisfies two major components of human decision-making: On the one hand, such a utility function allows for risk-seeking behavior for losses, while on the other hand, it is capable of describing diminishing sensitivity, that is, the further away one gets from the reference point, the less sensitive one becomes towards changes in outcomes (Tversky & Kahneman, 1992).

Within this utility pattern, it has also been noticed that "losses loom larger than gains" (Kahneman & Tversky, 1979), meaning that a loss of a certain size causes the agent with a pain that is bigger than the joy that would result from a gain of the same size. Hence, the utility function takes a steeper course for losses than for gains while displaying a kink at the reference point (Köbberling & Wakker, 2005; Wang, Rieger, & Hens, 2017). This phenomenon has been labeled as *loss aversion* and has been used to explain the Endowment Effect, under which people tend to see an object as more valuable if they own it, compared to not owning it (Thaler, 1980; Tversky & Kahneman, 1991; Polman, 2012), thus creating a difference between Willingness-to-Pay and Willingness-to-Accept (Kahneman, Knetsch, & Thaler, 1990; Tversky & Kahneman, 1991), the unwillingness to accept balanced bets in which the winning amount does not significantly exceed the losing amount (Kahneman, 2003) or the Status Quo Bias, which describes human beings' reluctance towards changes relative to their current situation (Samuelson & Zeckhauser, 1988). A hypothetical utility function that satisfies concavity for gains, convexity for losses, diminishing sensitivity and loss aversion can be seen in *Fig. 1*.

Loss aversion has been described as a major component in observable risk aversion towards prospects containing both the chance of winning and losing (Köbberling & Wakker, 2005; Novemsky &

[1] More specifically, Sugden (2003) argues that Prospect Theory, while emphasizing on reference dependence, is not capable of capturing any kinds of utility derived from overall asset positions. Furthermore, the author argues that Prospect Theory does not involve the notion of states of the world, thus, it cannot be applied if the agent's initial endowment (hence, his reference point) is unknown.

Kahneman, 2005; Wakker, 2010b). Although the aversion towards such gambles can be solely modeled as risk aversion by the Expected Utility framework, such levels of risk aversion would imply utterly implausible preferences for high stakes (Rabin, 2000). Note that even though risk and loss aversion are similar and related to each other, they are not essentially the same. While risk aversion can be described as the distaste towards dispersion in chance distributions, the aversion towards losses is rather caused by the psychological impacts that experiencing a loss would have (Wang, Rieger, & Hens, 2017). It has been suggested that while risk aversion may be part of "deep" and intrinsic preferences, loss aversion, on the other hand, rather poses as an emotional bias (Andersson, et al., 2016), which has been shown to have neural roots (Tom, et al., 2007).

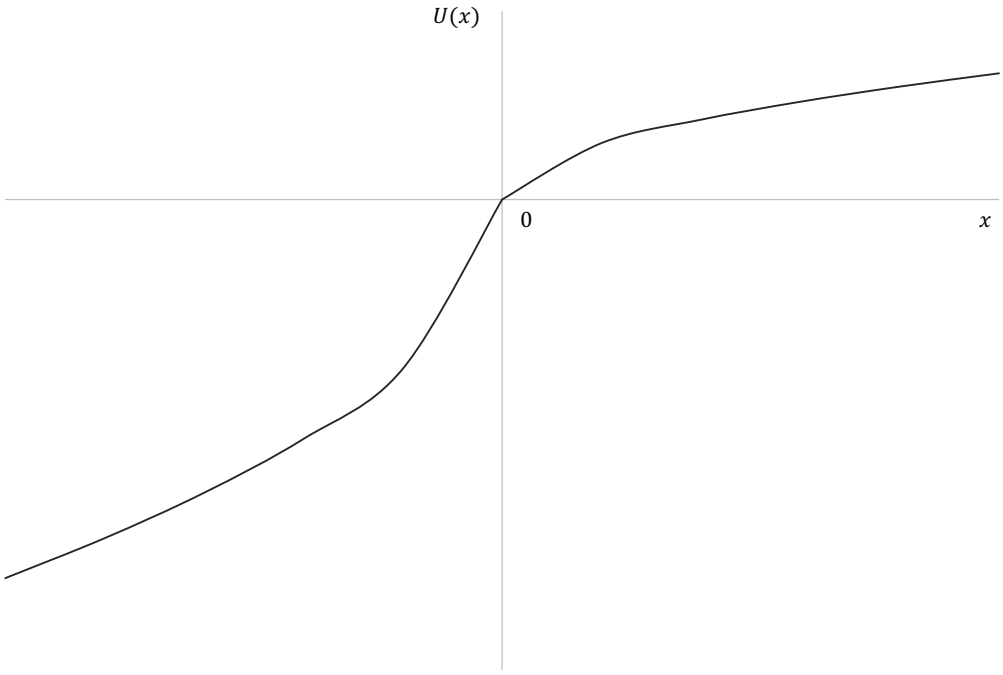

Fig. 1: A utility function under Prospect Theory. The utility function takes a concave shape above & a convex shape below the reference point. Note that the function has a kink at the reference point (scaled to zero), making its course steeper for losses than for gains.

While these previously mentioned patterns of human decision-making are profound and have been replicated by many studies, it is worth noting that apart from risk aversion, these kinds of behavior rather constitute as mental biases whose roots are of psychological nature than part of normative decision-making (Köbberling & Wakker, 2005). It is hard to argue that mentally distorting objective probabilities is part of a rational decision-making process, and making decisions based on some kind of heuristically chosen reference point could lead to unnessecarlily risk-seeking actions in light of an outcome that is perceived as a loss, potentially harming the agent himself. It is also hard to rationally justify why losing an object or a certain amount of money would cause pain that is larger compared to the joy from gaining the same object or amount. These biases stem from certain mental processes, such as thinking about the

regret one might feel (Bell, 1982), overly focusing on potential negative outcomes (Kray, 2000), framing effects (Tversky & Kahneman, 1981; 1986) or an exaggerated feeling of anxiety (Camerer, 2005).

So far, most studies that confirm these flawed behavior patterns are conducted with individuals making private decisions for themselves. Meanwhile, some of the aforementioned biases during decision-making may be overcome by letting other people make decisions for oneself. The decision-maker, under such a deciding-for-others framework, is thus not subject to any consequences of his actions. Kray (2000), for instance, has shown that people giving advice to others weigh decision attributes differently than people making a personal decision for themselves. Polman (2012) has also demonstrated several mental processes that are different between deciding for others and deciding for oneself, such as the amount of information sought for. Furthermore, by using neuroimaging techniques, it has been shown that evaluating outcomes for others involves different brain regions than evaluating them for oneself (Corradi-Dell'Acqua, et al., 2013). To let another person, who does not bear the consequences, to decide on oneself may sound somewhat offbeat at first sight, but people routinely make decisions for others in a variety of domains. Generally speaking, very few people would make an important decision without at least seeking advice from others on how they would act in such circumstances. In the medical domain, doctors decide on which treatment the patient gets, without facing the prospect of suffering from its potential downsides. In principal-agent models, the principal engages an agent to act upon his interests, with the agent bearing the consequences of his actions only partly. In financial environments, people delegate their money to be invested by institutions, financial advisors or even non-human Robo-advisors, all of whom do not fully account for potential losses.

However, it is worth noting that solely shifting the decision-making process to an external body is unlikely to solve all irrationalities. It does not seem plausible that by just reassigning the consequences of a choice, one will be able to remove all probability distortion biases, such as the risk-seeking behavior for small probabilities or the Certainty Effect. Probabilities are objective values that people struggle to deal with (Opaluch & Segerson, 1989), and it remains unclear how these difficulties will disappear if a person does not face the consequences of his actions. To take the same line, it is also implausible that a different decision framework can fully remove the reference-dependent nature of utility, as changes compared to some adapted reference level as an effective stimulus is a fundamental part of human perception (Kahneman, 2003). But the fact that the decision-maker is not facing potential bad consequences his choice could lead to means that loss aversion might be curbed if decision and responsibility are separated. It seems unreasonable that such a decision-maker would suffer from loss aversion, since after all, he does not actually bear any consequences of his choice and thus, does not have many tangible assets to lose.

With the help of an online experiment, this study aims to analyze whether people make less loss-averse decisions if they decide for others compared to if they decide for themselves. To put it differently, this paper is concerned with whether loss aversion is reduced in a decision framework under which the decision-maker is not held accountable for his actions. In chapter II, some existing literature on self-other decision making will be discussed. Afterward, the experiment, including some underlying theory about the choice tasks used, will be explained in chapter III. Results will be shown in chapter IV, and chapter V will be dedicated to discussing those, including some reasoning for the outcomes and limitations of this study. Chapter VI concludes.

II. LITERATURE REVIEW

While both risk and loss aversion are well-documented dimensions of human behavior during decision-making, most researchers have focused on situations where people make decisions for themselves. In other words, most studies have been concerned with decisions that solely influence the well-being of the decision-maker himself. Meanwhile, not much research has been done when it comes to comparing the behavior of human beings when they make decisions for themselves versus for someone else. Moreover, existing studies that looked into decisions made in such a setting point towards vastly different directions while using various approaches and focusing on different drivers of behavior, severely limiting their comparability with each other. This chapter is aimed to present the reader with an overview of some existing research on the case of a person making a choice for someone else.

In general, many researchers have found differences between self- and others-decisions. Kray (2000), in a study related to advice-giving, has named two main reasons therefor. Firstly, it is possible that we assume different preferences for other people than for ourselves, and it has been shown that people, in general, tend to believe that others are less risk-averse than themselves (Hsee & Weber, 1997). Secondly, it is also conceivable that when people are tasked with advising others, they do so with different motivations compared to when they are making decisions for themselves. Recommendations for others not only need to be justified by the agent himself, but also by the recipient of the advice. As such, these advisors are more likely to recommend actions that are easier to justify and socially more acceptable (Kray, 2000). Moreover, advisors may also be less concerned with potential bad outcomes, resulting in them displaying less desire to avoid those and hence, putting less effort behind their actions (Kray, 2000). While giving advice is not the same as making decisions, it is conceivable that these processes are similar and related to each other. However, the author has mostly refuted motivational reasons, and instead, wrongly inferred preferences for others have been cited as the main reason for the discrepancy (Kray, 2000).

In an early within-subjects study, Zaleska & Kogan (1971) have demonstrated that individuals act more conservatively when making decisions for others, noting that in such cases, subjects tend to maximize the chance of winning at the cost of the possible amount that can be won. The authors believe that for others-decision makers, the downsides of being responsible for potential losses, which leads to self-blame, outweigh the benefits from being responsible for potential gains, causing them to select the option that minimizes the chance of losing (Zaleska & Kogan, 1971). However, it is worth noting that the subjects in this study were all recruited from the same program at the University of Paris (Sorbonne), and although they were not aware of the exact person they were deciding for, it is conceivable that these subjects were familiar with each other, reducing their emotional distance towards each other. This distance is said to have an impact on the decisions made for others (Stone, Yates, & Caruthers, 2002; Polman, 2012), and Andersson et al. (2016) have argued that the increased emotional distance in a deciding-for-others framework poses as an important reason why agents can make less loss-averse choices for other people compared to their own self-related decisions. Hence, it is conceivable that the set-up of this study did not promote this difference to an significant extent, causing subjects to mainly focus on the prevention of losses and self-blame when deciding for others.

Similar results pointing towards more conservative choices were found by Borresen (1987), in whose study subjects were asked to hypothesize a situation in which siblings have to decide on whether to lease or sell an inherited business. More specifically, participants were assigned into the role of *protagonists* - ones that make the actual decision and bear the consequences, and *supporters*[2], who only gave advice to the protagonists. Furthermore, instead of relying on conventional tasks used in decision-making experiments, participants were asked to rank a series of arguments both for and against the two options. In this study, it has been shown that supporters (who advised the protagonists, their hypothetical sibling) were more conservative, putting more emphasis on long-term benefits, whereas protagonists prioritized arguments that highlighted immediate rewards (Borresen, 1987). However, the role of supporters was framed as providing assistance rather than making a decision for the protagonist, and it is unclear how such a framing influences the supporters' actions. Besides, the ranking of arguments under hypothetical circumstances does not fully resemble a decision under risk with actual money at stake.

Fernandez-Duque & Wifall (2007) have run a study with a risky card game relying on similar treatments, dividing participants into *actors* and *observers*. Again, while actors were given the task of making an actual decision and bearing the consequence of those, observers were simply asked what the actor should have or what the observer himself would have done in the same situation. Consistent with the findings of Borresen (1987), observers took less risk than actors, though both groups took levels of risk beyond

[2] Technically, the author did not use the term *supporters*, but rather described their role as "to support the decision of one of the protagonists" (Borresen, 1987, pp. 1301). This treatment was then abbreviated as the *O-group*.

rationality. The authors believed that being rewarded for one's actions might lead to repetition of such behavior at the cost of considering potential losses and that actors are more prone to suffer from confirmation bias than observers, who rather rely on a rational analysis of risks versus benefits (Fernandez-Duque & Wifall, 2007). However, again, observers in this study were solely giving advice rather than making a decision that had an impact on the actors' payoffs, and under no condition were they able to interfere with the actors' decisions. Furthermore, similar to Borresen's study (1987), the experimental environment, which involves playing a simple card game, may induce participants to display a different set of behavior compared to when the decision is framed as a risky prospect. Therefore, it remains unclear how predictive the results from this study are at describing loss aversion in actual decisions under risk that are made for others.

Stone, Yates, & Caruthers (2002) conducted a study around the notion that the difference between deciding for oneself versus deciding for others stems from different kinds of regret if the decision turns out to be harmful. In more detail, the authors have analyzed the effect of increasing the frequency of feedback from previous choices (thus, leaving more space open for one to feel regret) as well as differentiating between skill- and chance tasks (under skill tasks, subjects deciding for others may experience the feeling of guilt if things turn out to be bad, which resembles a different experience of regret). While it has been found that increasing the feedback rate does lead to more conservative choices, there was no difference between subjects choosing for themselves and those choosing for others, even after controlling whether the choice made for oneself is private or public (Stone, Yates, & Caruthers, 2002)[3]. However, the gambles used here only included different levels of gains but no potential losses, and such gambles cannot provide one with any insights on loss aversion (Wakker, 2010a). The finding that decisions for oneself do not differ from those made for others within the domain of gains is consistent with the results of Andersson et al. (2016).

On the other hand, there is also plenty of evidence that human beings do make riskier decisions for others than for themselves. For instance, in the domain of dating and relationships, Beisswanger et al. (2003) have demonstrated that people make riskier decisions and give riskier advice to others than they themselves would act. One of the potential reasons for doing so listed by the authors suggests that people consider the potential negative outcomes to be more important when deciding for themselves compared to when deciding for others (Beisswanger, et al., 2003). Within the monetary domain, Cvetkovich (1972)

[3] Most choices made for oneself are private, meaning that the choice is not observed by others. In the mentioned paper, deciding for oneself publicly means that the decision-maker is being observed by another person while he makes his choice. In contrary, choices for others are almost always public, since most decisions for others involve a person who is aware about a decision being made for him. Thus, the decision-maker needs to justify the decision he has made. Differences between decisions made for oneself vs. for others may also stem from the desire of the decision-maker to preserve his self-image. For a more detailed discussion on this topic, see Stone, Yates, & Caruthers (2002).

has shown that while there is no difference among choices between both decision frameworks if both subjects are from the same gender, both males and females deciding for their opposite gender acted riskier than the person from the other respective gender that was deciding for him/herself. To put it in other words, males do not make riskier decisions for other males compared to the choices he makes for himself, but did so for other females, and vice versa. The author argues that subjects in mixed-sex decision-tandems might have believed that they were more different from each other than subjects in same-sex decision-tandems, upon which assumption they made different choices according to their "expectations of gender-appropriate behavior" (Cvetkovich, 1972).

However, all studies mentioned so far were concerned with the risk attitude of the decision-maker in general, while the notion of loss aversion has received little to no attention. Meanwhile, Wakker (2010b) believes that over half of the observable risk aversion is caused by loss aversion. Following this assertion, what is often said to be risk aversion is, in fact, mostly made up of a decision-maker's aversion towards potential losses rather than his "genuine" distaste towards risks. Furthermore, Rabin (2000) has also noted that the observed risk aversion for small and medium stakes cannot be solely linked to the utility curvature, which is the only determinant for risk-attitude under Expected Utility. Instead, he believes that loss aversion, as a departure from EUT, acts better at explaining the risk aversion observed at small and modest stakes (Rabin, 2000). Novemsky & Kahneman (2005) have even concluded that there is no risk aversion beyond loss aversion for balanced bets (50% of winning vs. 50% of losing) involving amounts that are not substantial[4].

Taking a look at some more recently published studies that emphasize on the aspect of loss aversion while looking into the difference between the two decision frameworks, the evidence points more clearly towards one direction. Polman (2012) has concluded that deciding for others reduces loss aversion while using several different experiments regarding both risky and riskless choices and applying both within- and between-subjects designs. Within this work, the author identified several psychological reasons that causes this observed disparity[5]. Mengarelli et al. (2014), in a long-term study, confirmed Polman's findings that deciding for another person dampens loss aversion using a series of decision tasks in a within-subjects design. In an attempt to find further explanations, the authors have mentioned the sense of responsibility, arguing that people are more inclined to avoid bad outcomes for themselves than for others; or, in other words, that the feeling of regret is stronger than guilt (Mengarelli, et al., 2014).

[4] However, for this conclusion to be valid, the authors also made the strong assumption that within an exchange transaction, the initial loss is evaluated separately from the following compensation, effectively making the initial loss during an exchange look like the same as the loss resulting from losing a gamble. For a more detailed discussion on this assumption, see Novemsky & Kahneman (2005).

[5] In more detail, these reasons consist of different construal levels, promotion vs. prevention focus according to the Regulatory Focus Theory by Crowe & Higgins (1997), a different amount of information sought for, omission bias among people deciding for themselves and the power a person feels when he decides for others (Polman, 2012).

Interestingly, this poses a contradiction to the results of Stone, Yates, & Caruthers (2002), who has found no differences between the effect of regret and guilt on the level of risk-taking.

Another study corroborating the impression that deciding for others reduces loss aversion was conducted by Andersson et al. (2016). More interestingly, the authors looked into two different kinds of decisions under risk: one involving bets that only contained gains, and one that had gambles of mixed nature, involving both gains and losses. The results came at no surprise given the studies mentioned above: While there were no differences in choice patterns if no losses were involved (confirming Stone, Yates, & Caruthers (2002)), choices for others entailed less loss aversion if losses were a possible component of a gamble (Andersson, et al., 2016). The authors have argued that loss aversion rather constitutes as an emotional bias that affects decisions under risk alongside the cognitive processing of information available, whereas risk aversion can be described as a true, intrinsic preference (Andersson, et al., 2016). Since decisions consist of a mix of emotional and cognitive processing (Loewenstein & O'Donoghue, 2004), loss aversion, which is largely driven by emotional mechanisms (Achraf, Camerer, & Loewenstein, 2005), can be overcome by separating the decision from the consequence-bearer, as the emotional distance to the matter will decrease in such circumstances (Andersson, et al., 2016).

This study aims to take the same line as the three aforementioned studies that were particularly concerned with loss aversion. In particular, I will focus on the difference between deciding for oneself versus for others in terms of loss aversion, meaning that mixed gambles will be used in the following experiment. By doing so, I wish to replicate the first pieces of evidence that deciding-for-others frameworks are effective at combatting this bias (Polman, 2012; Mengarelli et al., 2014; Andersson et al., 2016).

III. DATA GATHERING, HYPOTHESES & METHODOLOGY

III.1 Subjects recruitment

A total of 140 subjects participated and completed the experiment, most of whom were recruited via social media platforms such as Facebook or WhatsApp. The participants pool mostly consists of my friends, fellow students, their friends, their fellow students and some of my family members, resulting in a group that is, to some extent, biased towards an educated student population. The experiment was conducted online via the *qualtrics* platform.

Before starting their sessions, subjects were first informed by an instruction screen about the purpose and procedure of this experiment. Afterward, a separate screen was installed to remind them of their experimental endowment, which will be discussed in the upcoming *Experiment design* chapter. All

instruction screens were furnished with a time restriction, and participants were only able to advance to the next screen after a certain amount of time to ensure that they actually read the instructions.

III.2 Measurement of loss aversion

In order to measure loss aversion in a valid way, it is important that decision-makers are confronted with prospects that involve chances for both winning and losing, as exposing them to prospects that only contain gains or losses cannot capture loss aversion (Wakker, 2010a; Köbberling & Wakker, 2005). To better understand the gambles used in the experiment, it is required to take a closer look at the basic principles of loss aversion under Prospect Theory. An agent's observable utility preferences regarding mixed gambles, under this theory, can be discomposed into the intrinsic evaluation of outcomes, probability weighting and loss aversion (Wakker, 2010b; Köbberling & Wakker, 2005). In this paper, I follow Wakker's (2010b) approach to denote the aforementioned intrinsic utility with a lowercase *u*, while the overall observable utility is referred to with an uppercase *U*. To put it mathematically, *U(x)* takes the following shape according to Wakker (2010b):

$$U(x) = \begin{cases} u(x) & if\ x \geq 0 \\ \lambda u(x) & if\ x < 0 \end{cases} \tag{1}$$

When looking at this utility function, it becomes evident that while the observed utility for the domain of gains fully resembles an agent's intrinsic preference over outcomes, the utility for losses are multiplied by λ, the loss aversion parameter (Tversky & Kahneman, 1992), and loss aversion exists if $\lambda > 1$ (Köbberling & Wakker, 2005; Wakker, 2010b). It is worth noting that in this notion, it is assumed that the reference point lies at zero. As there is currently no valid and comprehensive way to model a person's reference point (Wakker, 2010b), it has been suggested that the reference point lies at a person's status quo (Kahneman & Tversky, 1979; Sugden, 2003). Zero as a reference point can be attained by rescaling the status quo and all relevant outcomes (Köbberling & Wakker, 2005).

Under Prospect Theory, it is widely accepted that the observable utility function takes a steeper course for losses than for gains, and loss aversion is indicated by the "degree" of the kink in the utility function at the reference point. In more detail, the sharpness of the kink is implied by the loss aversion parameter λ (Köbberling & Wakker, 2005)[6]: The higher the loss aversion, the higher is the value λ takes, the

[6] In this paper, I follow the notion that the steeper course of the utility function for losses than for gains stems from the kink at the reference point (Köbberling & Wakker, 2005). Some works, however, have also identified a more concave utility for losses than for gains without necessarily having a kink as loss aversion (Kahneman & Tversky, 1979).

steeper the section for losses becomes, and the more prominent is the kink at the reference point. According to Wakker (2010a), it is reasonable to assume that the intrinsic utility *u(x)* is, to some extent, symmetric around the reference point, implying that *u(x) = –u(–x)*. The addition of the loss aversion parameter λ causes the utility function to indeed take a different course for losses, yielding in the observable utility function *U(x)*. Following (1), loss aversion can be interpreted as the exchange rate between utility units from gains and those from losses (Wakker, 2010a; Köbberling & Wakker, 2005).

Wakker (2010a) has presented an easy way to measure loss aversion for small amounts by asking people for a value *x* that results in the following indifference:

$$(0.5: x; 0.5: -1) \sim 0 \tag{2}$$

In this case, the value of *x* is equal to the loss aversion parameter λ. Note that Wakker proposed the usage of the aforementioned prospect to capture the degree of loss aversion for any given person. Thus, this procedure requires some strict, but also reasonable assumptions:

Probability weighting: For this method to be valid, it is assumed that the different probability weighting functions for gains and losses, as described by Kahneman & Tversky (1979), take the same value at 50%. With *u(0) = 0*, this indifference can be depicted by Prospect Theory as:

$$w^{+}(0.5)u(x) + w^{-}(0.5)\lambda u(-1) = 0 \tag{3}$$

This equation can be rewritten as:

$$w^{+}(0.5)u(x) = -w^{-}(0.5)\lambda u(-1) \tag{4}$$

Under the assumption that $w^{+}(0.5) = w^{-}(0.5)$, the probability weights on both sides of the equation cancel each other out. Thus, we obtain:

$$u(x) = -\lambda u(-1) \tag{5}$$

Linear utility for small numbers: For *x* to be equal to λ, it is required that the intrinsic utility for small stakes around zero takes a linear shape. In other words, subjects must exhibit linear utility over the stakes concerned in this prospect. As a person's intrinsic utility function is unknown, this assumption is crucial for the measurement of loss aversion since otherwise the inherent utility cannot be disentangled from loss aversion, as the observed preference can well reflect a person's basic utility for the stakes concerned.

By assuming that the intrinsic evaluation of such small outcomes is linear, which seems reasonable (Rabin, 2000; Wakker, 2010a), every preference statement regarding losses that does not fully mirror that agent's preferences for gains can be rooted back to loss aversion. Hence, without loss aversion (meaning that $\lambda = 1$), x would take the value 1 in (5) due to the symmetric nature of intrinsic utility. With $U(x) = u(x)$ *if* $x > 0$ and $U(-1) = \lambda u(-1)$, (5) can be rewritten as:

$$U(x) = -U(-1) \tag{6}$$

Equation (6) implies that obtaining x provides the decision-maker with joy that is equivalent in size with the pain that results from obtaining -1. By isolating the loss aversion parameter λ in (5), we obtain:

$$-\frac{u(x)}{u(-1)} = \lambda \tag{7}$$

It becomes evident that λ expresses the exchange rate between negative and positive utility. With the assumption of linear utility for the stakes involved, it becomes clear that:

$$x = \lambda \tag{8}$$

III.3 Experiment design

As this study is more concerned with the comparison of loss-averse behavior people exhibit in different decision frameworks rather than obtaining precise estimates for λ, the decisions that subjects faced in this experiment have deviated from Wakker's method to some extent. In more detail, participants were asked to state their preferences in *Multiple Price Lists* (MPLs), with choices between receiving *€0* for sure and risky prospects which contained a 50% chance to win an increasing monetary amount x and a 50% chance to lose *€5* (*Table 1*). The further down in the MPL one moves, the more attractive the prospects become. Increasing the loss from *€1*, as proposed by Wakker (2010a), to *€5* has two main reasons: Firstly, very small amounts are not very important in reality (Wakker, 2010b), and decision-makers may not take the tasks seriously. Furthermore, using too small stakes may indeed induce more risk-seeking behaviors and thus pollute the data. This effect is also known as the *Peanuts Effect* (Weber & Chapman, 2005). Besides, according to Rabin's paradox, people should indeed exhibit risk-neutrality for small- and medium-sized stakes (Rabin, 2000), following which it is still reasonable to assume that utility takes a linear shape for stakes that are a bit further away from zero.

Moreover, a within-subjects design has been applied in this study, in which people made choices both for themselves and for others. To avoid random behavior in the stage where subjects chose for others, participants were instructed that their choices might determine the payoff of someone close to them and that this other person cares about his payoff. They were also told that their own payoff may also depend on the choices another person has made for them. In order to ensure that subjects will pay attention to the instructions mentioned, a time restraint has been put into place, and participants were only able to proceed to the next step after a certain period of time that is required for someone to thoroughly read the task description. To avoid confounds that may pollute the data, the order of the two decisions was randomized.

Receive €2 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €4 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €6 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €8 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €10 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €12 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €14 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €16 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €18 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €20 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €22 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €24 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €26 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €28 with 50% and lose €5 with 50%	○	○	Receive €0 for sure
Receive €30 with 50% and lose €5 with 50%	○	○	Receive €0 for sure

Table 1: The *Multiple Price List* used in both decision tasks. Subjects were asked to indicate their preference between the left and the right option. Before seeing the MPL each time, they were instructed by a separate screen on the decision frame they currently find themselves in, with the instructions being furnished with a time restriction such that participants were only able to advance to the MPL after a certain amount of time.

Since every participant in the within-subjects design is deciding both for himself and others, a smaller number of subjects is required in order to detect any significant effects. Besides, even if utility for the stakes involved is not linear, looking at different behaviors on an individual level is still expected to give us valuable insights on the difference in loss aversion between the two different decision frameworks. More formally, let us denote the loss aversion parameter for others with λ', while the payoff for others that yields in the indifference in (2) is referred to with y. Under the assumption that the intrinsic evaluation of outcomes is identical for deciding-for-oneself and deciding-for-others[7], equation (7) in others-decisions, thus, takes the form of:

[7] This is a strict, but crucial assumption which, to some extent, contradicts Kray's (2000) idea that people assume different preferences for others than for oneself. However, no conclusions can be drawn regarding loss aversion otherwise, as any possible preference pattern can be solely driven by an agent's intrinsic utility in others-decisions.

$$-\frac{u(y)}{u(-1)} = \lambda' \tag{9}$$

By subtracting (9) from (7), we obtain:

$$\frac{u(y)}{u(-1)} - \frac{u(x)}{u(-1)} = \lambda - \lambda' \tag{10}$$

Note that from (10), it is impossible to determine the exact difference in the size of loss aversion between the choices due to the unknown course of *u*. However, as *u(–1)* is always negative, it becomes evident that a subject's loss aversion in self-decisions exceeds his loss aversion in others-decisions if he indicates a smaller *y* than *x* (meaning that in others-decisions, the subject would ask for a lower winning amount in the prospect to be indifferent compared to self-decisions). Therefore, any difference between the choices in both MPLs still reveals that the agent has a different level of loss aversion in self- than in others-decisions.

Furthermore, probability weighting is expected to be a lesser issue under a within-subjects design, and even if the assumption of $w^+(0.5) = w^-(0.5)$ does not hold, it is still very reasonable to assume that a decision-maker does not adapt different probability weights when deciding for himself compared to when deciding for others. Therefore, assuming that probability weighting in (4) is not canceled out, equation (10) would take the shape of:

$$\frac{w^+(0.5)u(y)}{w^-(0.5)u(-1)} - \frac{w^+(0.5)u(x)}{w^-(0.5)u(-1)} = \lambda - \lambda' \tag{11}$$

Probability weights cannot take negative values. Hence, it follows that $\lambda > \lambda'$ if $y < x$ since *u(–1)* is always negative, similar to equation (10). Therefore, this experiment is capable of demonstrating whether the agent's degree of loss aversion differs for self- and others-decisions even if $w^+(0.5) \neq w^-(0.5)$. This pattern becomes more obvious if utility for the stakes involved is assumed to be linear (Rabin, 2000; Wakker, 2010a), as (11) can be shortened to:

$$\frac{w^+(0.5)}{w^-(0.5)}(x - y) = \lambda - \lambda' \tag{12}$$

This problem highlights the importance of assuming linear utility (for both self- and others-decisions) for the small stakes involved.

To make the experiment incentive-compatible, one subject was selected at the end of the experiment and got paid according to a randomly selected choice that either he has made for himself or someone else has made for him. In other words, in case a person gets selected, his payoff can be either determined by one randomly selected choice he has made for himself or a randomly selected choice that has been made by someone else in the part where that person was instructed to decide for others. To ensure that potential losses one can make are credible, all subjects received an endowment of *€5* prior to the start of the experiment. In other words, the endowment serves the purpose of setting the reference point at *€5* such that realizing a bad outcome in the gambles is actually perceived as a downward departure from the status quo, and hence, a loss. It is worth noting that endowing the subjects with *€5* technically changes the nature of the prospects, and in case the selected choice indicates a preference for the risky gamble, the respective gamble will be played out, and the final amount was added to the endowment, whereas preference for *€0* will result in a payoff that simply consists of the endowment. In more detail, preferring the *€0* option in the selected payoff choice would mean that the subject receives the initial endowment of *€5*, whereas preferring the gamble in the selected choice would result in him either obtaining *€5+x* in case of winning or *€0* in case of losing. However, it seems implausible that anyone would participate in an experiment in which he can lose money, and not endowing the subjects with money would render an incentive-compatible experiment design impossible. As mentioned previously, subjects were informed about the payoff mechanism and reminded of their endowment on a separate instructions page right after the initial instructions, with this page also containing a time restraint to ensure that the message was read carefully.

Besides, a set of questions related to the demographics of the subjects as well as their self-reported risk aversion and self-reported anger they feel after losing something was included in the questionnaire. These questions were placed right after the payoff instructions and before the treatments, as increasing the time frame between instructions and decisions is expected to hamper subjects from combining the endowment with the payments of the prospects, which would change the nature of the prospects. The entire questionnaire, including all instructions and control questions, can be found in the *Appendix*.

III.4 Hypotheses

This study is meant to explore whether deciding for others reduces loss aversion compared to deciding for oneself. Therefore, in line with the latest results obtained by Polman (2012), Mengarelli et al. (2014) and Andersson et al. (2016), the main research hypothesis is framed as:

Subjects indicate less loss-averse preferences when deciding for others (earlier switch to the prospects in the MPL) compared to deciding for themselves.

It is worth noting that in such a within-subjects design, the exact possible gain in the prospect that makes it more appetizing than the sure amount is not of interest for the hypothesis for either task, as the difference between the rows in which subjects switch to the prospect in both tasks matters. Besides, no hypotheses have been phrased around the demographic questions and self-reported values, as they are not related to the main topic of this study, but only serve the purpose of further data exploration to provide interesting insights for further research.

III.5 Methodology

In order to analyze the difference between loss aversion in choices for others compared to those for oneself, a measure that indicates this difference has been created. In more detail, the row after which a subject in the others-decision part started to prefer the gamble was subtracted from the row after which he started to prefer the gamble in the self-decision task. Hence, a positive value indicates that the subject started preferring the prospects earlier in the others-tasks than in the self-task, indicating a less loss-averse preference for others than for himself. Meanwhile, a negative value would mean that the subject is more loss-averse for others than for himself. The non-parametric *sign test of matched pairs* and the *Wilcoxon signed-rank test* have been applied to analyze whether there are significant differences between the "switching row" in the two decisions. Besides, as part of some additional data exploration to provide insights for further research, *Ordinary Least Squares* (*OLS*) regressions, with the difference between the two decision tasks as the dependent variable, were run to see whether the aforementioned self-reported values have an impact on the difference in loss aversion between decisions for oneself and those made for others.

IV. RESULTS

IV.1 Descriptive statistics

Out of all subjects that have been recruited to participate in this study, 140 people have completed the online experiment. Nine responses had to be removed due to inconsistency, as these subjects have indicated preferences involving more than one switching point in one of the MPLs or preferred a comparatively bad gamble over the safe option but reversed their preferences for objectively better prospects (In the MPLs used, this phenomenon was reflected by switching from the left to the right side at any given point). Hence, in total, 131 responses were included in the analysis.

Out of the 131 participants that were evaluated, 69 subjects have indicated the same preferences for themselves and others, 36 have made more loss-averse choices for others than for themselves, while 26

have made less loss-averse preferences for others than for themselves. This response pattern suggests that deciding for others does not reduce loss aversion, compared to making personal decisions. On average, subjects in the deciding-for-themselves task started to prefer the gamble over the safe option after *3.36* rows (*SD = 2.50*)[8]. The third row consisted of a choice between a gamble with 50% chance to win *€6* and 50% chance to lose *€5* and obtaining *€0* for sure, while the fourth row was made up by a choice between a gamble with 50% chance to win *€8* and 50% chance to lose *€5* and getting *€0* for sure. To translate this into the indifference in (2), this result means that in self-decisions, subjects, on average, have indicated that they would be indifferent between *€0* for sure and a gamble in which they have a 50% chance to win *€6.72* and a 50% chance to lose *€5*. From this indifference, by dividing this amount by *5* (since Wakker's (2010a) original indifference was multiplied by *5* in this experiment), it follows that the average loss aversion for self-decisions amounts to $\lambda = 1.34$. In the deciding-for-others task, the average switch occurred after *3.50* rows (*SD = 2.51*), implying that participants were indifferent between getting *€0* for sure and a gamble with 50% chance to win *€7* and 50% chance to lose *€5* in choices they made for others. The mean loss aversion parameter λ' for decisions made for others is equal to *1.40*. These results suggest that loss aversion does prevail for both self- and others-decisions (mean $\lambda > 1$ in both tasks), although to a lesser extent than $\lambda = 2.25$, as demonstrated by Tversky & Kahneman (1992). Taken together, participants, on average, switched over to the prospects *0.15* rows earlier in the self-decision task compared to the others-decision task (*SD = 1.89*). Again, these results confirm the impression that decisions made for others are not less loss-averse than those made for oneself, and it rather seems that choices from such an others-decision frame entail more loss aversion.

The most extreme difference between choices in both tasks that has been observed was six rows for both directions. In more detail, one subject started preferring the prospects six rows later in the others-task than in the self-task (making a more loss-averse choice for others than for himself), whereas one subject switched over to the prospects six rows earlier in the others-task compared to the self-task (less loss averse choice for others than for himself), respectively. Both the median and the mode regarding the difference between switching points in both tasks lie at zero. *Fig. 2* shows how this difference is distributed.

IV.2 Main results

The data on the difference in loss aversion was tested on normality mathematically with the *Kolmogorov-Smirnov test* (*K-S test*) to assess whether powerful parametric methods can be used. With $p < 0.0001$, the null hypothesis that the distribution follows a normal distribution is rejected, meaning

[8] All numbers reported here are rounded after the second decimal digit.

that the data does not follow a normal distribution. Therefore, non-parametric tests, such as the *sign test of matched pairs* or the *Wilcoxon signed-rank* test were applied to draw conclusions from the data.

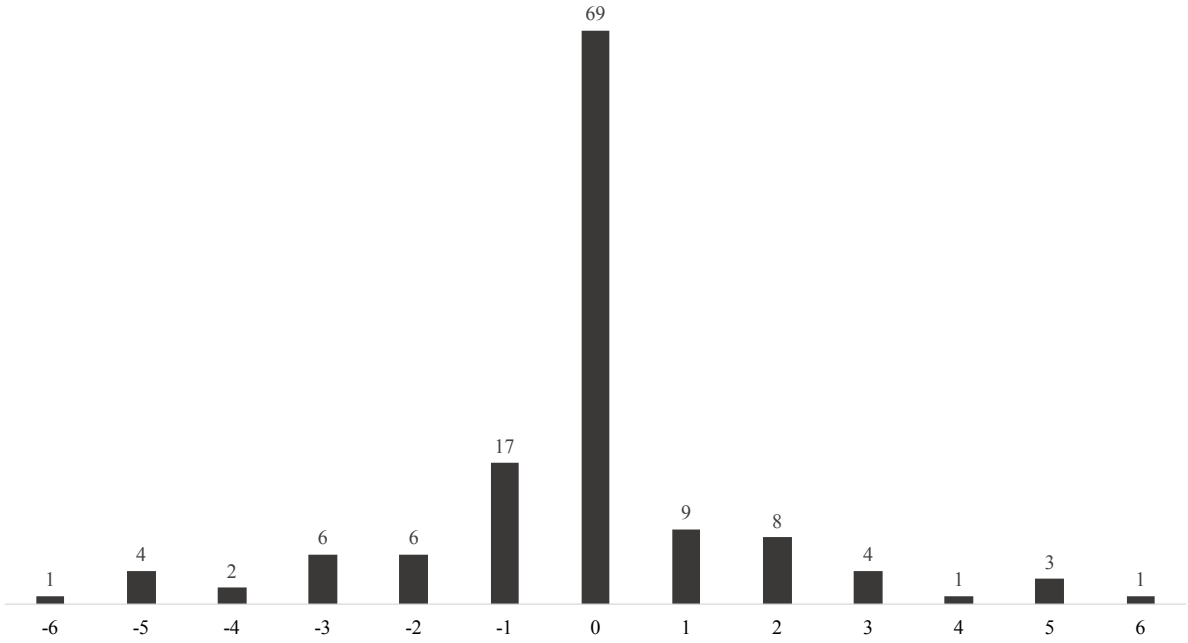

Fig. 2: Frequencies: Row after which the gamble was preferred in the self-task – row after which the gamble was preferred in the others-task. Note: A positive value indicates less loss-averse preferences for others than for oneself, while a negative value expresses the opposite.

According to the *sign test of matched pairs*, the two-sided p-value amounts to *0.2529*, suggesting that the null hypothesis that the medians of the two groups in terms of the row in which subjects start to prefer the gamble are the same cannot be rejected at 10% significance level (*Table 2*). Hence, the impression from looking at the descriptive statistics that decisions made on behalf of someone else are not less loss-averse is confirmed. It is worth noting that this method provides one with relatively weak results, as the test only requires very few and weak assumptions. In particular, the test only computes whether the medians of the two decision tasks are different form each other. Since the difference between loss aversion in both decision tasks can be quantified and ranked as described in the methodology chapter, using a *Wilcoxon signed-rank* would yield in more convincing results. Again, with a two-sided p-value of *0.2461*, the null hypothesis cannot be rejected at a 10% significance level, suggesting that there is no difference in loss aversion between self- and others-decisions (*Table 3*).

To investigate whether the same conclusion holds with a more powerful test, the parametric *paired t-test* has also been conducted. With a two-sided $p = 0.3813$, the null hypothesis that the means in terms of the "switching row" in both decisions are the same cannot be rejected at 10% significance level, again implying that there is no significant difference between the decisions in the two different frames while further corroborating the results from the non-parametric tests (*Table 4*).

Row of switch self – others	observations	expected
positive	26	31
negative	36	31
zero	69	69
total	131	131

H0: Median row of switch self – Median row of switch others = 0
Pr(#positive ≥ 36 or #negative ≥ 36) = 0.2529

Table 2: Difference between self- & others-decision. Results from the *sign test of matched pairs*

Row of switch self – others	observations	sum of ranks
positive	26	2650
negative	36	3581
zero	69	2415
total	131	8646

H0: Row of switch self = Row of switch others
z = –1.160
Prob > |z| = 0.2461

Table 3: Difference between self- & others-decision. Results from the *Wilcoxon signed-rank test*

	observations	mean	SD
Row of switch self	131	3.3588	2.5025
Row of switch others	131	3.5038	2.5065
Difference		–0.1450	1.8897

t = –0.8784 Degrees of freedom = 130
H0: Mean Difference = 0
Pr(|T| > |t|) = 0.3813

Table 4: Difference between self- & others-decision. Results from the *paired t-test*

IV.3 Additional data exploration

During the data collection process, self-reported values on risk aversion as well as the anger one feels after losing something (as an approximation for self-reported loss aversion) were gathered alongside with other demographic background information[9]. In detail, participants reported these two values on a

[9] Subjects were further asked to respond to questions regarding their age, income, highest level of education obtained, employment history in a set of occupations that are related to self-other decision making, enrolment

scale from 0 (extremely avoiding risk / not upset at all) to 10 (extremely liking risk / extremely upset). OLS regressions were run to detect whether these self-reported values have an impact on the difference in loss aversion between self- and others-decisions. It is important to emphasize that no hypotheses have been phrased around these variables and that these findings are not part of the main results related to the research question. Instead, this analysis rather acts as data exploration to provide interesting insights for further research.

Table 5 indicates that people who claim to be more risk-averse seem to make more loss-averse choices for others than for themselves. The self-reported level of anger one feels in case something gets lost accidentally is not significant at the 10% level. The aforementioned effect goes away if all control variables are included, suggesting that these self-reported figures do not have a significant effect on the difference in loss aversion between self- and others-decisions.

V. DISCUSSION

V.1 Discussion on results

To my surprise and in contrast to others that have conducted similar studies, making decisions for others was shown to not have any impact on loss aversion of the choices involved. The outcomes of this experiment reveal that decision-makers still suffer from loss aversion when making choices for others, although they are not subject to any (financial) consequences under this setting. Furthermore, the data also show that the magnitude of loss aversion was comparable over the two decision settings. The results suggest that the implications of Prospect Theory for decision-making under risk that are related to loss aversion even hold for the case if people are making such decisions for other people. Whether the outcomes of this study are stable and externally valid should be examined by further research, since the experiment in this study has some limitations that are discussed in a later chapter.

Loss aversion is a phenomenon that has been shown to have neural roots (Tom, et al., 2007). Despite the finding that the same outcome is evaluated by different neural processes if that evaluation is done for others than for oneself (Corradi-Dell'Acqua, et al., 2013), it remains unclear how regions in the brain that are responsible for loss aversion are activated if a decision is made for others compared to one made for oneself. It is conceivable that loss aversion, as such, is so essential to our neural processing of decisions under risk that it might not even be overcome if a decision-maker himself has nothing tangible to lose. Following the stance that loss aversion is caused by the psychological consequences of experiencing a loss (Wang, Rieger, & Hens, 2017), the results of this study suggest that the roots of loss

status as a student, whether they possess any investments, whether they have engaged themselves in charitable activities and whether they have participated in any gambling activities.

aversion might be so deeply enshrined in our neural mechanisms that they cannot be removed by changing the decision framework and reassigning the responsibility of a decision.

Row of switch self – others	(1)	(2)
Self-reported risk-aversion	-0.1771** (0.0767)	-0.1523 (0.0970)
Anger one feels if sth. gets lost accidentally	0.1152 (0.0743)	0.1087 (0.0759)
Age		
18-24		(omitted)
25-34		0.1486 (0.5208)
35-44		2.2265** (0.9657)
45-54		0.4360 (0.8211)
55-64		3.6408*** (0.6486)
65 or higher		0.2697 (0.8343)
Male		0.4349 (0.4551)
Student		0.0444 (0.6014)
Highest level of education		
High school diploma		(omitted)
Vocational education		1.009* (0.5439)
Bachelor's degree		0.5454 (0.4652)
Master's degree		0.6440 (0.7356)
Doctorate or higher		(omitted)
Monthly disposable income		
Under €1000		(omitted)
€1000 - €2000		-0.2311 (0.4465)
€2000 - €3000		-0.8178 (0.7805)
€3000 - €4000		-0.1666 (0.8299)
€4000 and above		-0.0999 (0.8754)
Ever occupied in		
Financial industry		(omitted)
Insurance industry		-1.3404 (1.2197)
Doctor or health industry		-0.5767 (1.1731)
Higher managemeent position in any company		-0.1948 (0.6745)
More than one of those		-0.9297 (0.9844)
None of them above		-0.6621 (0.5134)
Possession of investments		-0.3169 (0.4382)
Ever gambled		0.7102 (0.4526)
Ever engaged in caritative activities		-0.8369 (0.5225)
Constant	0.0577 (0.6436)	0.7364 (1.0815)

Table 5: Regression results from additional data exploration. Robust standard error shown in brackets. Note that the coefficient for *Doctorate or higher* has been omitted due to collinearity, as the only participant who stated to possess such a level of education was also the only response in the *Age* category *35-44*.
** = p < 0.10, ** = p < 0.05, *** = p < 0.01*

Meanwhile, as discussed in the literature review, many scholars have discovered that decisions made for oneself differ from those made for others, citing many reasons for this disparity. The fact that no differences have been found between self- and others-decisions casts doubt over some of these explanations. For instance, based on the results of this study, it is questionable whether people, when tasked with deciding for others, really assume different preferences than when deciding for themselves,

as claimed by Kray (2000). However, it should be noted that it is also conceivable that participants in this experiment did not assume different preferences for others than for themselves due to the homogeneous nature of the subjects pool. Moreover, while Zaleska & Kogan (1971) have suggested that potential self-blame in others-decisions causes people to make more conservative choices for others than for themselves, Mengarelli et al. (2014) believed the opposite, stating that people are more concerned with avoiding bad outcomes for themselves than for others, thus leading them to act more conservatively if making self-decisions. The results of this study cannot confirm either of these contrasting arguments, and it rather seems that the feeling of regret in self-decisions and guilt in others-decisions both induce loss aversion to a comparable extent, similar to Stone, Yates, & Caruthers' (2002) results for risk aversion.

Lastly, it is important to mention that loss aversion is only one out of many biases and difficulties we face during decision-making. Although the results of this experiment suggest that deciding for others does not entail less loss aversion compared to deciding for oneself, this setting might still be useful at debiasing other kinds of flawed behavior. It is up for future research to determine whether such a decision set-up can be beneficial, as it is beyond the scope of this study to investigate the usefulness of self-other decision-making in general.

V.2 Limitations & Further research directions

Albeit this research has revealed meaningful insights on the impact of deciding for others on loss aversion, several limitations restrain the validity of this experiment, providing matters for further research to investigate. In this study, the deciding-for-others task in the experiment was framed as "making a decision for other participants that you might know", reminding the subjects that their decision may be relevant for their fellow students, friends or colleagues. The specific wording was intended to prevent random behavior in the others-task since this decision was not incentivized. Intrinsic empathy, therefore, was emphasized to act as a substitute for monetary rewards. However, increasing empathy and thus, reducing the emotional distance between decision-maker and consequence-bearer, may cause subjects to make decisions that are closer to their own preferences. Loss aversion is said to be rooted in emotional biases during decision-making that can be reduced if someone else decides for the agent, as the emotional distance is increased under such a framework (Andersson, et al., 2016). Besides, it also seems reasonable that a person does not want to make choices that could yield a bad outcome for someone close to himself. It is questionable whether the emotional engagement has been reduced in the others-task in this experiment due to the lack of control therefor, and because of the overall simplicity of this experiment due to limited time and resources, it is conceivable that the difference in emotional engagement between the two decisions was simply not big enough to create any

significant disparity in loss aversion. Hence, it would be interesting for further research to see what would happen if the relationship between decision-maker and consequence-bearer is further clarified, especially since specific perspective-taking has been shown to affect loss aversion (Sokol-Hessner, et al., 2009)[10].

Moreover, a within-subjects design has been chosen due to the expectedly small sample. It was also preferred over a between-subjects design since looking at difference-in-difference data provides me with a more profound estimate of the effect compared to using between-subjects measures. However, while the order of the tasks was randomized in order to prevent effects arising from a specific order of treatments, the experiment design might well have caused some learning confound, as subjects may not see any reasons why they should behave differently in the two decisions: Out of the 131 analyzed responses, 69 participants (53.67%) have stated the same preferences for himself and others. In particular, although human beings are frequently tasked with making decisions on behalf of another person, letting them do so right before or after they make the same decision for themselves seems unnatural and does not happen much in reality. Exposing them to such a circumstance may well cause subjects to behave identically in both situations, as they may fail to justify a decision-making process in which they make different choices for others compared to themselves. Thus, the results from this study would be more meaningful if they can be replicated by a between-subjects experiment with a large sample, a within-subjects design that is more natural (e.g. increased time between the tasks) or some sort of natural field experiment.

A further limitation involves the monetary amounts used in this study. Small stakes that are very close to the reference point are not particularly important, and so cannot be an analysis centered around those (Wakker, 2010b). In fact, the prospect of losing *€5* might not be sufficient to trigger an "exaggerated feeling of anxiety", which is said to be an important driver for loss aversion (Camerer, 2005). However, the results from this study suggest that on average, there is moderate loss aversion in both self- and others-decisions (mean $\lambda > 1$ in both decision tasks). It is worth noting that given the assumptions regarding linear utility and cancel-out of probability weights hold, the observed distaste towards fair and balanced bets should be caused by only loss aversion. It is not clear whether the assumptions were met, and it is imaginable that the experiment has also captured some general aversion towards dispersion in chance rather than only loss aversion.

[10] More specifically, it has been shown that when subjects were told to "think as traders", they displayed significantly lower levels of loss aversion (Sokol-Hessner, et al., 2009). Thus, a clear framing, such as "making a decision for a close friend", may yield in results that are more clear-cut and easier to translate into actionable recommendations

However, if small stakes cannot invoke loss aversion, but big stakes can, then Prospect Theory might be incomplete since, under this model, the steeper course the utility function takes for losses compared to gains should be universal for all outcomes that are considered as a loss. On the other hand, it is also possible that the setting of the reference point to the endowment is inaccurate, as this point might not reflect the reference point in the decision-makers' minds. Lastly, subjects may have predominantly combined the endowment with the gambles, changing the true nature of these. However, if any of two latter considerations turn out to be true, any incentive-compatible experiment regarding loss aversion would be difficult to conduct, as in the first case, it would be required to determine where the reference point lies and which losing amount is actually considered as a loss, whereas in the second case, it would call for a design under which participants can actually lose money at the end of the experiment. Taken all this together, it is unclear how larger stakes would change the outcomes, posing an interesting set-up to further investigate on.

This study mainly looks at the within-subjects measure of the difference in loss aversion while paying little attention to the subjects' baseline level of loss aversion. It would be interesting to explore how this baseline value influences decisions made for others. Furthermore, the results from the *Additional data exploration* chapter presents future researches with further directions, and general risk aversion and anger one feels after losing something accidentally, as an approximation for loss aversion, can both become insightful variables if they are elicited more profoundly. Moreover, even though engagement in charitable activities fails to have a significant effect on the difference in loss aversion, it would be, for a broader perspective, interesting to see how social preferences can alter the decisions made on behalf of others. Being caresome towards others may well induce one to make decisions for others that are of more loss-averse nature. On the other hand, a person that wishes to be better off than others might deliberately take excessive risks for others as part of a strategy to worsen off their payoff.

One further aspect that has not been examined in this paper is related to culture. Agents from more collectivistic cultures, such as Asian ones, may display stronger loss aversion in others-decisions, compared to those from more self-oriented cultures, such as the West (Polman, 2012). Wang, Rieger, & Hens (2017) have shown that cultural background and country of origin do have an impact on loss aversion. Specifically, the authors noted that Eastern European subjects tend to be more averse towards losses, whereas people from Anglo-American countries tend to do so to a lesser extent. Moreover, people from competitive societies also tend to be more loss-averse due to higher pressure in life. Furthermore, subjects emphasizing the importance of individualism also seem to be more loss-averse than those having a more collectivistic view of life. The authors have even shown that religion might shape loss aversion, citing that people from Orthodox-Christian countries being more loss-averse than others. While this extensive study around the impact of culture on loss aversion has been conducted with subjects making individual preference statements, it is up for future research to determine whether

subjects from, for instance, Anglo-American countries, make decisions for others that are different from those made by people from Eastern European nations.

Lastly, aside from all aforementioned limitations that were more concerned with the experiment design, it might be the case that a further limitation lies in the tool used for this experiment. Due to limited time and resources, an online experiment was conducted via *qualtrics* instead of a lab experiment. Though *qualtrics* is capable of randomizing treatments and has several other useful functions for creating a proper experimental environment, responding to an online questionnaire, on certain occasions, simply does not resemble participation in an actual experiment. Subjects were able to, for instance, respond to the questionnaire on their phone while being underway, undermining the effort that would have been required for completing this experiment. Furthermore, there was no experimenter present at the time when subjects responded to the tasks, possibly leaving the experimental environment ambiguous. Besides, since many participants were my fellow students, many of them were responding to multiple surveys in a brief period of time. Thus, it is possible that these subjects did not put much effort behind responding to this specific questionnaire, resulting in them exerting less effort than they would have done in a lab or real-life deciding-for-others situations.

Kray (2000) has shown that differences in decisions for oneself versus advice for others do not stem from the fact that advisors are exerting less effort. Instead, they rather tend to think things more thoroughly, having come up with more factors that might determine a choice when asked to think freely of as many of those attributes as possible. Polman (2012) has also stated that people who make decisions for others typically evaluate more information, compared to self-decision makers. Nevertheless, due to the aforementioned reasons and the chance of getting paid based on the random lottery incentive logic being fairly small, it is conceivable that subjects did not exert much effort in either task. What might have been a learning confound, as described earlier in this chapter, could also have been caused by the lack of effort exerted by these participants. Choosing the same options in both tasks seems like an easy and obvious decision rule that does not require much thinking process. Therefore, it would be interesting to see to what extent a real lab experiment with a richer incentive mechanism would replicate my findings.

VI. CONCLUSION

The finding that human beings display higher sensitivity to losses than to gains has been replicated myriad times, making loss aversion one of the most well-documented biases in the theory of decision-making under risk. But while loss aversion is solid and present in a variety of different choice situations, it was mostly examined in cases in which a person makes a private decision for himself. By contrast,

my study was aimed to assess whether loss aversion can be resolved by letting a person who does not bear the consequences to make the decision. Since the decision-maker is now not subject to any potential losses that can result from his actions, it was suspected that loss aversion is reduced under such a decision framework. For this purpose, an experiment with a within-subjects design was conducted, in which subjects were asked to indicate their preferences towards risky and mixed prospects for themselves and others in respective *Multiple Price Lists*.

The results from this experiment demonstrate that there is no significant difference in terms of loss aversion between these two conditions. They also suggest that loss aversion prevails in both decision frames, extending the validity of some of the implications of Prospect Theory to the domain of making decisions for others. It is conceivable that loss aversion as such is simply so deeply enshrined in our neural processes that it can prevail even if a decision is made for someone else. However, the outcomes of this experiment stand in contrast with many other scholars' findings, and the results of this study need to be further confirmed and replicated by other researchers to be more convincing, as, aside from other limitations, a short online questionnaire with simple decision tasks, which was used due to limited time and resources, might be too abstract and contain too many limitations to extract the difference in loss aversion between deciding-for-oneself and deciding-for-others.

APPENDIX

Questionnaire 1

Questions / Instructions	**Possible choices / actions**
Dear participants, My name is Minghan Zhu and I'm currently a student of Behavioral Economics at the Erasmus School of Economics Rotterdam. The following survey is part of my master thesis and aims to analyze your behavior when you are making decisions for other people. At the end of the study, one participant will get paid according to the choices that have been made during the experiment. The survey will take you approx. 5 minutes to complete. The questionnaire will consist of three parts. Prior to the start, you will be given an **endowment of €5 to cover potential losses** you might make during the experiment. In the first part, you will be asked to answer some questions regarding yourself and your socio-economic status. Please answer to those questions truthfully. Your answers, as in all parts of this survey, will be anonymized and only serve the purpose	*Proceed to the next screen unlocked after 28 seconds*

of this study. No other participant or third party will be made access to your actions. In the next step, you will be asked to state your preferences between a series of risky gambles and a fixed amount of money. Your choices are related to **your own** payoff. Please state your preferences truthfully and in a manner that best represents your feelings towards the options. Note that each preference statement can be selected to determine your final payoff. In the last part, you will be facing similar choices between risky prospects and sure amounts as in the previous part. **However, this time, your choices do not impact your own payoff, but the one of a randomly chosen participant.** Again, please state your preferences as truthfully as possible. **Keep in mind that you're deciding for other actual participants (your fellow students, friends, colleagues and so on) who care about their payoff. Please also keep in mind that your own payoff may depend on choices other people make,** so please take the questions seriously.	
At the end of the experiment, one participant will be selected to get paid. The exact amount depends on one randomly selected choice that either the participant has made for himself or someone else has made for him. If the chosen option is a risky gamble, that gamble will be played out and the result will be added to the **initial endowment of €5**. You will then receive either €5 plus the money you won or €5 minus the money you lost. If the chosen option is for the sure amount, then the payout will consist of the endowment of €5 and the sure amount. Please enter your e-mail address at the end of the survey if you're interested in receiving your payoff. In case you have further questions, feel free to contact me: 504831mz@student.eur.nl Thank you very much for your participation!	*Proceed to the next screen unlocked after 12 seconds*
What is your age?	18-24 25-34 35-44 45-54 55-64 65 and above
What is your gender?	Male Female Other*
Are you currently enrolled as a student?	Yes No
What is the highest level of education you have obtained?	Lower than high school* High school diploma

	Vocational education Bachelor's degree Master's degree Doctorate or higher
What is your monthly disposable income?	Under €1000 €1000 - €2000 €2000 - €3000 €3000 - €4000 €4000 and above
Have you ever worked in one of the following domains or positions? You can select multiple answers.	Financial industry Insurance industry Doctor or healthcare industry Gambling industry* Higher management position of any company None of those above
Are you currently in possession of any investments? (Stocks, bonds, investment funds, etc.)	Yes No
Have you ever participated in any kind of gambling before?	Yes No
Have you ever donated money to charity organizations or engaged yourself in charitable activities?	Yes No
On a scale from 0 (extremely avoiding risk) to 10 (extremely liking risk), how do you see yourself in terms of willingness to take risks?	Scale from 0 (extremely avoiding risk) to 10 (extremely liking risk), with increments of 1
On a scale from 0 (not upset at all) to 10 (extremely upset), how do you feel every time whenever you lose something accidentally?	Scale from 0 (not upset at all) to 10 (extremely upset), with increments of 1
In the next step, you will be asked to state your preference between a left and a right option. Your choices here affect **your own payoff**. Note that one randomly selected choice can be used to determine your payoff in case you are selected as the participant to be paid out.	*Proceed to the next screen unlocked after 5 seconds*
Please indicate your preference between the left and the right option for each row.	*Multiple Price List (Table 1)*
Now, you will be asked to indicate your preference between a left and a right option as before. However, the choices you make here **do not influence your own wealth**, but **one other randomly selected participant's payoff**. Keep in mind that you're deciding for other actual participants you might know (your fellow students, friends, colleagues and so on) and that they care about their payoff. Please also keep in mind that your own payoff may depend on choices other people make, so please take the choices seriously. Note that one randomly selected choice can be used to determine someone else's payoff.	*Proceed to the next screen unlocked after 9 seconds*

Please indicate your preference between the left and the right option for each row.	*Multiple Price List (Table 1)*
Please enter your e-mail address in case you are interested in being paid off. If not, please simply proceed.	*Empty field for e-mail addresses*

Note: All options marked with * were not selected by any participant. Hence, these response items do not appear in the regression results of *Table 5*.

Questionnaire 2

Questions / Instructions	**Possible choices / actions**
Dear participants, My name is Minghan Zhu and I'm currently a student of Behavioral Economics at the Erasmus School of Economics Rotterdam. The following survey is part of my master thesis and aims to analyze your behavior when you are making decisions for other people. At the end of the study, one participant will get paid according to the choices that have been made during the experiment. The survey will take you approx. 5 minutes to complete. The questionnaire will consist of three parts. Prior to the start, you will be given an **endowment of €5 to cover potential losses** you might make during the experiment. In the first part, you will be asked to answer some questions regarding yourself and your socio-economic status. Please answer to those questions truthfully. Your answers, as in all parts of this survey, will be anonymized and only serve the purpose of this study. No other participant or third party will be made access to your actions. In the next step, you will be asked to state your preferences between a series of risky gambles and a fixed amount of money. **However, your choices do not impact your own payoff, but the one of a randomly chosen participant.** Please state your preferences truthfully and in a manner that best represents your feelings towards the options. **Keep in mind that you're deciding for other actual participants (your fellow students, friends, colleagues and so on) who care about their payoff. Please also keep in mind that your own payoff may depend on choices other people make,** so please take the questions seriously. In the last part, you will be facing similar choices between risky prospects and sure amounts as in the beginning. This time, each preference statement is related to **your own** payoff. Again, please state	*Proceed to the next screen unlocked after 28 seconds*

your preferences as truthfully as possible. Note that each preference statement can be selected to determine your final payoff.	
At the end of the experiment, one participant will be selected to get paid. The exact amount depends on one randomly selected choice that either the participant has made for himself or someone else has made for him. If the chosen option is a risky gamble, that gamble will be played out and the result will be added to the **initial endowment of €5**. You will then receive either €5 plus the money you won or €5 minus the money you lost. If the chosen option is for the sure amount, then the payout will consist of the endowment of €5 and the sure amount. Please enter your e-mail address at the end of the survey if you're interested in receiving your payoff. In case you have further questions, feel free to contact me: 504831mz@student.eur.nl Thank you very much for your participation!	*Proceed to the next screen unlocked after 12 seconds*
What is your age?	18-24 25-34 35-44 45-54 55-64 65 and above
What is your gender?	Male Female Other*
Are you currently enrolled as a student?	Yes No
What is the highest level of education you have obtained?	Lower than high school* High school diploma Vocational education Bachelor's degree Master's degree Doctorate or higher
What is your monthly disposable income?	Under €1000 €1000 - €2000 €2000 - €3000 €3000 - €4000 €4000 and above
Have you ever worked in one of the following domains or positions? You can select multiple answers.	Financial industry Insurance industry Doctor or healthcare industry Gambling industry* Higher management position of any company None of those above

Are you currently in possession of any investments? (Stocks, bonds, investment funds, etc.)	Yes No
Have you ever participated in any kind of gambling before?	Yes No
Have you ever donated money to charity organizations or engaged yourself in charitable activities?	Yes No
On a scale from 0 (extremely avoiding risk) to 10 (extremely liking risk), how do you see yourself in terms of willingness to take risks?	Scale from 0 (extremely avoiding risk) to 10 (extremely liking risk), with increments of 1
On a scale from 0 (not upset at all) to 10 (extremely upset), how do you feel every time whenever you lose something accidentally?	Scale from 0 (not upset at all) to 10 (extremely upset), with increments of 1
In the next step, you will be asked to indicate your preference between a left and a right option. The choices you make here **do not influence your own wealth**, but **one other randomly selected participant's payoff**. Keep in mind that you're deciding for other actual participants you might know (your fellow students, friends, colleagues and so on) and that they care about their payoff. Please also keep in mind that your own payoff may depend on choices other people make, so please take the choices seriously. Note that one randomly selected choice can be used to determine someone else's payoff.	*Proceed to the next screen unlocked after 9 seconds*
Please indicate your preference between the left and the right option for each row.	*Multiple Price List (Table 1)*
Now, you will be asked to state your preference between a left and a right option as before. However, your choices here affect **your own payoff**. Note that one randomly selected choice can be used to determine your payoff in case you are selected as the participant to be paid out.	*Proceed to the next screen unlocked after 5 seconds*
Please indicate your preference between the left and the right option for each row.	*Multiple Price List (Table 1)*
Please enter your e-mail address in case you are interested in being paid off. If not, please simply proceed.	*Empty field for e-mail addresses*

Note: All options marked with * were not selected by any participant. Hence, these response items do not appear in the regression results of *Table 5*.

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