

A PROCESS ACCOUNT OF THE ENDOWMENT EFFECT:
VOLUNTARY DEBIASING THROUGH AGENTS AND MARKETS

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We contest the loss aversion theory of the endowment effect, in which the effect depends on the status of endowment alone. Instead, we propose that the nature of the trading process determines whether people resist or accept an exchange by affecting the responsibility people feel for their choice. The more they feel responsible for the decision, the more they expect experiencing regret over a negative outcome. Aversion to regret causes people to resist a rational trade and exhibit the endowment effect. In a series of experiments, we analyze two institutions that alter the trading process and reduce perceived responsibility --agency and markets. We find that both mute the endowment effect; moreover, participants intentionally use them to self-debias. Since many institutions shift responsibility, we conclude that the endowment effect is not present in many domains previously thought to implicate it. Institutional design often need not rely on paternalistic intervention.

I. INTRODUCTION

According to Rational Choice theory, the amount that each person values a good or entitlement should not be affected by whether he owns or possesses it if transaction costs are absent.¹ Thus, the amount that a non-owner would be willing to pay to purchase a good (WTP) should equal the minimum amount that the same person would be willing to accept to part with the good if he owned it (WTA). Yet extensive experimental evidence seems to suggest that this basic statement of Rational Choice theory often does not hold. Instead, people often seem to value goods that they own (or possess) more than those they do not. This gap between WTA and WTP values is referred to as the “Endowment Effect” (Tversky & Kahneman, 1991; Kahneman, Knetsch and Thaler, 1991). Evidence of the endowment effect has been found in numerous studies using different methodologies (basic exchange experiments but even fMRI studies) and a wide variety of entitlements (ranging from mugs to lotteries) and across different cultures.²

The endowment effect has important implications for legal policy. First, it implies that people may reject exchanges that would leave them with higher utility *ex*

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¹ Rational Choice Theory predicts that ownership will affect valuation if there are wealth effects, in that the good is sufficiently valuable to shift out a subject's budget constraint.

² See generally Henrich, et. al. (2005); Horowitz and McConnell (2002 (both survey studies). Moreover, there is evidence that the effect persists when subjects do the experiment multiple times (Shogren, et. al. (1994)).

*post.*³ This undermines a central insight of the Coase Theorem that, absent transactions costs, bargaining will result in the entitlement allocation that maximizes total social welfare (*e.g.*, Hoffman and Spitzer 1993; Epstein 2003, at 211). Thus, and in contradiction to the Coase Theorem, the initial allocation of goods affects trading outcomes.⁴

Legal scholars have relied on the endowment effect to justify a wide variety of legal interventions.⁵ Yet the justification for legal intervention is weaker than many have assumed. Legal interventions can be costly and prone to error.⁶ Accordingly, before we intervene, we should analyze whether people have the ability, and the incentive, to deliberately overcome the endowment effect on their own (hereinafter “debias”⁷).⁸ Whether people have the ability to self-debias warrants exploration because an increasing number of studies suggest that the endowment effect does not depend on possession alone but also on the context of trading. For example, evidence shows that agents who possess a good, but are acting on behalf of others, do not exhibit the endowment effect (Marshall, et al. 1986; Knetch and Sinden 1984; see also Korobkin and Guthrie 1997).⁹ Other studies report that repeated experience in trading a given commodity in market transactions attenuates the endowment effect (see List 2003; Engelmann & Howard 2010). If people do not exhibit an endowment

³ The endowment effect implies that the compensation people ask for a good that they own i.e., their Willingness To Accept (WTA) exceeds the amount they would be willing to pay (WTP) for the very same good if it was not their endowment. The endowment effect complicates the concept of social welfare. Assuming that the effect changes true valuations, it is difficult to determine what allocation maximizes total social welfare when the amount each person values an object depends on whether she is entitled to it or not (Hoffman and Spitzer 1993, pp. 103-113). See our discussion of the question on page xx.

⁴ For an excellent discussion of the legal literature on the endowment effect see Klass and Zeiler 2013.

⁵ See generally Sunstein (1986, pp. 1169); Jolls (2009). Authors using the endowment effect to justify specific interventions include Jolls, Sunstein & Thaler (1998); Jolls (2000 246-47); Jolls and Sunstein (2006: pp. 220-25); McCaffery, Spitzer & Kahneman (1995); Moss & Huang (2009, pp. 258); Block-Lieb & Janger (2006: 1548, 1554, 1565); Zimmerman (2010: 1138); Lemley (2012: 485-86); Lemley & McKenna (2010: 168).

⁶ Paternalistic interventions may not be welfare-enhancing for many reasons. The government often does not have sufficient information to determine peoples’ best interests. Also, government actors may be affected by behavioural biases or are captured (Arlen 1998: pp. 1769-70; Jolls & Sunstein 2006: p. 231-32). In addition, legal rules generally need to be standardized, which can work to the detriment of those with different preferences from the average person. Finally, substantive government intervention can undermine individuals’ sense of autonomy and thereby reduce people’s welfare (see generally Rachlinski 2003; Jolls & Sunstein 2006: pp. 228-231).

⁷ We use the term “bias” to refer to the endowment effect and “debiasing” to label mechanisms that overcome it because the term is commonly used in a broad sense in the literature. Also, although the endowment effect is not a bias under the status account, but instead is a distortion of preferences, under our theory it is a bias, as explained below. See *infra* text accompanying notes 16-17. Our study will show that people can be aware of the distortion, still awareness alone does not change their preference.

⁸ See generally Romano (1986); Arlen (1998: p. 1777, 1780); Rasmussen (1998: pp. 1697-98); Korobkin (2003); Posner; Arlen Spitzer Talley (2001); Jolls and Sunstein (2006: p. 226); Rachlinski (2003: pp. 1211-13).

⁹ A different study shows that people who are agents do not exhibit an endowment effect when making exchanges on *their own* behalf with their principal (Arlen, Spitzer, & Talley 2001). These findings do not address whether individuals can self-debias by employing someone else (an agent) to trade on their behalf in one-time arms-length transactions.

effect in some institutional contexts, they may deliberately seek out those institutions to overcome their bias and trade when it increases their welfare. Whether people are really willing to self-debias depends critically on the mechanism behind the endowment effect and whether institutional factors can influence it.

Under the traditional status-based account of the endowment effect people have no incentive to debias. The classic explanation for it is given by prospect theory (Kahneman & Tversky, 1979) and is accepted by many Behavioral Law and Economics scholars. It assumes that loss aversion leads to an increased valuation of the good when it is sold as compared to when it is purchased because selling creates a loss while buying generates a gain. (Thaler, 1980). So people who are endowed with a good genuinely place a higher value on it than they did before they owned/possess it.¹⁰ In this account, the endowment effect results from cognitive processes that people are not aware and have no control of, suggesting that people cannot debias. Moreover they would not want to, because they lack an incentive to debias; since their valuation is genuine they reject exchanges at the lower willingness-to-pay value. By contrast, we propose and test a process account of the endowment effect. We assume that the endowment increases the psychological cost associated with the decision to trade the good, without necessarily altering how it gets valued. In that case people would benefit if they could change the process of trading, enabling them to obtain the economic gain of the exchange at a lower psychological cost. While the status account of the endowment effect predicts that people do not care about self-debiasing, our process account implies that they have an incentive to debias.

Studies that question the status-based account find that people indeed do not always exhibit an endowment effect when status-based Prospect Theory would predict that they should (Plott & Zeiler 2005, 2007).¹¹ Endowed agents as well as experienced

¹⁰ Consistent with Prospect Theory, studies show that many factors drive loss aversion, such as the level of personal attachment (Strahilevitz & Lowenstein, 1998) or self-association with the good (Maddux et al., 2010), and thus, it is argued, also should increase the endowment effect. E.g., Heller & Hills (2008, pp. 1479) (“Humans have a well-verified psychological inclination to value their current endowments more than identical items that they currently lack but could purchase”); Amir & Lobel (2008, at 2103) (“Ownership causes individuals to request far more money when selling an item than non-owners are willing to pay.”); Berman (2011 at 1720)(citing Loss Aversion as the preferred explanation for the endowment effect); Serkin (2009, p. 1267-68). Of course, not all legal scholars writing on the endowment effect accept this view, see, e.g., Arlen (1998); Korobkin (2003, at pp. 1254-55) (describing the literature on the regret-based theory of the endowment effect); Plott & Zeiler (2005, 2007); Arlen & Talley (2008). Similarly, evidence shows that buying and selling shifts the attentional focus of the decision maker (Fischer, et al., 1999), with sellers focusing on the object they are about to surrender and buyers on the money they will forego (Carmon & Ariely, 2000). Johnson et al. (2007) argue that sellers first consider why they may reject the transaction and then what suggests entering it, while buyers process the two queries in reverse order. The ordering biases the process, since first queries have a stronger impact on preference formation.

¹¹ See, e.g., Brown (2005); Novemsky & Kahneman (2005, pp. 123-24, 127); Knetsch and Wong (2011); Carmon, Wertenbroch, Zeelenberg (2003); Plott & Zeiler (2005, 2007, 2011); see also Arlen, Spitzer, Talley (2001). Early evidence contrary to this loss-aversion-derived view of the Endowment Effect is found in experiments showing that subjects do not exhibit an endowment effect with pens (bar-Hillel & Neter 1996) and “numeraire goods” (Kahneman et al. 1990, at 1329-32). See (Weaver & Frederick 2012) (discussing how these findings are inconsistent with a “pain-of-losing” account of the endowment effect); see generally Horowitz and McConnell, 2002 (surveying studies); Brown and Gregory; Sayman and Öncüler 2005). Similarly, evidence also shows that people also may not endow a good they own if they acquired it for exchange rather than use (e.g., List, 2003; Novemsky & Kahneman (2005). Beyond this, Loewenstein and Issacharoff (1994) found that they could enhance the

traders are not biased.¹² Trying to account for this evidence, scholars have suggested that the endowment effect may result from anticipated regret reducing people's willingness to trade. Zhang and Fishbach (2005) suggest that sellers want to avoid the regret of trading an entitlement for too low a price while buyers want to avoid overpaying. Agents work on behalf of others and professional traders are accustomed to the ups and downs of their business, therefore they have less regret and do not exhibit an endowment effect.

Studies on lotteries confirm that anticipated regret associated with trading a winning ticket induces the bias. People even refused to exchange one lottery ticket for another of equal expected value plus a bonus for trading (Ritov & Baron 1995; Bar-Hillel & Netter 1996; Maimaran 2011).¹³ Whether loss and regret aversion interact in triggering the endowment effect is yet unknown, but there is growing evidence that regret aversion is a strong trigger of the endowment effect.

Since regret imposes an unwanted psychological cost on people's decision to trade, endowed people's greater resistance to trading is not primarily driven by an increased valuation of the endowed object, but results from their need to compensate for anticipated regret over trading. Instead of asking for higher compensation people may also choose to reduce their regret if the right institutions are available. The gains from trade are the incentive to reduce regret and mute the endowment effect.

endowment effect by enhancing a subject's sense of entitlement to the good. Arlen, Spitzer, Talley (2001) found that a simple change in the framing of the experiment can eliminate the endowment effect even with respect to University coffee mugs. Specifically, subjects told to assume that they are agents of a firm did not exhibit an endowment effect in cash-for-mug transactions with that firm, even though subjects were trading for themselves. Neither of these results appears to be compatible with a simple, ownership-triggered view of what triggers the Endowment Effect. See generally Arlen (1998) (discussing these studies and their implications for the standard Behavioral Law & Economics account of the Endowment Effect); Korobkin (2003) (same); Arlen & Talley (2008) (same).

More recently and more generally, Plott and Zeiler (2005) provide evidence that loss aversion does not explain observed valuation gaps and find evidence of subject misconceptions related to the valuation elicitation device. In a follow up study, they reject loss aversion as an explanation for observed exchange asymmetries, instead finding support for alternative explanations related to, for example, the elicitation mechanism (public choices) and the procedures used to endow (Plott and Zeiler 2007). Additional evidence consistent with their core results includes Isoni, et al. (2011). Plott and Zeiler (2005, 2007) do not claim that there is no WTA-WTP gap, but only that it is not explained by loss aversion or standard Endowment Effect Theory (Plott & Zeiler 2011).

¹² See *supra* note 7. *E.g.*, Camerer (2005); Bar-Hillel & Netter (1996); Maimaran (2011); Loewenstein & Issacharoff (1994); Zhang & Fishbach (2005); Lin, Chuang, Kao, & Kung (2006); Martinez, Zeelenberg, & Rijsman (2011). The role of emotion in human decision making rejects the idea that people employ any single unitary decision making program (such as Rational Choice theory or Prospect Theory) to make all decisions. People employ a variety of decision-making programs, often simultaneously, some of which operate below our level of self-awareness (*E.g.*, Camerer, Loewenstein, and Prelec, 2005; Cosimedes & Tooby, 2006). But note, once subjects realize that they experience regret, avoiding it can be a rational response. The idea of self-debiasing builds on it: Participants deliberately suppress regret by delegation.

¹³ The magnitude of regret at exchanging a lottery ticket appears to be associated with the anticipation of regret if one exchanges a ticket and fails to win (especially if one learns that you exchanged a winning ticket), as opposed to depending on whether the subject learns that someone else received one's ticket and won with it (Bar-Hillel & Netter 1996).

Whether people can debias depends on what affects regret. Recent studies suggest that at the core of regret is the fear of making a bad deal.¹⁴ We propose in contrast that regret is not only determined by the potential loss associated with a bad deal. Instead, the amount of regret people anticipate strongly depends on the process of trading: people experience greater anticipated regret the more they feel responsible for the decision to trade. Consequently people should be able to minimize their level of regret by reducing their direct responsibility for making the choice.¹⁵ In other words, people should be able to debias.

Our process theory thus implies that we should treat the endowment effect as a bias.¹⁶ Bias does not only refer to cognitive misperceptions. It also includes motivational deviations from rational decision making, such as the sunk cost fallacy. A motivational bias occurs when the process of decision making produces a psychological cost that people try to unconsciously or consciously avoid. If this psychological cost --rather than the actual choice options--motivates people to deviate from rational choice predictions, then their behavior is biased. Thus the motivational bias distinguishes between the utility subjects derive from the consequences of their choice and the emotional costs of decision making. In our process account, subjects would accept a trade were they to focus on the outcome of the choice alone (as Rational Choice Theory predicts); nevertheless they reject to trade in order to avoid regret for a decision that they feel responsible for. Regret and responsibility aversion bias their motivation.¹⁷

Our process account of the endowment effect allows us to analyze institutions involved in the trading process to determine whether they likely influence the bias in real world domains. We focus on two institutions that we expect to weaken peoples' sense of responsibility for their trading decision.¹⁸ The first institution is agency. Evidence from dictator games shows that participants can shift personal responsibility for an unfair decision by delegating the choice to an agent (Bartling and Fischbacher 2012; see also Hamman, Loewenstein, & Weber 2010).¹⁹ We expect that, similarly,

¹⁴ Regret depends on many factors, some of which are outside people's control. These external factors include the nature and uniqueness of the entitlement or market prices, see Korobkin 2003. Since we are interested in self-debiasing we focus on factors that people have in their control.

¹⁵ Gilovich and Medvec (1994: 362) ("people's regrets typically involve only those negative outcomes for which they feel partly responsible,"); van Dijk, & Manstead 1998, 2000; Zeelenberg et al. (1998), what precisely drives regret is hotly contested, Connolly & Zeelenberg, (2002).

¹⁶ By contrast, under the status theory of the endowment effect there is no such distinction. Instead, the effect represents a shift in actual valuation. Therefore, some advocates of this theory do not refer to the effect as a bias.

¹⁷ Of course the psychological costs of decision making could be included in the utility function, making subjects behave in line with rational predictions when they refuse to trade. Advocates of such a broad concept of rational choice theory might prefer a different term than bias. But this understanding would not question our major distinction between psychological costs of the process of decision making itself and the utility subjects derive from available options. It would only lead to a change of terminology, which would neither change our results nor their relevance to the endowment effect.

¹⁸ There are other studies which analyze mechanisms for debiasing other deviations from rational choice. For example, Babcock et al. show that prompting parties to consider the weaknesses of their case muted self-serving biases in the context of settlements.

¹⁹ Similarly, there is evidence that third parties attribute less blame to principals if the principal acted through an agent and directed him to violate the norm Paharia et al. (2009); see generally Hill (2012)

people will attribute responsibility for a bad trading decision to the agent who made the decision for them. They therefore should more readily accept welfare-enhancing trades and delegate the decision to trade to their agent when given the opportunity to do so.²⁰

The second institution we examine is markets. Previous research reports that people tend to reduce their sense of responsibility by adjusting their behavior to conform to decisions made by other actors. Markets are a domain where decision-making is easily observed and bandwagon effects are often observed (Simonson 1992; see Kahneman and Miller 1968). We assume that endowed market participants reduce responsibility by conforming to others, and thereby reduce their anticipated regret over bad outcomes. This herding behavior can reduce the endowment effect when people trade in markets that are dominated by professional traders who generally are not subject to the endowment effect, because they hold the entitlement for its exchange value (List 2004, Novemsky and Kahneman, 2005)²¹ or they are agents trading on behalf of others (Loewenstein & Adler 1995).²²

We tested our hypotheses in a series of treatments. In each treatment, subjects were initially given a lottery ticket marked Heads or Tails with the chance to win 8 Euros if their ticket matched the outcome of a coin toss. We observed their willingness to trade their lottery ticket for the alternative ticket plus additional compensation (25 €-Cents). Our *Base* treatment establishes subjects' willingness to trade absent any intervention, and was designed to replicate the endowment effect.²³ As expected, although Rational Choice Theory predicts that all participants should trade in order to gain the additional 25 €-Cents), we found that subjects in this condition rarely trade their tickets, consistent with the endowment effect. We then examined the effect of agents and markets on subjects' willingness to trade. Subjects knew that no one else (e.g., neither their agent nor the group) could have better information about which ticket (Heads or Tails) would win. Thus, we were able to attribute any treatment effect on the frequency of trades to the fact that these institutions reduce subjects' sense of responsibility for, and regret over, the decision to trade.

In our first agency treatment, subjects were assigned to an agent to make the trading decision, but the subject retained the right to veto the decision. A loss aversion status account of the endowment effect would predict that subjects should genuinely prefer their original ticket and thus should veto the agent's trading decision. By contrast, we hypothesized that subjects would accept the agent's decision to trade,

²⁰ We give principals veto power because people are more likely to use agents to mute the endowment effect if they do not have to sacrifice autonomy (see Arlen & Tontrup 2013) and can control agency costs.

²¹ To them, the deal contains little uncertainty because they know the goods well and hold them only for trading. Thus they have little reason for regret and do not exhibit an endowment effect (List 2004; see Novemsky and Kahneman, 2005).

²² We explore both markets and agency because they present different ways of shifting the attribution of responsibility. Subjects can use agents to delegate the action while retaining a veto. In the market context, people perform the action themselves, but shift responsibility by imitating the decision of others.

²³ Studies showing that subjects exhibit an endowment effect in lottery tickets include Bar-Hillel & Neter 1996; see also Knetsch and Sinden 1984; Marshall, Knetsch and Sinden 1986).

because agency intervention allows them to attribute the primary responsibility for the decision, and the negative outcome it might bring, to their agent. Thus, the intervention of the agent would enable subject to trade and obtain the monetary bonus without bearing the full psychological cost of regret. Consistent with this hypothesis, we found that the vast majority of subjects whose tickets were traded by the agent let the trade go through. In a second agency treatment, we examined whether subjects would voluntarily delegate the initial trading decision to an agent in order to self-debias. We found that many subjects delegated--even though they could easily make the trading decision themselves and could leave the laboratory much earlier if they did not delegate. Delegation increased the frequency of trades significantly. Moreover, nearly all subjects who delegated accepted their agents' decision to exchange tickets. Since participants predicted that their agents would trade, the results suggest that they delegated because they wanted to trade without assuming the responsibility for the decision and the cost of anticipated regret. In other words, they deliberately chose to debias.²⁴

In our market experiment, subjects retained full authority of the trade decision but were given information about the choices of other subjects, which was taken from a session in which most participants had exchanged their ticket. We find that the majority of subjects decided to trade, consistent with our explanation that the market allows subjects to shift their responsibility for making the decision to the other participants by conforming to their choices.

Previous studies have manipulated the magnitude of the endowment effect by framing or priming subjects with regret (Loewenstein & Issacharoff 1994; Lerner, Small, and Loewenstein 2004; Lin, Chuang, Kao, and Kung 2006; Ritov & Baron 1992; Martinez, Zeelenberg, Rijsman 2011; Wang 2009; Zhang and Fischbach 2005), but to our knowledge, this is the first article to show the causal link between responsibility and regret as a source of the endowment effect and to use this relationship to explain the debiasing effect of agency and markets. We also are the first to show that endowed people can and will voluntarily debias if given the opportunity to do so. Our process account of the endowment shows that regret is not only about the loss of a commodity itself but about the structure or process of the trade. The theory opens the door for an institutional approach, since the process of trading can be changed by institutions. Since the institutions we analyzed are the natural domain for business transactions, our results suggest we assume that the endowment effect occurs much less frequently in business relationships than previously thought.

This article proceeds as follows. Section 2 describes the design of our agency experiment. Section 3 presents our behavioral predictions and section 4 reports the results. Section 5 explains design and hypotheses of our second experiment examining conformity in markets. In section 6 we discuss results and policy implications for both experiments. The last section concludes.

²⁴ We ran an “*information only*” agency treatment to control for the possibility that subjects might mistakenly believe agents had better information or expertise. Subjects in this treatment were no more willing to trade than in the Base treatment.

II. AGENCY EXPERIMENT

A. Experimental Design

Our basic experimental setting is a judgment and decision-making task in which participants are endowed with an entitlement and then offered the opportunity to trade it for an economically identical item plus a monetary bonus. Our control treatment is designed to replicate the standard result that subjects on average exhibit an endowment effect, in that they should refuse to trade their entitlement and sacrifice the bonus. Our treatments examine the effect of agency on subjects' willingness to trade. In each treatment, whenever the agent is used he makes the initial decision to exchange tickets. All agents are incentivized to trade and possess the same information as the subject. In each treatment, subjects can accept the agent's decision or veto it; subjects who veto decide for themselves whether to trade. This enables us to examine whether the use of agents affects subjects willingness to trade when agents assume responsibility for making the affirmative decision to trade. The subjects' ultimate autonomy/control over the decision is guaranteed by a veto option. This setup is designed similar to many real-life agency relationships. In the first treatment, *Mandatory Agent*, use of the agent is mandatory and we test whether subjects are more willing to exchange tickets when the agent assumes the responsibility for the decision to trade. In our second treatment, *Optional Agent*, we analyzed whether endowed subjects are willing to delegate the initial trading decision to an agent (who is incentivized to trade), instead of making the decision themselves. We analyze both the decision to delegate and whether subjects' voluntary use of agents affects their willingness to trade. For both agency treatments we predicted that subjects would be more willing to exchange tickets because the initial decision of the agent reduces the subjects' responsibility for the outcome, and thus the regret they anticipated to feel should they lose in the lottery. The second treatment tells us whether principals are aware that their responsibility and regret aversion keeps them from trading and thus deliberately delegate in order to trade without experiencing regret.

To isolate the role of responsibility in reducing the endowment effect, we had to make sure that subjects respond to the agent's intervention solely because it mutes the subject's felt responsibility for the trade, and not because the subject believes that the agent has superior information about the outcome. We addressed this potential confound in several ways. First, we selected an object for participants to trade about which the agent could not have better information. Thus, rather than using a commodity, such as a mug, we endowed each subject with a lottery ticket (designated Heads or Tails) that provided a monetary payoff in the event that a coin toss matched the ticket. Participants could exchange their ticket for an identical second ticket and were offered a monetary bonus for the exchange. Since the endowed and the exchanged good were identical in attributes and payoff expectation,²⁵ neither the agent nor the experimenter could have superior information about which ticket would

²⁵ Prior experiments have found that subjects exhibit an endowment effect in lottery tickets (Knetsch and Sinden 1984; Marshall, Knetsch and Sinden 1986; Bar-Hillel & Neter 1996; Maimaran 2011).

win. The easily understood and familiar²⁶ game (a coin toss) ensured that principals had no reason to rely on agents for superior expertise about the game itself.²⁷ Third, we informed principals (correctly) that agents were paid only if they traded the ticket. This ensured that subjects would have strong confidence about the motive the agents had for trading the ticket: agents trade to collect their earnings and not because of superior knowledge or expertise. This design also excluded effects of ambiguity aversion that might have distorted results were principals uncertain about whether the agent would trade or not.²⁸ For confirmation, we asked subjects control questions before they made their choices to ensure they understood that the agent did not have more information than they did.²⁹ Finally, we conducted a control treatment in which subjects received information about the trading decision of an agent acting for a different principal, and then made their own decision in light of that information. This treatment allowed us to disentangle the effect of shifting responsibility to an agent from any confounding impact of the (illusory) informational content of the agent's choice.

To avoid having subjects' decisions distorted by other-regarding preferences, principals were correctly informed that none of their decisions would affect their agent's payoffs.³⁰ Finally, to exclude any effect of distrust in the experimenter, we not

²⁶ Most people have experience with a coin toss that determines an outcome they care about (such as who gets the ball first in a sporting event).

²⁷ Plott & Zeiler (2011) raise general concerns about the use of lotteries as an experimental work horse. But their concerns focus on experiments which require subjects to value lotteries with different payoffs and probabilities of winning. Subjects' payoffs are determined randomly using a Becker–DeGroot–Marschak mechanism. Our lottery, by contrast, only requires subjects to understand that the probability of winning with a ticket marked Heads is identical to the probability of winning with a Tails ticket, since our lottery contained only two tickets of which one had to be the winner. We posed control questions to confirm participants comprehension. This extremely simple structure seemed to effectively eliminate misconceptions, since all but one participant passed our control questions. Finally our results should hold as long as any sources of problems are consistent across treatments, such that the differences in trading behavior must be driven by our manipulations and not something else.

²⁸ Our decision to incentivize agents to select the option with the highest expected value for the principal is consistent with the view that agents acting for principals do not exhibit an endowment effect even when the principal would when acting for himself. This hypothesis gains support from experiments that people predicting their own behavior with respect to trading an object do not accurately predict that they will exhibit an endowment effect (Loewenstein and Adler 1995). These subjects are the most loyal agents possible—as they are agents for themselves. Similarly, there is evidence that buyers' agents do not accurately predict the endowment effect of sellers even when incentivized to do so. (van Boven et al. 2003).

²⁹ Our use of lottery tickets also helps us to address methodological concerns with some endowment effect experiments, as we will describe in detail below in the discussion section. In experiments in which subjects are endowed with an object such as a mug, subjects may view the experimental condition as signaling that the experimenter either views the mug to be particularly desirable or wants the subject to have the mug. Subjects may then infer increased quality from the fact that they were given the object (Korobkin 2003: 1247; Plott & Zeiler 2007). In our experiment, subjects were told that all participants would start the experiment endowed with an economically identical ticket and that Heads and Tails tickets were randomly distributed. The strictly random process of assigning the tickets and the simplicity of the lottery (with only two tickets with the same probability of winning) guaranteed that participants could not derive that their personal ticket had superior quality. Obviously the ticket also had no value itself (See Korobkin 2003: 1247 noting that experiments finding the endowment effect using lotteries would not be plagued by the problem of subjects perceiving information signals from the experimental manipulation).

³⁰ The agent was paid for the decision to trade even if the principal decided to veto the agent's decision. As expected, agents followed their incentives and all but one decided to trade.

only instructed participants that in line with the strict convention of experimental economics, no deception would be used in the experiment (no false coins etc.), but participants were also told that they could either accept the coin toss the experimenter would perform at the beginning of the experiment (which remained hidden until the end) or throw the coin themselves after the session.³¹

Our dependent variable for measuring the effect of our treatments on the endowment effect is the frequency of subjects who traded their ticket. All treatments were completed with a post-experimental questionnaire. Subjects were asked to indicate the regret they expect to feel, assuming that they lose in the lottery after they decided to trade their ticket on a 7-item *Likert* scale (1=no regret at all; 7=very strong regret).

1. *The Base Treatment*

Each subject was initially endowed with a ticket with the word “Heads” or “Tails” written on it, representing the outcome of a coin toss. The subjects obtained their ticket by withdrawing the sealed ticket from a box. For each subject, a coin was tossed and covered (hiding the outcome) before subjects made their trading decisions privately in their individual room. Subjects were told that they either could accept the covered outcome or throw the coin themselves after the experiment was finished. This guaranteed that participants trusted that neither they nor the experimenter knew whether “Heads” or “Tails” was the winning ticket. Subjects were instructed that they would receive 8 Euros (€ hereafter), which equals approximately \$10, if the ticket they held at the end of the session matched the result of the coin toss. Thus, each subject began the experiment with a ticket that had a 50% chance of winning 8 €.

After reading the instructions and correctly completing all control questions,³² subjects were offered the opportunity to exchange their ticket for a ticket with the alternative symbol on it (Heads/Tails) plus a monetary payment of 25 €-Cents. Given that each ticket (Heads or Tails) had the same expected value (4 €), each subject’s expected earnings were strictly higher if he traded his ticket. Thus, a rational participant, who is not subject to the endowment effect, should exchange his ticket for the alternative (equally valuable) ticket in order to obtain the guaranteed monetary bonus. A subject who retains the ticket is exhibiting the endowment effect (Knetsch and Sinden 1984; Marshall, Knetsch and Sinden 1986; Bar-Hillel & Neter 1996; Maimaran 2011).

2. *Mandatory Agent*

In our first agency treatment, *Mandatory Agent* (hereinafter *Mandatory*), each subject (principal) was assigned an agent automatically. The principal was instructed that the agent would decide whether the principal’s ticket would be exchanged for the alternative ticket. The principal was informed that each agent would receive 2 € for making the decision whether to trade his ticket if, but only if, the agent decided to

³¹ Almost all participants accepted the experimenters’ coin toss, suggesting first that subjects did not hold any distrust and second, and in line with our theory, that they shied away from taking over responsibility for the trade.

³² Subjects could only proceed with the experiment if all answers were correct, confirming that they fully understood both the payoff function and the choices they had to make).

trade the principal's ticket.³³ Agents did not share in the outcome of the lottery. Principals were instructed that the agent's decision would be binding unless they intervened to veto it.³⁴ A principal who vetoed the agent's choice could then decide whether to trade or keep his initial ticket. In order to ensure that a principal's acceptance was not distorted by other-regarding preferences, subjects were informed that the agents who decided to trade the ticket would be paid 2 € even if the principal vetoed the trade. Whether or not the principal vetoed the decision of the agent did not influence this payment.

The *Mandatory* treatment shifts the responsibility for the affirmative decision to trade to the agent, while leaving unchanged the potential loss (or gain) associated with the choice. The agent enables the principal to trade without assuming responsibility for the action; the principal only bears responsibility if he intervenes and vetoes the trade.

3. *Optional Agent*

The *Mandatory* treatment both shifts responsibility and transforms the subject's role from action to inaction. Our second treatment allows us to clearly distinguish the influence of these two factors. We aim to show the effect of agency attenuating outcome responsibility in a context where subjects must take an action if they want to trade. In this treatment, *Optional Agent (Optional)*, subjects can decide to delegate to an agent who then assumes responsibility for the affirmative decision to trade, or make the trading decision themselves.³⁵ If the principal delegates, then, as in *Mandatory*, the agent decides whether the principal trades or keeps the ticket; upon learning the agent's decision, the principal can accept or veto it to make the decision himself. If the principal delegated to the agent, then the agent received 2 € if he decided to trade independently of whether the principal later vetoed his choice. Principals who did not delegate and made the Trade/Keep decision themselves saved the extra time waiting to learn the agent's decision and deciding about a veto (about 10 minutes). In order to ensure that the principal's delegation decision was not distorted by other-regarding preferences, they were informed that the agent would also be paid the 2 € if they decided not to involve their agent.

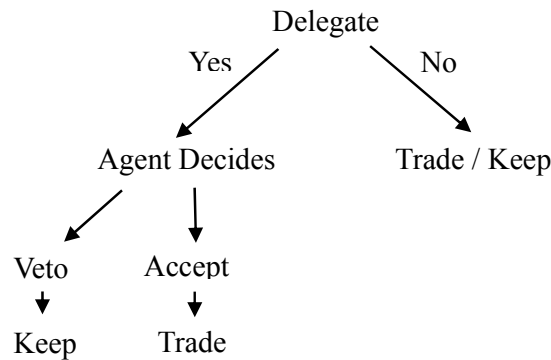
The two decisions facing the principal are presented below in a decision tree.

³³ See supra note 27. Although each principal had one agent, each agent was assigned to six principals, and received 2 € for each ticket traded. Thus, agents could make up to 12 € by trading all tickets of their six principals. Agents completed the experiment in separate sessions in advance of the participants in the role of principals. They were assigned ex post and randomly to their experimental partners. Principals were not aware that their agent was assigned to several partners. As expected, agents traded the tickets.

³⁴ In all agency treatments, principals decided whether to veto after learning whether the agent decided to have the principal trade or keep his ticket.

The fact that principals had ultimate veto power over the decision to trade should mute any concern that principals may have felt unendowed in their original ticket in the *Mandatory Agency* treatment, since the agent could not force the principal to trade. This concern is further muted in *Optional Agency*, since principals had the option not to use the agent at all.

³⁵ We discuss why this treatment should shift responsibility infra at Section 4.B.

Figure 1: Decision Tree for Principals

In this design, the decision to delegate is properly viewed as a decision to shift responsibility because principals do not obtain any other advantage from delegating to the agent. Principals have no “expertise” based incentive to delegate because the agent does not have superior information about the outcome of the coin toss or the structure of the game. We ruled out curiosity as a motive for delegation because the agent was strongly incentivized to trade and the data indeed revealed that principals were very confident in their expectation that the agent would do so.³⁶ Principals were unlikely to delegate unless they received a benefit (i.e., trading without responsibility) because delegation imposed an opportunity cost on them. The principal was instructed that a decision to use the agent would result in the principal sitting in his room for an additional 10 minutes, in order for him to learn the agent’s decision and make his decision about whether to veto the agent’s choice. Delegation thus increased the total expected experiment time by 40%, from 15 to 25 minutes. Note that this increase is likely to be substantial to the subjects. By far the most common question asked by students about any experiment is “how long does the session last?”, because they are on a tight schedule during the semester.

4. *Information-Only Treatment*

While our lottery design should already rule out any mistaken belief that principals could learn from their agents trading decisions,³⁷ we explicitly test that subjects do not use agents, and accept their decisions, to gain superior expertise. We conducted the “*Information-Only*,” treatment in order to examine whether principals will follow the decision of an agent if they get only the information about whether the agent favors the trade. This treatment was also intended to control for any omitted variables that might be associated with the introduction of the agent to the game and that might distort our results

In the *Information-Only* treatment, the subject does not have an agent acting on his behalf, but instead simply learns about the decision made by an agent who is acting for a different principal. The agent is incentivized to trade exactly like in *Mandatory* and is making a decision for a real principal (from a previous session). The subject is informed about the agent’s decision, but, upon receiving the

³⁶ Moreover, even if principals did delegate out of curiosity or for no reason at all, this should not increase actual trading unless delegation muted the endowment effect.

³⁷ See supra text accompanying notes 25-30 and paragraph accompanying note 36.

information, the subject must decide for himself whether to trade his ticket. The treatment disentangles the impact that the information about the agent's choice may have had from the shift of responsibility because the participant is informed about the agent's choice but cannot shift responsibility to the agent for the decision whether or not to trade.³⁸

B. Subjects, Payments and Procedures

We conducted the study in the experimental laboratory of the University of Jena. The lab is located on the University's main campus, assuring that recruited participants study a variety of disciplines; we also had some non-students in the sample. We adhere to the standards of experimental economics, including instructing participants that no deception would be used. Recruitment was done on campus using an advertisement that announced the place, time, and expected earnings associated with the experiment.

We had a total N of 262 participants, a little more than half of them were women. In our post-experimental questionnaire we asked for some demographic variables: sex and age (18-41 mean=23.4) were balanced between treatments.³⁹ We also classified the subjects' disciplines into the following categories: Psychology, Natural Sciences, Philosophy, Teaching, Economics and (other) Social Sciences. Finally we elicited whether subjects acquired professional experience outside of the University.⁴⁰ In our results section, we tested whether these demographic characteristics affect our results and report regressions that show that they did not. We made sure that no subject participated in more than one session.

In the laboratory, subjects were seated in separated booths with no ability to see each other and with sound insulation ensuring the strict independence of their decision-making. Participants received paper instructions and then selected their lottery ticket by reaching into a box containing sealed lottery tickets, marked Heads or Tails. After reading the instructions, subjects were provided with control questions. Principals had to calculate their earnings for the following scenarios: If they decided to trade or keep their ticket, assuming that they either won or lost the lottery. In all but the *Base* treatment we also questioned principals about whether the agent had any information about the trade or lottery they did not have (and if so what information that was) and what the agent's personal earnings would be should he decide to a) trade or b) keep the principal's ticket.⁴¹ Any subject who did not get all answers right on the first attempt was asked to re-read parts of the instructions. Misunderstandings appeared only in one out of ten times. Participants had to answer all questions correctly after the second trial in order to proceed to the next experimental stage. We

³⁸ We expect subjects not to be affected by this treatment in any way different than in the Base treatment, even though we expect them to be affected by information about the group decision, because people's tendency to conform to groups generally does not translate into conformity to the act of just one individual.

³⁹ We controlled for the balance of demographics and disciplines in the regressions as is discussed in Section III *infra*.

⁴⁰ We call that binary variable *Job*.

⁴¹ Correct answers were that 1) Agent has no additional information. 2) 2 € for trading – independently of whether the ticket is a winner.

excluded three of 265 participants, because they failed both the first and second attempt after re-reading. Generally, if students had questions about the experiment they were pointed to the relevant lines of the written instructions. Oral directions beyond the written instructions were not given. In the post-experimental questionnaire subjects reported that they found the instructions easy to understand and act upon.

After completing the control questions, participants made their experimental choices. Principals who decided to trade their ticket turned in their original ticket for the alternative one. After all decisions were made, participants were asked whether they wanted to accept the experimenter's coin toss, or wanted to throw again. The result of the lottery was revealed in their presence, after which they received their earnings in cash.

In the *Optional* treatment, subjects needed to communicate their choices about whether to delegate to the agent. Since we did not rely on computer software we followed a strict protocol: One experimenter collected the principals' choices; an agent was randomly assigned to the principal; the agent's choice, along with new sealed instructions (concerning the veto), were brought back to each principal in his booth. When a participant had made his decision he would open the door of his booth and the experimenter would hand him the instructions for the next stage. After submitting their last decision, subjects completed the post-experimental questionnaire.

To simplify the procedure, participants assigned the role of agent completed the experiment upfront and then were randomly matched with principals ex post. Each agent was assigned to six principals; subjects were paid accordingly to their actions in these formed pairs. The instructions correctly informed principals that the agents were real and made their choices in the laboratory.

C. Behavioral Predictions

This section details our behavioral predictions for each of our treatments of the agency experiment.

1. *Base: Replicating the Endowment Effect*

Our core prediction is that when subjects bear full responsibility for the trade (as in the *Base* and *Information-Only* treatments) subjects will exhibit an endowment effect. All subjects endowed with their ticket are given the opportunity to trade their ticket for the alternative ticket in the lottery. A non-biased agent should be willing to trade his ticket for an identical expected value plus the extra bonus of 25 €-Cents. Nevertheless, consistent with the existing literature on the endowment effect,⁴² we hypothesize that tested against the rational prediction of trading a significant number of subjects will be disinclined to trade their lottery ticket, because they are more adverse to regret an actual loss—trading a winning ticket—than a missed gain, when they failed to obtain the ticket they later learn won the lottery (**Hypothesis H₁**).⁴³

2. *Mandatory Agency: Shifting Responsibility*

⁴² Bar-Hillel, Maya & Efrat Neter (1996).

⁴³ *Id.*

The prediction that subjects are biased and keep their ticket because of regret aversion follows existing studies.⁴⁴ The agency treatments go beyond this literature and test a causal relationship between felt responsibility and regret. We assume that the feeling of being responsible for the decision to trade and thereby for any negative outcome it might bring triggers regret aversion and generates the endowment effect in *Base*. We hypothesize that subjects should feel less regret about giving a potentially winning ticket out of hand if they can attribute responsibility for the affirmative decision to trade to another party, here the mandatory agent. We assume that principals will attribute primary responsibility for the trading decision to the agent – even though they can veto it. We predicate this assumption on evidence that people exhibit an omission bias, in that they attribute more responsibility to actions rather than inactions.⁴⁵ So principals should attribute most of the responsibility for the trade to the acting agent, despite their veto option. The hypothesis is further supported by a study from Zhang and Fischbach (2005, p. 321) who found that subjects exhibited an endowment effect when the choices presented to sellers were framed as actions (“sell” the item), but weaker when the choices were framed as inactions (“keep”).⁴⁶ Subjects seemed to anticipate a lower level of regret in the inaction frame. We assume that subjects similarly will experience less regret when they accept the decision an agent has made for them. Along the same lines Bartling & Fischbacher (2012, discussed in more detail below) show that principals seem to feel less responsibility for the violation of a fairness norm if the violation is performed by an agent — even when the principal intended the agent to violate the norm.

In our treatment, a principal who does not use his veto power and accepts the trade remains inactive; the omission bias allows him to attribute the responsibility for the trade unlike in the *Base* condition to his active agent. By contrast, a principal who rejects the agent’s decision would be burdened with the full responsibility for the loss should it turn out that the ticket selected by the agent was the winner.

Thus, we hypothesize that, in comparison with *Base*, significantly more subjects in *Mandatory* will not exhibit an endowment effect and trade their ticket allowing the decision of the agent to go through (**Hypothesis H₂**).

3. *Optional Agent: Principal Self-Debiasing*

The *Optional* agent treatment is designed to analyze whether principals will voluntarily delegate their trade decision to an agent in order to enable them to get the benefit of trading without bearing the full emotional cost of regret, as delegation shifts the responsibility for the decision to the agent. Given that agents do not have superior expertise and participants face opportunity costs for delegation (time spent on the experiment), we do not expect principals to delegate unless delegation enables them

⁴⁴ *Id.*; Zhang, Ying and Ayelet Fischbach (2005).

⁴⁵ Jonathan Baron & Ilana Ritov (2004).

⁴⁶ Similarly, Ritov and Baron (1992) examined whether evidence of a status quo bias is attributed to a genuine bias in favor of the status quo or instead to enhanced regret associated with actions as compared to inactions. They found evidence that subjects view a hypothetical bad outcome produced through action on the part of the person harmed as worse than one produced by inaction, even when the action maintained the status quo. By contrast, they did not find independent evidence (independent of action/omission) of a status quo bias.

to reduce their (emotional) costs of trading. We claim that many principals are aware that regret is keeping them from making the otherwise beneficial trade. Given the opportunity we expect them to use delegation in order to self-debias and mute regret. The bonus offered for exchanging tickets is the incentive for them to self-debias. If the endowment effect would truly change their valuation of the good rather than induce an independent psychic cost as we assume, principals would have neither an incentive to delegate or to trade.

The conclusion that principals can mute responsibility by delegation – even though this involves a deliberate act to delegate to someone they expect and want to trade—rests on theory about the nature of responsibility and on evidence how people tend to attribute it. Responsibility is conceptually very different from causation. First people attribute responsibility primarily to actions rather than omissions, even if both produce the same outcome and thus both are causal. (Kahneman & Tversky, 1982; Spellman, 1997). This omission bias explains why having, but not using, a veto does not make principals feel responsible for the outcome the agent brings up.

Second, people evaluating a chain of actions that produced an outcome (here delegation and the trade) do not assign the same degree of responsibility to all actions that were causal for the outcome. Instead, they tend to attribute primary responsibility to the last action in a causal chain (Spellman 1997).⁴⁷ Spellman's finding is consistent with our assumption that principals can delegate to their agent wanting and expecting him to trade without feeling responsible for the agent's trade. The agent performs the trade and is thus the last actor in the causal chain. Therefore, the principal can attribute the primary responsibility for the decision and any losses to him, relieving him of regret.

Delegation lets principals take a lower rank in the causal chain of acts leading to the trade. In turn, because of the omission bias, their unused veto option does not shift responsibility back to them. Delegation reduces the principal's perceived responsibility for, and the regret he expects over, any negative outcome. In theory principals should delegate once they realize that after shifting responsibility the gains from trade are larger than the expected psychic costs of trading.

This central assumption, that principals will *intentionally* employ agents in order to shift responsibility to them, is supported by two economic studies on peoples fairness preferences which show that subjects faced with a trade-off between self-interest and fairness use agents to shift the blame for an unfair but beneficial decision (Bartling & Fischbacher, 2012; Hamman, Loewenstein & Webber, 2010). Bartling & Fischbacher implement a dictator game and find that dictators deciding how much to share with a receiver, prefer to delegate the decision to a second player rather than make a fair transfer themselves. Because the dictators' and the delegees' payoff are identical the dictator expects the delegee to choose the unfair allocation. Delegation allows dictators to obtain the benefit of the unfair division while limiting their

⁴⁷ Lawyers have formed causality and responsibility into strict concepts. The condition *qua non* formula leads us first to the conclusion that the principal is causal. For evaluating responsibility, however, we ask whether the decision of the agent was independent and deliberate. In our design, the agent has complete freedom to decide whether or not to trade. Thus, the agent has responsibility for that decision, even though his decision (trade) is predicable. Delegation indeed reduces the responsibility of the principal even though does not eliminate it.

responsibility for the final decision.⁴⁸ Interestingly, the delegation affects both the delegators' and the receivers' attribution of responsibility: receivers who are allowed to sanction dictator and delegee concentrate their punishment on the delegee, apparently attributing the primary responsibility for the unfair decision to him, even though the dictator clearly delegated in order to achieve an unfair division.

We disentangle the above with a series of testable hypotheses. First we hypothesize a basic treatment effect in the frequency of trades: more principals should trade their ticket in *Optional* than in the *Base* treatment (**Hypothesis H₃**). Thus, *Optional* mutes the endowment effect. Examining the mechanism behind this treatment effect in more depth we assume that participants deliberately self-debias. We hypothesize that significantly more principals will delegate their decision to the agent in order to self-debias compared to the prediction of rational choice theory that none will delegate because of the opportunity costs delegation imposes on them (**Hypothesis H₄**). Since we assume that delegation allows even those subjects to reduce regret and trade, who would have otherwise decided to avoid regret by keeping their ticket, we hypothesize that a higher percentage of subjects delegate to agents than traded in the *Base* condition (**Hypothesis H₅**). Finally confirming our assumption that principals delegate because they want to trade without the costs of regret, we expect them to accept the agent's decision to trade (**Hypothesis H₆**).

4. *Information-Only Treatment - Control*

The *Information-Only* treatment is primarily designed to exclude the confound that subjects who delegate and accept the trade in the agency treatments are operating out of a mistaken belief that agents have information or expertise but it also tests whether our results are influenced by some other omitted variable associated with the use of agents.⁴⁹ Principals are provided with the same information as in *Mandatory* or *Optional*—that is they learn whether their agent decides to trade or not—but principals cannot attribute responsibility to him, because he acts for a different principal and his decision does not apply to the principal's ticket. Thus, our principal obtains the information about the agent's choice, but bears the full responsibility if he wants his ticket traded.

If the results in *Optional* and *Mandatory* are driven by the informational content of the agent's decision, then we should observe significantly more trades in the *Information-Only* than in the *Base* condition, because subjects received the same information as in *Mandatory*. By contrast, we assume that the effect in *Optional* and *Mandatory* is driven by the agent assuming the responsibility for the trade. This leads us to **Hypothesis H₇**: the frequency of trades should not differ significantly between *Information-Only* and *Mandatory*, but not between *Information-Only* and *Base*.

⁴⁸ Third parties also attribute less blame to principals for unfair acts if the principal acted through an agent even when the principal directed the agent to do the norm violating act and controls the agent's actions. Paharia et al. (2009); see generally Hill (2012).

⁴⁹ In theory this result is obvious: All information about the lottery is common knowledge and the setup is easy to comprehend. Also our control questions confirm that participants clearly understand that nothing is to learn from the agent's decision. Still we decided to directly test whether participants mistakenly follow the agents choice because they think it has informational value.

5. *Post-experimental Questionnaire*

To support our central claim that people who trade through agents do not exhibit an endowment effect because they attribute responsibility to their agents and therefore anticipate less regret over a negative outcome, we elicited the level of regret that participants self-report in different treatments. Participants were asked to imagine first that they traded their ticket (*Trade* condition) and second that they kept it (*Kept* condition). For each scenario, they were instructed to indicate how strongly they would feel regret if the ticket they have at the end of the experiment does not win the lottery, while the other one (that they either gave away or failed to trade for) won the lottery. Participants indicated their anticipated regret on a Likert Scale ranging from 1 (very little regret) to 7 (very strong regret). In the *Mandatory*, as well as in the *Optional*, treatment principals can attribute responsibility to their agents. If participants regret a negative outcome less, they will feel little responsibility for it and the level of self-reported regret should be significantly lower in the agency treatments compared to *Base*. Also the difference between the two conditions *Trade* and *Kept* should be larger in *Base* (**Hypothesis H₈**).

D. Results of the Agency Experiment

Summarizing our results, our *Base* condition replicates the finding that most subjects exhibit an endowment effect by refusing to trade their ticket when they bear full responsibility for the decision. The post-experimental questionnaire reveals that those subjects who anticipate a higher level of regret should they lose in the lottery, are more likely to keep their original ticket. The results of our agency conditions suggest that responsibility-shifting institutions mute the endowment effect and that subjects will voluntarily employ such institutions for this purpose. Thus, we find that subjects are significantly more willing to trade in the *Mandatory* treatment where the agent acts on their behalf. This evidence supports our hypothesis that the endowment effect is driven by people's sense of responsibility for potential negative outcomes associated with the decision to trade. Consistent with this result, principals in the agency treatments reported that they expected to experience significantly less regret should they lose in the lottery than in *Base*. The results of our *Optional* treatment show that principals deliberately choose to debias. Contrary to the predictions of Rational Choice Theory, half of our subjects voluntarily delegated their trading decision to their agent, even though delegation imposed an opportunity cost. The results support our assumption that principals deliberately want to reduce their responsibility for a potentially negative outcome in order to benefit from the trade without facing regret.⁵⁰

Finally, the results of our Control (*Information-Only*) Treatment confirm that a shift of responsibility-minimizes the endowment effect. We find that subjects who were able to observe an agent's trading decision on behalf of a different principal, but could not shift responsibility to an agent, showed the same resistance to trading as subjects in the *Base* Treatment.

⁵⁰ See *supra* note 7 and text accompanying notes 16-17.

In Table 1 below we report a detailed summary statistics of all treatments of the agency experiment. Generally, we report all results in conservative non parametric statistics in the text. In footnotes we add regression results for the central treatment effects that control for basic demographic variables (sex, discipline, previous jobs outside of the university) and for self-reported regret that we measured in our post-experimental questionnaire. Although certain demographic variables turned out significant in some treatments, the regressions did not reveal a robust pattern to conclude that they had any systematic influence on results. All treatment comparisons remain significant in the regressions.⁵¹

Table 1

	Base	Information-Only	Mandatory	Optional Agent Total	Optional Agent: Delegated	Optional Agent: Not Delegated	Total N
Trade	19 (30%)	11 (39%)	31 (69%)	30 (51%)	26 (90%)	4 (13%)	91
Keep	45 (70%)	28 (61%)	14 (31%)	29 (49%)	3 (10%)	26 (87%)	116
Treat		p=1	p<.01*** p<.01***	p=.04** p=.03**	p<.01*** p<.01***	p=.12 p=.15	
Total N	64	39	45	59	29	30	207

*Treat reports two p-values. First compares treatment to Base, second to Information-only using a two-sided Fisher Exact test

5. Base - Replicating the Endowment Effect

Rational choice theory predicts that subjects should trade their lottery ticket because trading gives them an extra 25 Euro-Cents without affecting their expected payoff from the lottery. Subjects who do not trade exhibit an endowment effect.⁵² We hypothesized that participants resist trading because they are averse to the regret they anticipate to experience if they lose in the lottery. A participant who realizes that he will bear an emotional cost if he trades may rationally decide to keep the ticket.⁵³

H₁: Subjects should reveal an Endowment Effect

We test the frequency of trades which we observe in the *Base* treatment against the prediction of Rational Choice Theory that all participants will trade their ticket to obtain the higher expected payoff. We find that the vast majority of subjects (70%) do not trade their ticket in the *Base* treatment – a difference that we interpret as evidence for the endowment effect.

A two-tailed Fisher Exact test yields $p < 0.01$ confirming a significant difference between subjects' decisions in the *Base* treatment and the predictions of

⁵¹ The same holds for the conformity study.

⁵² The degree to which subjects retain the ticket depends on the magnitude of the “endowment effect” as compared with the side payment associated with trading (here 25 €-Cents)

⁵³ If we treat regret aversion as a psychological cost, we can reconstruct the endowment effect in rational choice terms see Gary S. Becker (1976).

Rational Choice Theory. A one sample χ^2 test analyzing whether the observations in *Base* are equally distributed returns a significant result of $p < 0.01$, again suggesting that subjects' choices are biased.

2. *Mandatory Agent: Shifting Responsibility Reduces the Endowment Effect*

H₂: In Mandatory principals trade significantly more often than in Base

We hypothesized that principals should be more willing to trade in the *Mandatory* treatment than in *Base*, because subjects feel less regret when they can attribute primary responsibility for the trade to their agent. Consistent with this hypothesis, we find that principals in the *Mandatory* treatment are significantly more willing to trade than in *Base*. Whereas 70% of the subjects in the *Base* treatment exhibited an endowment effect and only 30% decided to exchange their original ticket, we find the opposite result in *Mandatory* with 70% of the subjects trading and Only 30% keeping their ticket. A two-tailed Fisher Exact test yields a significant treatment effect with $p < 0.01$ ⁵⁴. Note that the *Optional* treatment (presented below) provides additional support for Hypothesis 2.

3. *Optional Agent: Principals' Self-Debiasing and Its Effects*

We hypothesized that principals will delegate to agents in order to obtain the gains from trade without the regret they expect to experience if they made the decision to trade on their own and that this self debiasing leads to more trading. Since this is a complex claim, we present our results in the following steps: a) We first report the basic treatment effect (H_3): More subjects trade in *Optional* than in *Base*. b) We attribute this treatment effect to those principals who decide to delegate their choice: Compared to the rational prediction of non-delegation a significant number of principals will delegate their decision to the agent (H_4). c) More subjects delegate in *Optional* than have traded in *Base* (H_5). d) We assume that principals delegate to limit own responsibility. We exclude other motivations by testing whether principals are certain that the agent will trade. e) Since principals delegate in order to trade, they will not veto an agent's decision to trade.

H₃: More principals trade in Optional than in Base

For the basic treatment comparison we find that 51% of subjects trade their ticket in the *Optional* treatment compared to only 30% in *Base*. A two-tailed Fisher Exact test yields a significant result with $p = 0.03$, and thus confirms our hypothesis that principals trade significantly more often in *Optional* than in *Base*.⁵⁵

The increased trading in this treatment group is driven by the behavior of the principals who delegated. Examining Table 1, we see that 90% of the subjects who delegated decided to trade their ticket, as compared to only 30% in the *Base* treatment. In contrast when we select those principals who did not delegate, of these, only 13% traded their ticket. The difference between the delegated and the not

⁵⁴ Results hold in a logistic regression: Treat $p < 0.01$, Nagelkerkes .506, sex=.27, discipline $p = .05$, job $p = .01$, regret $p < .01$.

⁵⁵ The results hold controlling for demographics and regret in a logistic regression which yields: Treat $p < 0.01$, Nagelkerkes .558, sex $p = .01$, discipline $p < .01$, job $p = .01$, regret $p < .01$.

delegated cases is highly significant using a two tailed Fisher Exact test $p < 0.01$ ⁵⁶. The comparison of the delegated cases with *Base* is also significant (Fisher Exact test $p < 0.01$)⁵⁷. Thus, delegation seems to have a strong influence on trading choices.

H₄: Subjects delegate even though Rational Choice predicts they will not

Forty-nine percent (49%) of the principals decided to delegate the trading decision to an agent, even though (i) delegation imposed an opportunity costs on them, (ii) they correctly anticipated the agent's decision (see below), and (iii) the agent did not have any superior information or expertise.⁵⁸ A two-tailed Fisher-Exact test comparing the result with the prediction of Rational Choice Theory that people would not delegate, yielded a significant result with $p = < 0.01$. This is consistent with our theory that principals benefit from delegation because it reduces their responsibility and allows them to trade at a reduced emotional cost.

H₅: Significantly more subjects delegate to agents than were willing to trade in the Base treatment

Consistent with our assumption that subjects delegate in order to trade without regret, while they would keep their ticket if they had to bear full responsibility for the trade, we find that subjects delegated to agents significantly more frequently than they were willing to exchange their ticket in the *Base* treatment. Specifically, whereas 30% (19/45) of subjects traded in the *Base* condition, 49% (29/59) delegated to an agent in the *Optional* condition--the difference being significant employing a two-tailed Fisher Exact test $p = 0.04$ ⁵⁹.

These findings indicate that many principals in the *Base* treatment resist trading because the 25 Euro-Cents bonus they can obtain from the trade does not exceed their emotional cost of regret attached to the trade. But when principals can lower their costs of regret by delegating the trading decision they prefer to obtain the bonus. The result supports our hypothesis that delegation shifts responsibility and thereby reduces anticipated regret and the endowment effect.

Principals are confident that the agent will trade

Our hypothesis that principals delegate in order to trade rests on the assumption that principals expect agents to exchange tickets. Otherwise principals might be simply interested in the choice of the agent looking for advice. To make sure that principals confidently expected agents to trade, we informed them that agents had a strong incentive to exchange tickets: any agent given responsibility only got paid if he traded. Consistent with this experimental design, we found that 97% of principals expected their agent to trade the ticket. To elicit the confidence in their expectation we gave participants an endowment of 100 €-Cents that they could either keep or wager

⁵⁶ The results hold controlling for demographics and regret in a logistic regression which yields: Treat $p < 0.01$, Nagelkerkes .824, sex $p = .14$, discipline $p = .32$, job $p = .22$, regret $p = .01$.

⁵⁷ The results hold controlling for demographics and regret in a logistic regression which yields: Treat $p < 0.01$, Nagelkerkes .660, sex $p < .00$, discipline $p < .01$, job $p = .04$, regret $p = .01$.

⁵⁸ Making the decision to trade on their own would lead participants to the same outcome at lower opportunity cost, enabling them to leave earlier while earning the same return.

⁵⁹ The results hold controlling for demographics in a logistic regression: Treat $p < 0.01$, Nagelkerkes .422, sex $p = .17$, discipline $p < .01$, job $p = .10$, regret $p < .01$.

on their expectation. If their estimation was correct, the risked amount was doubled, otherwise it was lost. Principals put on average 82.8 €-Cents of their endowment on the expectation that the agent will trade. Given that participants are typically risk averse, even about almost certain events, and would rather keep than bet their endowment, the result reveals that principals are highly confident that the agent will trade. This supports our hypothesis that subjects delegate because they want their ticket to be traded. The finding makes it unlikely that principals delegate out of mere curiosity.

H₆: Principals do not veto

Our hypothesis that principals delegate to agents in order to trade at lower emotional cost implies that principals who delegate will not veto the agent's decision to trade the ticket (**Hypothesis H₆**). Consistent with this hypothesis, almost all principals who delegated the decision to the agent accepted the agent's decision to trade the ticket. Specifically, we found that 29 participants in *Optional* decided to delegate their decision to trade to an agent (Table 1). Of these, 88.5% (26) accepted the agent's decision to trade, while only 3 vetoed it. A one sample χ^2 test shows that these observations are not equally distributed ($p < 0.01$). If principals delegated out of curiosity, they should veto the trade decision, whenever they had no intention to trade, which is 70% of the time, in the *Base* treatment.

4. Information-Only Treatment: No Confound of Expertise

H₇: Agents in Information-Only should not affect frequency of trade

Agents do not have any superior information about the outcome of the lottery and thus should affect subjects' decisions to trade their lottery tickets only when they shift responsibility for the trade. Accordingly, we hypothesized that participants in the *Information-Only* treatment who could only observe an agent who was not acting for them but for a different principal should exhibit an endowment effect. Following our line of argument that shifting responsibility rather than informational cascades eliminate the endowment effect, the frequency of trading in *Information-Only* should match the one in *Base* but fall short of *Mandatory* or *Optional*. As expected we do not find a statistically significant difference in trades compared to *Base* (two-tailed Fisher Exact test $p = 0.26$). Furthermore we replicated all treatment effects we found for *Base* with *Information-Only* (see also above table 1), that is the treatment effects with *Mandatory* (two-tailed Fisher Exact test $p < 0.01$) and *Optional* (two-tailed Fisher Exact test $p = 0.03$) remain significant using the data of *Information-only* instead of *Base*.⁶⁰

5. Post-experimental Questionnaire

We measured the regret subjects expected before they were informed about the true outcome of the experiment by asking them to imagine 1) they traded their ticket and then received feedback that the ticket they gave away won the lottery and 2) that

⁶⁰ All reported effects hold in linear regressions controlling for demographics.

they did not trade and the ticket they kept lost.⁶¹ In *Mandatory* we informed subjects in addition that the agent decided to trade. We measured anticipated regret in the treatments *Base*, *Control* and *Mandatory* using a 7-item *Likert* scale (1=very little regret; 7=very strong regret)⁶². For each treatment we had two conditions: In *Trade* participants were asked to assume that they traded their ticket, while in *Keep* they were asked to imagine that they hold on to it. We present the results in the summary table 2 below:

Table 2

	Base	Control	Mandatory
Trade	3.36 p=.03	3.69 p<.01***	2.6 p<.01*** p<.01***
Keep	2.55	3.02	2.33
Difference	.82	.67	.27 p<.01***

*Table presents two p-values. First reports whether size of regret predicts trades. Second compares Base and Control.

Our behavioral results suggest that regret is the driving cause behind the endowment effect we report.⁶³ The survey data confirms this result. If regret drives the endowment effect, then the level of anticipated regret subjects indicate in the *Trade* condition should predict whether a participant is likely to trade or keep her ticket. We therefore test the correlation between regret and the frequency of trades and find a significant result at $p < 0.01$ for Kendalls-Taub for the *Base* treatment (-.362), for *Mandatory* (-.495) as well as for *Control* (-.691).⁶⁴ These results provide strong support for the relationship that the higher a subject's level of reported regret, the less likely he is to trade his ticket. This suggest that any institution that reduces anticipated regret by changing the degree of responsibility participants feel for the outcome, should influence the trading behavior of subjects. In the next step, we test whether our agency manipulation in the *Mandatory* treatment successfully reduced the level of regret subjects expected to experience.

⁶¹ Note that if the hypothetical setting should weaken results this effect would work against the assumed result. We did not employ the measure in the *Optional* treatment, because this condition lasted already much longer.

⁶² One might object that the levels of regret that we report appear to be relatively low such that we might not be capturing the factor that really motivates people's actions. But note that the reported numbers are averages and thus also include the data of those participants who did not resist trading because they did not anticipate any regret. Also, the stakes involved was only 8 €. Accordingly, we should not expect participants to indicate very strong regret; they will likely associate strong regret with choices with more serious consequences. Since people's personal benchmark for strong regret is unobservable, we cannot interpret absolute values of regret and thus focus on treatment effects.

⁶³ See *infra* Section V.

⁶⁴ Logistic regressions using *Trades* as dependent and *Regret* as independent variable yields to significant result in all treatments at $p < 0.01$: **Base:** Nagelkerkes $R^2 = .560$, sex $p < 0.01$, discipline $p = .03$, job $p = .05$; **Mandatory:** Nagelkerkes $R^2 = .723$; sex $p = .12$ discipline $p = .42$ job $p = .25$; **Control:** Nagelkerkes $R^2 = .708$, sex $p < .22$, discipline $p = .76$, job $p = .76$.

H₃: Participants in Mandatory anticipate a lower level of regret than those in Base and Control

We elicited the regret participants indicate in both conditions *Trade* and *Keep* and compare the levels participants indicated in the three different treatments. In *Mandatory* we found a mean of expected regret of 2.6 in the *Trade* and 2.33 in the *Keep* condition. The mean for *Base* was 3.36 for *Trade* and 2.55 in *Keep*. Finally, in the *Control* treatment participants indicated a mean for the *Trade* condition of 3.69 and 3.02 in *Keep*. When we focus on the regret participants anticipated in the *Trade* condition, which reveals whether participants are likely to exhibit an endowment effect, and compare *Mandatory* with both *Base* and *Control* treatments, we find a significant result for both comparisons with $p < 0.01$ using a two-tailed Mann-Whitney test.⁶⁵ This result is confirmed when we calculate the difference between the *Trade* and *Keep* conditions. The size of this difference measures the emotional costs of trading, which is the increased regret participants expect to experience when they imagine that trading rather than keeping their ticket. If agency truly does suppress regret, the emotional cost of trading should be smallest in *Mandatory*. Accordingly we find a difference between *Trade* and *Keep* of .27 for *Mandatory*, but .82 for *Base* and .67 for *Control*. When we test the result for *Mandatory* against both *Base* and *Control* both comparisons are significantly different with $p < 0.01$ using a two-tailed Mann-Whitney test. Thus, as predicted subjects in *Mandatory* have the smallest emotional costs of trading. This explains why they were significantly more likely to trade their ticket. The survey data is thus in line with our choice data: Agency increases the frequency of trades because it significantly reduces the emotional costs of trading.

IV. DEBIASING THROUGH MARKETS - EXPERIMENT 2

The agency treatments test an institution that simultaneously shifts both the intellectual responsibility for the trade as well as the responsibility for the causal action itself to an agent. Our theory that people can lower their emotional cost of trading the less they feel responsible for the outcome predicts that many common institutions should have the potential to mute the endowment effect. In our second experiment we analyze markets because they do not only allow us to extend our theory by disentangling intellectual from the responsibility for the causal action, but also because of their sheer importance. In markets people can observe, and conform to, the behavior of others, which may allow them to shift intellectual responsibility, even though they actually take the causal actions.

Evidence shows that market participants tend to “herd” by conforming their decisions to those of others. Among the many explanations for herding⁶⁶ are that it

⁶⁵ The results hold in a linear regression. We find for 1) **Base:** Treat $p < .01$, Sex $p = .58$, Discipline $p = .60$, job $p = .94$ $R^2 = .089$; 2) **Control:** Treat $p < .01$, Sex $p = .42$, Discipline $p = .52$, job $p = .50$ $R^2 = .192$.

⁶⁶ See Scharfstein, D. and Stein, J. (1990). Information cascades can cause group or herding behavior in markets, if market participants assume that others have information or expertise that they do not have. The advance they assume is revealed in the choices of the group, so they imitate them. Our design cancels out this motivation for herding, because our design ensures that other subjects obviously can have no hidden information or wisdom. Following the crowd in our setting may only reduce responsibility.

reduces anticipated regret. When people base their decisions on the choices of others, they feel less responsible for negative outcomes because they do not have to attribute them to the failure of their own independent judgment. While an investor's choice may turn out wrong, in his judgment he simply followed others. Herding thus allows people to lift the intellectual responsibility for a possibly negative outcome off their shoulders. Accordingly, they should be able to reduce regret that makes them exhibit the endowment effect, even though they perform the action that causes the potentially negative outcome.⁶⁷

Our second experiment, *Social Conformity*, tests whether people are more likely to trade, if offered the opportunity to conform their behavior to the decision favored by most subjects of a prior experimental session (when most subjects traded). We are interested in social conformity because it allows us to extend the link between responsibility, regret aversion, and the endowment effect to institutions that leave the choice to the subject. This generalization of our results has important policy implications: Our theory suggests that people may not exhibit an endowment effect when they trade in actual markets in which participants can observe and follow the decisions of professional traders who are unlikely to exhibit an endowment effect (List 2003). Since markets are a very common institution, the finding would strongly limit the distortions to be expected of the endowment effect in business interactions.

A. Experimental Design

Our *Social Conformity* treatment builds on the *Base* condition in which subjects directly decide whether to trade the ticket.⁶⁸ In *Social Conformity* participants were informed about the trading choices of subjects in “previous sessions” prior to making their own decision whether to exchange or keep their ticket. The data we provided them with was taken from the *Mandatory* treatment in which the majority of subjects traded. Selecting this treatment allowed us to explore whether subjects would be more likely to exchange their ticket than they were in the *Base* condition upon learning that a majority of subjects in a prior session traded.⁶⁹ After receiving this information, the subjects decided whether to trade their ticket. As in study 1, at the end of the experiment participants were asked to indicate the level of regret they expected to experience assuming both that they traded or kept their ticket and it lost.

B. Behavioral Predications

We assume that subjects will partially attribute their intellectual responsibility for trading to other participants by conforming their decision to the data we provide them with. Accordingly, we hypothesize that subjects, informed that a majority of

⁶⁷ People also can be expected to experience less regret from the negative outcome of a choice made in conformity with others because the fact that most other people suffered the same outcome is likely to mute any shame or sense of reproach associated with making the decision..

⁶⁸ No agent was assigned, nor did subjects have the opportunity to involve one.

⁶⁹ Note, subjects do not adopt the decision of only one agent, they follow the crowd, and importantly it is a crowd of participants who made the same decision as the subject. The agent in the *Information-only* treatment instead is unaffected by the consequences of the trade and strongly incentivized to exchange the ticket. Therefore we expect the results for *Conformity* to differ from the *Information-Only* treatment.

participants in a prior session traded, will exchange their ticket significantly more often in the *Conformity* treatment than in *Base* (**Hypothesis H₁**). We also expect subjects to indicate lower levels of regret imagining that they decided to trade and lost, with their choice conforming to the majority decision compared to the *Base* treatment (**Hypothesis H₂**).

Our experimental design ensures that subjects who follow the choices of others are best viewed as trying to mute their individual responsibility and thus experience less regret for a possible loss when they do not swim against the stream, simply doing what others did.

Herding behavior was discussed in many domains and can have multiple motivations. For example, in real world markets, other participants may have information or expertise that the decision maker does not have. In that context, a participant may rationally imitate the behavior of others, and ignore his own private information, in order to benefit from the expertise revealed in their choices (Anderson & Holt, 1997). Such information cascades also can interplay with regret aversion (Veeraraghavan & Debo, 2011). Yet in our experiment, as in the agency treatments, we employ a design that eliminates any expertise or information acquisition for following others: Subjects know that participants of the prior session did not have any hidden information about the outcome of the lottery. Since all subjects in the sample understood as revealed in our control questions that the expected value of both tickets was identical, gaining information could not motivate them to follow others. Remember that the Information-only treatment directly tested, whether participants had the illusion that they could learn from their agents' choices. If they understand in Information-only that there is nothing to learn, they do here as well.

Another explanation for herding comes from research on social norms (Cialdini & Trost 1998, Krupka & Weber 2008): People are social animals often willing to let the group decide the best course of conduct, what style to wear, who to befriend, in order to earn social appreciation. Therefore they adapt their behaviors to others. Our design avoids a confound arising from this desire to “fit in” because neither the subjects from the prior session nor subjects attending the same session will learn the participant's trading decision. The strict anonymity of subjects, combined with decision making in isolated booths, excludes the possibility that social status and the desire to fit in drive herding in our experiment.

Herding also can result from internalized rule compliance. Beyond longing for social appreciation people infer injunctive norms from observing predominant behavior and comply with it even in anonymity (Bicchieri, 2006). This mechanism of norm internalization is unlikely to be at work in our design. A subject's choice concerning whether to trade the ticket has no externalities or social relevance and thus lacks any normative dimension. We conclude that if subjects are pushed towards trading by the data we provide, their sole motivation is to reduce their own responsibility for their decision making.

C. Results

Results are consistent with our hypothesis that subjects are more likely to trade after being informed that a majority of participants of a prior treatment decided to

trade. Conformity with the decision of others seems to mute participants anticipated regret over an adverse outcome.

1. Conformity: Following the Crowd Limits Responsibility & Regret

H₁: Frequency of Trades is higher in Social Conformity than in Base

Comparing the frequency of trades in *Social Conformity* and *Base*, we find that, as expected, significantly more subjects exchange their tickets in *Social Conformity*.

Table 3

	Base	Social Conformity	Total N
Keep	45 (70.3%)	22 (44.9%)	67
Trade	19 (29.7%)	27 (55.1%)	46
Treat		p < 0.01***	
Total N	64	49	113

**p-value compares Social Conformity to Base (two-tailed Fisher)*

A two-tailed Fisher Exact test yields a p-value of $p < 0.01$ for the treatment comparison.⁷⁰

We take this as evidence that people attenuate their responsibility and regret by conforming to prevalent behavior. We expect that people may be even more inclined to conform in real world markets where they can not only shift responsibility but also hold the belief that other participants are more expert.

2. Post-experimental Questionnaire

As in the Agency experiment we measured the regret subjects expected to experience before they were informed about the true outcome of the lottery. Participants had to indicate two values, imagining that they traded and thereby conformed to the participant's behavior of the previous session or kept their ticket deviating from the behavior of the majority.

H₂: Participants in Conformity anticipate a lower level of regret than in Base and Control

Table 4 presents the results:

⁷⁰ We also performed a logistic regression comparing Conformity and Base with TRADE as dependent variable. Treatment holds significant at $p = .01$ as in the Fisher test (Nagelkerkes $R^2 = .22$, sex $p = .17$, discipline $p = .42$, job $p = .03$.)

Table 4

	Base	Control	Conformity
Trade	3.36	3.69	2.57 p<.01***
Keep	2.55	3.02	2.95
Difference	.82	.67	-.38 p<.01***

*p-values report treatment effects in comparison with Base and Control

We find a mean for the level of expected regret of 2.57 for TRADE and 2.95 for KEEP. The treatment effect for TRADE is again significantly different from Base and Control ($p < 0.01$ two-tailed Mann-Whitney test). Interestingly the value for KEEP is even higher than for TRADE, the difference between conditions is -.38 and significant (two-tailed Wilcoxon rank-sum test for paired samples with $p=0.05$). Thus when we calculate the difference between the two conditions (Trade-Keep) to capture the emotional cost of trading we find evidence for an emotional reward for trading rather than a cost: Participants expect to experience more regret when they imagine to keeping their ticket when the majority of other subjects traded it. This suggests that the effect of conformity on anticipated regret is stronger than omission bias. The value is also significantly different from both Base .82 ($p<0.01$) and Control .67 ($p<0.01$) using the two-tailed Mann-Whitney test.⁷¹

As for the other treatments, regret levels in *Social Conformity* predict trading behavior. The level of regret (*Trade* condition) is significantly correlated with the actual trading behavior with Kendall's tau ($-.279$) at $p=0.03$ ⁷².

Both results support our hypothesis that the opportunity to conform to the observable choices of others as typically provided in markets significantly reduces anticipated regret and thereby the endowment effect.

V. DISCUSSION

The results of our agency treatments (*Mandatory* and *Optional*), as well as the *Social Conformity* treatment, support our central hypothesis that status account explanations, under which endowment alone triggers the endowment effect, are not valid. Instead the process of trading has a strong impact on whether the bias occurs or not because the process of trading can enhance or attenuate the anticipated regret over the trading decision that triggers the endowment effect. The process can affect the regret people anticipate because regret does not depend on the magnitude of a negative outcome alone. The more responsible people feel for the trade, the more

⁷¹ We performed also linear regressions for each test. Comparing Conformity to 1) Base: TREAT $p < 0.01$, $R^2 = .111$, sex $p = .77$, discipline $p = .53$, job $p = .52$; 2) Control: TREAT $p = .03$, $R^2 = .142$, sex $p = .23$, discipline $p = .58$, job $p = .90$; 3).

⁷² In the logistic regression we find $p < 0.01$ (Nagelkerkes $R^2 = .342$, sex $p = .79$, discipline $p = .01$, job $p = .93$).

regret they expect to experience should the outcome be negative. People can reduce their sense of regret—that is their emotional costs of trading—by employing institutions such as agents or markets that reduce their sense of responsibility for the decision, making them less likely to exhibit an endowment effect. We show that people will employ these institutions deliberately when available in order to debias. When they opt into the mechanism they fully understand that it will lead them to engage in a trade that they would be reluctant to make on their own. Finally, people can embrace institutions such as markets to debias their trading behavior even when they retain full responsibility for the actual decision to trade, thus institutions do not have to interfere with peoples' autonomy in order to have a debiasing impact.

A. Controls and Robustness

Our experimental design tried to carefully control for alternative explanations that might confound our results.

One potential concern is that subjects might have been more willing to trade in the *Agency* and *Social Conformity* treatments because they believed that the trading decisions of the agents or the other subjects they could observe provided them useful information about the benefit of trading. We believe that several elements of our experiment render this concern unlikely: First, the obvious fact that it is not possible for an agent or the other subjects⁷³ to have better information about the outcome of the coin toss than the principal. Second, the simple and familiar structure of our lottery, which only requires subjects to understand that a fair coin toss is equally likely to produce Heads or Tails. Third, the strong incentives we gave agents to trade, which provided principals with confident priors that agents will exchange tickets (thereby ensuring that they would not expect to learn new information from the agent's decision). Finally, the direct test we provided through our *Information-Only* treatment, which provides information—but not responsibility shifting—and shows that subjects being informed about an agents' trading decision do not trade more frequently than in the *Base* treatment.⁷⁴

We also considered the possibility that subjects in the agency treatments were more inclined to trade because the intervention of the agent who they strongly expected to trade reduced the subjects' perception of being endowed with the ticket. This is not a likely explanation for our results for several reasons. First, in all of the agency treatments, subjects knew that they retained ultimate authority over whether to trade the ticket and thus knew that their original ticket was theirs to keep no matter what the agent did. Second, we found evidence of voluntary debiasing in two separate situations where there is no question that the subject was fully endowed. In the *Optional* treatment, the subjects who made the decision to delegate were fully endowed at the moment they decided whether to delegate. Thus, the finding that more

⁷³ Indeed in the *Social Conformity* treatment, our subjects are provided information about the trading decision of subjects presented with a different coin toss.

⁷⁴ We also considered the possibility that subjects might resist trading in the *Base* because they do not want to appear greedy, chasing a mere 25€-cents—a trading bonus they could obtain without affirmative action in the *Mandatory* treatment. Were this the case, subjects would not delegate in the *Optional Agent* treatment, however, as this also requires them to act affirmatively to obtain 25 €-cents, and also should not trade in the *Social Conformity* treatment.

subjects delegated than traded in the *Base* condition could not have been driven by a reduced sense of endowment. In addition, the subjects who traded in the *Social Conformity* treatment clearly were endowed with the ticket when informed about the decisions of the other subjects. They retained their ticket unless they made an affirmative decision to trade, just as in the *Base* condition, and yet these subjects were significantly more willing to trade than those in *Base*.

We also made sure that our results are not confounded and driven by other-regarding preferences. First, subjects were told that agents who traded would get paid 2 € even if the subject vetoed the trade. Second, we informed subjects in the *Optional* treatment that the agents would get paid even if the principal did not delegate. Thus if principals were motivated by social preferences they should not have delegated, since then the agent would be guaranteed the 2 € without any action on his part. Thus, if social preferences had an impact they would have worked against the treatment effect we report.

Varying risk attitudes will not cause, but may influence, our results (compare Sprenger 2010). Anticipated regret is connected to uncertainty. If outcomes or preferences were certain, then people would not anticipate regret when making a choice. With some probability an event has to occur that is regretted over a preferred outcome. Since a strongly risk averse subject gives this probability more weight, he may anticipate more intense regret than a risk neutral participant. Yet a risk neutral person will also experience regret; trading resistance might thus be influenced but is not caused by risk attitudes. Responsibility shifting institutions will lift the regret from the shoulders of both risk averse and neutral people.

We also designed our experiment to address the cognitive misperceptions and confounds that undermine internal validity, as identified by Plott and Zeiler (2005, 2007, 2011). Plott and Zeiler suggest that the experimental evidence which has been assumed to support the status-based account of the endowment effect may be caused by experimental artifacts. Plott and Zeiler claim that standard theory of preference formation, such as signaling theory and social preferences, account for exchange asymmetries. The first confound that Plott and Zeiler test for is that subjects handed a good by the experimenter may interpret it as a gift and thus not want to turn it down and disappoint the experimenter as a result of other-regarding preferences. To rule out this confound, we had each subject draw his ticket out of a box filled with multiple tickets; this protocol was consistent with the random assignment treatment conducted by Plott and Zeiler (2005).

Second, Plott and Zeiler (2007) suggest that subjects to which the experimenter allocates one good instead of another may interpret the experimenter's choice of good as a signal about the relative value of the good. This confound is ruled out by our design because the subject, not the experimenter, selects the ticket and second the two tickets are clearly identical in expected value. Moreover, we made sure that subjects understood that the experimenter does not have superior knowledge about experimental outcomes by instructing subjects *before* they made their choice

whether to trade their ticket that they would be allowed to make the coin flip themselves after the experiment if they wished.⁷⁵

Third, Plott and Zeiler (2007) observe that requiring a subject to raise their hand to indicate they want to trade imposes an extra transaction cost on those people who want to trade, which could explain endowed subjects resistance to trading in the classic experiments of Knetsch (1989). In our experiments, subjects bear the same transaction costs no matter how they decide since they must indicate all their decisions on a piece of paper (delegate, trade, veto or not) and turn it in. So in our experiment subjects incur the same transaction costs for all decisions.

Fourth, our experimental results are not distorted by subjects' making their decision in public. Plott and Zeiler (2007) note that observations may not be independent if participants raise their hands to trade in sight of each other as the decisions of the earlier movers may affect those of other participants. We also were concerned that subjects might imitate others to reduce their intellectual responsibility for their decision. To avoid this confound, we seated participants in separated sound-insulated booths when they made their choices, with no visual contact with each other to ensure that their decision making process was strictly independent.

Fifth, in our experiment subjects can make informed choices even if they, as Plott and Zeiler suggest (2005, at n. 15), are not good at estimating expected value. In our experiment, subjects do not need to be able to calculate a complex numerical estimate for the expected value of the lottery. Instead, they only need to understand that the expected value of the two tickets in the lottery is identical. We ascertain this understanding in our control questions.

Sixth, Plott and Zeiler (2005 at n. 15) note that subjects who engage in multiple treatments or rounds may exhibit a gamblers fallacy, in that they incorrectly use outcomes from prior treatments (or past rounds) to make biased estimates of the probability in future rounds (Plott and Zeiler 2005 at n. 15). We made sure that our experimental design was so familiar and simple to participants that repetitions or training rounds were not needed, as confirmed by the control questions that nearly all participants passed. Therefore, in our experiment, each subject makes only one trading decision in the experiment and receives feedback about the lotteries' outcome only after the session. Finally and closely related to points 6 and 7, Plott and Zeiler claim that subjects may incorrectly believe that they can guess the outcome of the lottery (2005, at n. 15), but this possibility would not explain why we get treatment effects.

B. Contribution to the Literature

Our results contribute to the literature on both the causes of, and institutional responses to, the Endowment Effect. Consistent with a new growing body of literature we dispute the traditional endowment status-based account of the Endowment Effect,⁷⁶ and suggest a process theory instead. In our view, the Endowment Effect is

⁷⁵ Interestingly and consistent with our hypothesis almost all subjects chose to not flip the coin suggesting that they wanted to avoid the responsibility for a causal action that would have determined whether they win or lose the lottery.

⁷⁶ See supra note 11 (discussing the experimental evidence).

caused by anticipated regret over the trade and the process of trading triggers or attenuates this regret. The more responsible people feel for the trade, the more regret they face should they make the wrong choice. Thus, institutions that shift, or allow people to shift, responsibility reduce the emotional cost of trading and thereby suppress the endowment effect.

Our theory is not only supported by our own evidence but can also explain the results of several important studies in the field, or at least our assumptions are consistent with their findings.

List (2003) finds that the endowment effect diminishes for experienced traders. List suggests that professional traders do not exhibit an endowment effect because they learn about the attributes of the good they trade and thus reduce preference uncertainty. List's findings nevertheless are consistent with the regret hypothesis. Professional traders should be more confident that they will not regret their own decision to trade because their experience enables them to rank goods and know their own preferences. Moreover, List's traders likely received predominantly positive feedback in their business since they were still active in the market when the experiment was run. Thus, they would likely be confident in making a good choice they do not expect to regret. Also, professional traders will have experienced both good and bad outcomes, and they are likely to have accepted occasional negative outcomes as a natural part of their business they do not regret. Thus, List's results are consistent with our assumptions. Going beyond List's findings, we would also predict that professional traders would not delegate their trading decision, because they have no need to attenuate their regret by shifting responsibility.

Along the same lines, the results of Engelmann et al (2010) are consistent with our theory. They argue that the endowment effect is caused not only by uncertainty about a good's attributes or preferences, as suggested by List, but also by "trade uncertainty," which they view as a fear of transaction costs hidden in the trading procedure (for example, concern that a trading partner cannot be trusted). They find that people can learn to get used to this uncertainty and trade without bias. Our theory suggests an alternative explanation for their findings: Engelman et. al constructed a trading process that muted regret. Subjects learned that they did not experience regret after the trade and therefore did not exhibit an endowment effect in later trading behavior. We would predict that their results depend on the quality of the feedback. If subjects who traded actually experienced unexpected transactions costs (in Engelmann's experiment they did not) then we would expect this outcome to intensify their anticipated regret with respect to future trades. Under our process account, their willingness to trade would depend on both whether the feedback they receive triggers future regret and their ability and willingness to use institutions to shift responsibility.

Weaver et al. (2012) propose a reference price theory to explain the endowment effect. They assume that possession and loss aversion do not cause the endowment effect. Instead, they claim that sellers offered the ability to trade consider not only their personal valuation but also use the market price as a reference because they do not want to make a bad deal. Therefore endowed subjects are reluctant to trade, even when offered an amount that exceeds their personal valuation, but falls short of the reference price. The regret hypothesis seems to be consistent with their

results. Traders may consider the market price in order to avoid regretting that they made a comparatively bad deal as others obviously get a better price. By contrast, if their personal valuation should be lower than the market price, they will still stick to it leading to an endowment effect.⁷⁷ The theories have very different implications, however. Our theory suggests that people would eventually trade for their personal valuation, and ignore the market price, if they can mute regret because they understand that the trade increases their utility. For Weaver et al. people do not perceive the deal as being in their interest. It remains a bad deal for them because it falls short of the market price. In consequence, people should not self-debias, because they have no incentive to do so. Thus Weaver et al. seems to be a new variation of those theories assuming that the endowment effect changes the valuation of the good itself. The regret hypothesis and our process account also are more general than their model. Their theory fails to explain why participants exhibit a strong endowment effect in our *Base* treatment in which the value of the lottery tickets was fixed, and thus an external reference point was neither provided nor possible. We conclude that regret and thus the endowment effect can be triggered by many factors that involve uncertainty about the trade not just by market prices and the fear of a bad deal.⁷⁸

Our results are not called into question by Plott and Zeiler (2005, 2007), as discussed above. Plott and Zeiler show that the WTA/WTP gap cannot be explained by classic “endowment effect theory,” that is by an endowment status account.⁷⁹ This is in line with our own conclusion to replace the status by a process theory. While Plott and Zeiler leave open, whether the bias exists in lotteries,⁸⁰ we find strong evidence for an endowment effect in the *Base* treatment, after controlling for the sources of misperception identified by Plott and Zeiler (2005, 2007). Isoni et al., who replicate Plott and Zeiler’s lottery design (but see Plott and Zeiler 2011) also report finding an endowment effect in line with our results⁸¹

Our analysis goes beyond the literature on regret aversion by proposing a process account of the endowment effect. In our theory, the regret people anticipate experiencing should they trade is heavily influenced by the process of trading. As an example of this process account, we identify the important role that responsibility plays in driving regret. Our finding that most subjects do not exhibit an endowment effect when the process lifts the responsibility for outcomes off their shoulders highlights the degree to which the effect is affected by the process governing the transaction, rather than by the possession of, or the nature of, the good. In particular, depending on the institutions used for trading, people will be more or less likely to trade the good they are endowed with. Thus, our proposed process account of the endowment effect naturally opens the door for clever institutional design. Our results are the first to show that people are self-aware that the process of the transaction will

⁷⁷ This is true for consumption goods. For professional traders personal valuation should not matter in any account.

⁷⁸ Weaver et al. (2012) are careful to suggest that reference points are one explanation for the endowment effect.

⁷⁹ Plott and Zeiler (2005) do not propose their own theory, but focus on falsifying the endowment status explanation of the endowment effect.

⁸⁰ Plott and Zeiler (2007, p. 7).

⁸¹ Isoni et al. (2011).

influence their decision whether to trade or not. Subjects were self-aware that responsibility and regret aversion kept them from trading when it was in their interest. They deliberately altered the process of trading, employing institutions that eliminated their bias.

We are aware that the lottery design we chose favors the theory we propose, but we are confident that our results nevertheless generalize to physical objects. Our two-ticket lottery makes the decision to trade transparently the right or the wrong choice *ex post* (after the outcome is revealed). Thus, participants anticipate learning with certainty whether they made the right decision, no matter how they decide. This heightens regret and makes it more attractive to employ responsibility-shifting institutions. While our lottery design supposedly intensifies the experience of regret, we chose this setting because of its cleanness. First, it presents subjects with a decision that has a distinct rational choice prediction: participants should trade the ticket—since the exchange holds expected outcomes constant and provided a bonus. This clear benchmark of what the rational decision is allows us in turn to identify a biased choice. The design also excludes expertise as a factor driving subjects' choices. By contrast, exchanges involving physical objects (like mugs and pens) make it harder to establish a clean rational benchmark since the valuation of objects is much more subjective and noisy. Moreover, with an exchange of goods, any experimental results would face the concern that subjects might believe that the agent has better information about the goods relative value. Nevertheless, we are confident that the process account of the endowment effect does generalize to physical objects as long as subjects have sufficient uncertainty concerning the objective attributes and valuation of the good, or their own preferences, such that participants are uncertain about their true valuation of the object they are about to sell or buy. This uncertainty will cause anticipated regret. Our process account then predicts that people who would want to trade if they did not anticipate regret can reduce their responsibility for the choice by using agents or conforming to other market participants in order to mute their regret. But testing our process account with physical goods will be difficult, because it requires an experiment that isolates and distinguishes the impact of pure responsibility-shifting from the influence of subjects' belief that agents can provide valuable information about the good.

While the effects we find are clear and robust, nevertheless, care is needed in interpreting the normative implications of our results. While we can show that many people employ institutions to mute their bias, not everyone chose to use the mechanism when it was available. Specifically, while many subjects delegated to their agents, others did not. But we should not conclude that debiasing must generally be imperfect. First the incentives for trading offered in the experiment were small, making it easier for subjects to refrain from trading. We expect that if all incentives were enlarged, such that subjects would receive 250 € for trading and 8000 € if they win the lottery, we would see more delegation because both anticipated regret as well as the urge to trade in order to collect at least the 250 € bonus would likely be much stronger. Also we analyzed institutions in our study separately to cleanly identify effects, while in actual legal domains these institutions will often be present simultaneously and interact, intensifying their impact. For example people can use agency relationships in markets. We may also not have chosen the most effective

institutions. The two we tested differed in how effectively they allow people to shift responsibility and attribute it to others or to conditions. Markets and conformity seem to have a stronger influence than agency. The search for more effective institutional design that relieves people from regret and makes them trade when they benefit according to their own preferences, remains for future research.

VI. CONCLUSION AND POLICY IMPLICATIONS

Evidence that people exhibit systematic deviations from rational choice, such as the endowment effect, has powerful implications for the law. Yet we cannot justify intervening in response to such biases without knowing their precise nature and domain (Arlen 1998; Zeiler 2010). We must understand both the causes of the anomalies and the institutional contexts that can mute them, whether automatically or only if people actively use them to debias.

This study represents a step forward along both dimensions. Our experiment contributes to our understanding of the causes of the endowment effect by proposing a process, rather than a status, account of the endowment effect. It also contributes to our understanding of institutions that enable people to voluntarily overcome the anomaly.

Scholars predicating normative policy prescriptions on the endowment effect often assume that it is driven by the status of the entitlement--whether it is owned or possessed—and thus by loss aversion alone. In this view, status changes alter peoples' preferences for the good itself. By contrast, we propose a process account of the endowment effect, which puts our experiment in line with the growing body of experimental evidence which suggests that ownership (or possession) is not sufficient to trigger the endowment effect (Knetsch & Wong; Kahneman and Novemsky 2005; Plott & Zeiler 2005, 2007, Glöckner, Tontrup, Bechtold 2012 see also Arlen, Spitzer, Talley 2001). We find that people anticipate the regret they expect to experience should they enter a bad deal. This psychological cost makes them reject otherwise welfare-enhancing trades. We show that regret aversion is not only determined by the fear of a bad deal, but primarily by the process of trading, specifically, by elements of the process that cause people to feel more or less responsible for their decision to trade. Subjects who feel directly responsible for the decision to trade anticipate regret should their choice prove incorrect. Thus, they resist trading in the *Base* condition because they did not want to bear the psychological cost of trading a potentially winning ticket with full responsibility, and not because they valued their endowed ticket more than the alternative one. By contrast, most subjects who can attribute the responsibility for the decision making process to an agent in *Mandatory*, anticipate little regret and thus are willing to exchange their ticket.

We also find that people can reduce the psychological cost of trading even when they remain fully responsible for performing the “action” In our *Social Conformity* treatment subjects were able to disperse their intellectual responsibility by conforming their behavior to the trading decisions of other participants thereby shielding themselves from regret, even though those others could not be wiser or better informed.

The most important consequence of the process account of the endowment effect we propose is that it reveals that people have an incentive to voluntarily debias, because the psychological cost of trading is unwanted. We show that endowed people will take voluntary steps to reduce regret and overcome their bias. This self-debiasing is evident in our *Optional Agent* treatment, where subjects willingly delegated the initial trading decision to agents even though they (i) fully understand that delegating imposes an opportunity cost on them, (ii) expect the agent to trade and (iii) were free to make the trade on their own. The comparison between the Base and the *Optional* treatment shows that self-debiasing leads to significantly higher frequency of trading.

Our results have important implications for legal policy. They reveal that we cannot routinely assume that people will exhibit an endowment effect whenever they are trading a good they own or possess. Whether people exhibit the endowment effect depends not (only) on their entitlement, but even more so on the institutional context of the process of trading, which may trigger or mute regret aversion. Moreover, we find that people are prepared to purposefully self-debias. The endowment effect may thus occur much rarer in real legal domains than previously thought. Accordingly, paternalistic policy interventions that limit people's choices to correct for the endowment effect cannot be assumed to be easily justified in domains where agency is either mandatory or optional, as often is the case with real estate, sales of expensive equipment, and deals involving lawyers. Even nudging people into trading may not be justified or necessary.

Yet the availability of debiasing institutions does not imply that the endowment effect is costless or that voluntary debiasing is invariably superior to intervention. Measuring actual total costs is intricate. When agency is required for other reasons (say expertise or impartiality) using agents to suppress the endowment effect does not impose an extra cost. But when people voluntarily employ agents solely to avoid regret, the endowment effect may introduce agency costs that they would otherwise have avoided. On the other hand, institutions can enable people to mute responsibility as a mere side effect without imposing costs. For example, our second experiment shows that markets have the potential to mute the endowment effect by allowing people to conform their behavior to the norm.⁸² Yet while markets can be a low cost debiasing mechanism,⁸³ they may introduce other social costs when they allow people to shift responsibility and follow the herd without giving careful consideration to the wisdom of their choices—as may have happened in the years leading up to the financial crisis.

While our study generally casts doubt on (paternalistic) interventions meant to address the endowment effect, our results also have implications for the debate over whether policy interventions should cause buyers and sellers to converge on WTA or WTP valuations when the gap is driven by the endowment effect.⁸⁴ The right choice

⁸² Of course, even though no direct costs are visible, others may be hidden. Responsibility aversion induced by the endowment effect may lead to the herd behavior occurring in crisis that can destroy enormous values. The endowment effect makes nonprofessional traders conservative, but once a critical mass of sellers is reached, the effect may abruptly disappear, resulting in increased trading.

⁸³ Of course, markets only debias when people can observe the trading behaviour of others.

⁸⁴ This conclusion holds when the WTA and WTP gap is caused by the endowment effect. But the gap can also have other causes: the endowment may shift the person's budget constraint or the trade

of valuation presents a dilemma under the status account of the endowment effect, since the theory assumes that both prices reflect peoples' true preferences. By contrast, this study suggests that buyer prices should be the preferred benchmark for regulation when prices are distorted by the endowment effect. The price that sellers demand does not simply reflect their preference for the object but is elevated by the psychological costs of the regret and responsibility aversion that attaches to the exchange. The valuation buyers indicate will be closer to their true preferences.

Our process account of endowment effect theory can also contribute to the debate about the nature and justification of interventions that address the endowment effect. Policy interventions taken to reduce the bias are often rejected as being paternalistic. Paternalism is defined by an interference with people's preferences. Strong paternalism forces people to act even in contradiction with their preferences, while weak paternalism respects them, but interferes with the means to achieve those ends.⁸⁵ Under the endowment status account of the endowment effect, the paternalism objection follows naturally because it assumes that people value the good more when endowed and thus reveal a true preference, when they reject trading. So any intervention would have to interfere with true preferences and therefore be called strong paternalistic. Under our process account, the psychological costs of trading is unwanted and prevents people from implementing their preferred choice concerning the good itself. So interventions that aim at eliminating the endowment effect are unlikely to interfere with people's ends but may prescribe a choice of means such as mandatory agents and could thus be classified as weak paternalistic. Thus the interventions appear to be milder and in line with peoples preferences on the grounds of our theory.

Besides these direct policy implications, our findings more generally underline the methodological importance of institutional-grounded experimental analysis. Experiments designed to establish the existence of a decision-making bias usually abstract from real world domains in which they are likely to occur in order to cleanly isolate the phenomenon. Yet our findings suggest that we must be cautious in drawing conclusions from studies that, because of their different purpose, were not designed to take any institutional legal environment into account. They may not have sufficient external validity and can easily mislead policy advice. To derive policy implications, experiments must incorporate consideration of the relevant institutions, especially institutions which have the potential to debias people or equip them to self debias. For, what seems to be a major anomaly in decision making in the laboratory calling for policy correction, may well disappear in institutional context. Accordingly, we need a stronger understanding of the interaction between biased decision-making and (existing) institutions, as well as a comparative cost benefit analysis of institutions'

may alter the person's utility function, as is the case with WTA and WTP valuations for serious permanent injury and death (see generally Arlen 1985).

⁸⁵ Gerald Dworkin speaks of soft paternalism if rational individuals would consent to the interventions given their preferences as a kind of self-binding behavior (Dworkin G. *Paternalism*. In: Joel Feinberg, Coleman J, editors. *Philosophy of law*. 6th ed. Belmont, CA: Wordsworth Publishing; 2000). See also Joel Feinberg, *Rights, justice, and the bounds of liberty: essays in social philosophy*, Princeton, NJ: Princeton University Press; 1980.

ability to eliminating anomalies, before we can identify welfare-enhancing legal reforms.

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Appendix: Instructions

[The following part of the instructions does not contain manipulations and was identical for all treatments]

ALL TREATMENTS

Dear Participant!

Thank you very much for attending our session! You will find detailed instructions for the experiment below.

A) General Rules

1. Anonymity and Duration

You are about to take part in an economics experiment that is financed by University funds. The experiment will last for approximately 15 minutes. All participants will remain strictly anonymous. Once the experiment is finished, nobody, including the experimenter, will be able to connect your earnings and the choices you made in the experiment with your name.

2. Procedure

If you read the following instructions carefully, you will be able to earn a substantial sum of money, depending on the decisions you make. It is therefore very important that you read these instructions carefully.

There shall be absolutely no communication during the experiment. Disobeying this rule will lead to exclusion from the experiment and you will not be eligible for any payment. If you have any questions, please ask the experimenter. Questions concerning the content of the instructions will only be answered by highlighting particular passages of the written instructions.

3. Payment

Your income is calculated in €. You will be paid in cash after the experiment is finished.

B) Setup

I. Lottery

You can participate in a lottery in this experiment. The lottery consists of two tickets – one “tails” the other one “heads”. Which of the two tickets is the winner will be decided by a coin toss. If the coin shows the same symbol as the ticket that you have, then you win 8 €. If the ticket instead displays the opposite symbol than your ticket, for example your ticket shows “heads” while the coin shows “tails” or vice versa, then you get 0 € from the lottery. Your sealed ticket was selected in your presence and at

random from a box. All the tickets were sealed and thus neither you nor the experimenter knows whether you have a “tails” or a “heads” ticket.

The experimenter tossed the coin at the beginning of the experiment and covered it with a mug that is marked with your cabin number. The result of the coin toss will only be revealed after the experiment is completed.

II. Your decision

Your ticket can be traded for the alternative ticket in the lottery. If your ticket is traded, you will open the envelope containing your ticket in order to determine which ticket you have and give it to the experimenter. The experimenter will give you the alternative ticket. The trade occurs before the outcome of the coin toss is revealed.

A. Consequences of the trade

If your ticket is traded, then you receive the alternative ticket of the lottery. Thus, if you had a ticket with “heads” then you receive one with “tails” and vice versa. Additionally you get an extra 25 Cents for the trade. If your ticket is not traded then you keep your initial ticket, but do not receive the extra 25 Cents.

Here is a summary of all possible payoffs from the lottery:

1. *If your ticket is not traded and ...*
 - a. the coin toss matches your ticket , then you get 8 € from the lottery.
 - b. the coin toss does not match your ticket, then you get 0 € from the lottery.
2. *If your ticket is traded and ...*
 - a. the coin toss matches your initial ticket, then you get 0 € from the lottery and 25 cents for the trade.
 - b. the coin toss does not match your initial ticket, then you get 8 € from the lottery and 25 Cents for the trade.

New Sheet! (After participants read the main instructions for the experiment, we handed them the following sheet. Note that the control questions are always handed out before the part labeled “The Experiment”).

C) Control Questions

1. You have a “tails” ticket. You trade it for the alternative ticket. The coin toss shows “heads.” How much do you earn?
2. You have a “tails” ticket. You keep your ticket. The coin toss shows “heads.” How much do you earn?

Only for OPTIONAL & MANDATORY

3. If the agent decides in your objective interest will he trade or keep the ticket?

Only for OPTIONAL

4. What does the agent earn if you do not involve him?

[In the following we present the instructions that describe the choices participants had to make. These instructions contain our manipulations and therefore differ between treatments. We therefore always indicate for which treatment a particular set of instructions applies for]

BASE**D) The Experiment**

Do you want to trade your ticket? YES or NO?

Please write your answer in the box below!

[This is the end of the instructions for the Base condition. In the following we will present the instructions for the other treatments. Since instructions of all treatments are identical until the point where the decisions the subject has to take are described we will not repeat the first part of the instructions but start for each new treatment by presenting the decision making task.]

[In the next part we present the instructions for the Mandatory Agent treatment]

MANDATORY AGENT**D) Your decisions**

A personal agent has been assigned to you, who will make the decision over whether to trade the ticket for you. You can veto the decision of the agent and replace it with your own choice.

The agent was selected because, in a pilot session, he decided whether to trade in the objective best interest of the principal. The agent is paid 2 € if he decides to trade your ticket. If he decides not to trade, then he receives no payment. The agent is paid by the experimenter independently of whether you veto or reject the agent's decision.

Your agent can decide to retain your initial ticket for you or exchange it for the alternative ticket in the lottery. You will be informed about his decision. You can either accept the decision of the agent, or you can veto it and replace it with your own choice. The agent does not learn whether you vetoed his choice or not.

Here is a summary of the consequences of your choice alternatives:

- a) If your agent decides to trade your ticket, then you can either veto his decision and keep your initial ticket, or you can accept his decision. If you accept his decision, you receive the alternative ticket of the lottery plus 25 Cents for the trade.
- b) If your agent decides to keep your original ticket, then you can accept his decision and keep your initial ticket. Alternatively you can veto his decision and trade your ticket yourself. In that case you receive the alternative ticket of the lottery plus 25 Cents for the trade.

New Sheet! (After the participant read the main instructions we informed him/ her the about the agent's decision with distributing the following sheet)

E) The Experiment**Your agent decided to trade / not trade your initial ticket.**

Do you want to veto the decision of your agent YES or NO?

Please write your answer in the box below!

New Sheet! (After the subject decided whether to veto the agents choice, we handed out the following sheet to any subject who decided to veto the agent's decision).

You decided to veto the decision of the agent.

Do you want to trade your ticket? YES or NO?

Please write your answer in the box below!

New Sheet! (After the subject decided whether to veto the agents choice, we handed out the following sheet to subjects who decided not to veto).

You decided not to veto the decision of the agent.

Therefore his decision is binding on you. Following his decision *your ticket is traded/ you keep your original ticket.*

[This is the end of the decision-making part of the instructions for the Mandatory condition]

[Now we present the instructions of the decision making part of the Optional Agent treatment]

OPTIONAL

D) Your decisions

You can decide whether you want to exchange or keep your ticket yourself or you can delegate the decision of whether to trade the ticket to a personal agent, who will make the decision for you. If you decided to involve the agent, his decision is not binding on you. You can veto the decision of the agent and replace it with your own choice.

The agent was selected because, in a pilot session, he decided whether to trade in the objective best interest of the principal. The agent is paid 2 € if he decides to trade your ticket. If he decides not to trade, then he receives no payment. The agent is paid by the experimenter independently of whether you veto or reject the agents decision. Even if you do not want to involve the agent he is paid the same 2 € by the experimenter.

Your agent can decide that you retain your initial or exchange it for the alternative ticket in the lottery. You will be informed about his decision. You can either accept the decision of the agent, or you can veto it and replace it with your own choice. The agent does not learn whether you vetoed his choice or not.

Here is a summary of the consequences of your choice alternatives:

- 1) If you delegate to your agent then you can either a) veto or b) accept his decision.
 - a) If you veto his decision when he decided to ...
 - ... trade then you keep your initial ticket.
 - ... keep, then you trade and receive the alternative ticket of the lottery plus the extra 25 Cents.
 - b) If you accept his choice when he decided to ...
 - ... trade, then you trade and receive the alternative ticket of the lottery plus the extra 25 Cents
 - ...keep, then you keep your initial ticket.
- 2) If you do not delegate to your agent, then you can decide to a) trade or b) keep your original ticket by yourself.
 - a) If you trade then you receive the alternative ticket of the lottery plus the extra 25 Cents.
 - b) If you do not trade then you keep your original ticket.

E) The Experiment

You received a ticket at the beginning of the experiment. Do you want to delegate the decision whether to trade your ticket, to your agent? Yes or No?

Please write your answer in the box below.

New Sheet! (Handed to subjects who decided to delegate)

Your agent decided to trade your initial ticket.

Do you want to veto the decision of your agent? YES or NO?

Please write your answer in the box below!

New Sheet! (Handed to subjects after they made the decision not to delegate)

You decided not to involve your agent.

Do you want to trade your ticket? YES or NO?

Please write your answer in the box below!

New Sheet! (Handed to any subject who decided to veto their agents decision after delegating to them)

You decided to veto the decision of the agent.

Do you want to trade your ticket? YES or NO?

Please write your answer in the box below!

[This is the end of the decision-making part of the instructions for the Optional condition]

[The following instructions were given to subjects in the "Information Only" treatment]

INFORMATION ONLY

D) Your decision

Before you decide whether to trade your ticket, you can observe the decision of a personal agent who is assigned to another participant, who we call the principal. The agent makes the decision in place of the principal. The principal can veto the decision of the agent and replace it with his own choice.

The agent was selected because, in a pilot session, he decided whether to trade the ticket in the objective best interest of the principal. The agent is paid 2 € if he decides to trade the ticket of the principal. If he decides not to trade, then he receives no payment. The agent is paid by the experimenter.

The agent can keep the initial ticket for the principal or exchange it for the alternative ticket in the lottery. The principal can either accept the decision of the agent, or he can veto it and replace it with his own choice.

New Sheet ! [Handed to subjects after they read the main instructions]

E) The Experiment

The agent decided to trade the initial ticket of the other principal.

Do you want to trade your ticket? YES or NO?

Please write your answer in the box below!

[This is the end of the decision-making part of the instructions of the Information only condition]

[The following instructions were given to subjects in the Conformism treatment]

CONFORMISM

D) Results of a previous Study

In October we conducted a lottery study in this laboratory. The participants were recruited in this building using the same advertisement as we used this time. We had 45 participants of which 31 decided to trade their ticket for the alternative one in the lottery. 14 participants decided to keep their ticket.

E) The Experiment

Do you want to trade your ticket? YES or NO?

Please write your answer in the box below!

[This is the end of the decision-making part of the instructions for the Conformism condition]

[The following questions were given to all subjects after all experimental decisions were made]

ALL TREATMENTS

F) Post Experimental Questionnaire

1. What is the probability that a “Heads” tickets wins in the lottery?
 - a. 50%
 - b. less than 50%
 - c. more than 50%
2. What is your major?
3. What is your sex?
4. Did you ever have a job (for at least 2 month) outside of the University?