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# Exchange Asymmetries Incorrectly Interpreted as Evidence of Endowment Effect Theory and Prospect Theory?

Charles R. Plott  
cplott@hss.caltech.edu

Kathryn Zeiler  
*Visiting Professor, NYU School of Law, zeiler@law.georgetown.edu*

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# Exchange Asymmetries Incorrectly Interpreted as Evidence of Endowment Effect Theory and Prospect Theory?

Charles R. Plott  
Department of the Humanities and Social Sciences  
California Institute of Technology

Kathryn Zeiler  
Georgetown University Law Center

## ABSTRACT

Systematic asymmetries in exchange behavior have been widely interpreted as support for “endowment effect theory,” an application of prospect theory positing that loss aversion associated with ownership explains observed exchange asymmetries. We offer an alternative explanation. Specifically, we conjecture that observed asymmetries can be explained by procedure-driven theories grounded in classical preference theory. To test this alternative explanation, we alter the procedures to preserve the predictions of endowment effect theory while ruling out procedure-driven explanations grounded in classical preference theory. The data reject endowment effect theory in favor of procedure-driven theories.

Keywords: endowment effect, exchange experiments, procedural controls

JEL Classifications: C91, D46, K10

# Exchange Asymmetries Incorrectly Interpreted as Evidence of Endowment Effect Theory and Prospect Theory?

Charles R. Plott and Kathryn Zeiler\*  
September 2006

Jack L. Knetsch (1989) reported an important discovery. Using a simple experiment, he demonstrated the existence of asymmetries in exchange behavior. More precisely, when he followed a specific set of procedures to endow subjects with mugs and provided each subject an opportunity to exchange the endowed mug for a candy bar, he found that very few subjects gave up the endowed mug. By contrast, when he endowed a different group of subjects with candy bars using the same set of procedures, very few gave up the candy bar in exchange for a mug. While Knetsch, and many of those who followed him, attributed the asymmetry to the influence of ownership on valuation (Knetsch (1989), p. 1277), our results demonstrate that observed asymmetries should be attributed instead to well known alternative theories that influence choices through the experimental procedures employed.

Knetsch's initial intuitions have been expanded in a large and growing literature claiming that observed exchange asymmetries support "endowment effect theory"—an application of prospect theory positing that loss aversion associated with ownership leads to asymmetries in valuations and exchange behavior. We use the term "endowment effect theory" rather than "endowment effect" to avoid the confusion over terminology that has emerged in the literature. From the beginning (i.e., Thaler, 1980) the label "endowment effect" commonly has been used to refer to observed asymmetries. Using this label to refer to the observed phenomenon is problematic because it suggests a particular theory as an explanation for asymmetries. To say that an observed phenomenon demonstrates an "endowment effect" does not simply denote that an asymmetry was observed; rather, use of the label implies that a very special form of

preferences causes the asymmetry. We use “endowment effect theory” to distinguish the theoretical explanation from the observed phenomenon, which we refer to in this narrow context as an “exchange asymmetry.” Specifically, endowment effect theory posits that individuals perceive parting with an endowed good as a loss that is greater than a potential gain from acquiring another good of otherwise equal value (Thaler (1980), p. 44). In turn, this interpretation generates support for a specific theory of choice behavior called prospect theory, of which loss aversion is a major component.<sup>1</sup>

More broadly, endowment effect theory has been advanced to explain two completely different classes of phenomena that have seemed to defy explanation by any classical economic theory. First, some have argued that endowment effect theory explains observed gaps between “willingness to pay” (WTP) and “willingness to accept” (WTA). When asked to report the most one would be willing to pay for an item the recorded amount tends to be lower than when the same person is asked to report the minimum amount he would be willing to accept to give up the item if owned. This observed phenomenon sparked dozens of articles over a period of twenty-five years. In recent years, however, several scholars have claimed that endowment effect theory explains observed gaps. Despite these claims, controversy remains, largely because measuring gaps requires using special methods to measure marginal rates of substitution. Plott and Zeiler (2005) posited a possible alternative explanation centered on subject misconceptions stemming from the preference elicitation method and ran additional experiments that implemented the union of commonly-used controls to reduce misconceptions. When procedures were used to eliminate alternative explanations, the gap disappeared. The data support the conclusion that observed WTA-WTP gaps are caused by subject misconceptions resulting from the use of

special mechanisms required to elicit valuations. The results suggest that endowment effect theory cannot explain data from that class of experiments.

Knetsch's (1989) results sparked a second body of evidence lending support to endowment effect theory. The simplicity of his experiments avoids rate of substitution measurement and thus avoids the complex elicitation procedures that Plott and Zeiler document as a possible source of subject misconceptions that lead to WTP-WTA gaps. For this reason, this explanation of WTP-WTA gaps, subject misconceptions, does not appear to apply to the results derived from Knetsch's simple design. Furthermore, the design's simplicity creates an impression that only endowment effect theory can account for observed asymmetries. Consequently, investigations of asymmetries have shifted away from the methods by which choices are elicited and toward a particular theory of preferences and conjectures about how the nature of different goods influences choices. The results from our study suggest that such diversions are premature.

The purpose of this study is to test an alternative explanation for observed asymmetries against endowment effect theory. Specifically, the alternative theory posits that asymmetries reflect the operation of classical preference theory together with well-established variations of classical theory operating through specific experimental procedures. For example, signaling theories suggest that experimenter choice of which good to endow might influence choices if subjects interpret the experimenter's choice as a signal of relative quality. Theories of other-regarding preferences suggest that asymmetries of choice unrelated to the value of the goods might occur if subjects feel obliged to avoid rejecting a good perceived as a gift from the experimenter. In addition, information aggregation and cascade theories suggest that the public nature of choice revelation allows for the possibility that choices depend on other subjects'

choices. To control for these alternative explanations we alter the procedures to rule out as many procedurally-based theories as possible.

For our purposes, the laboratory experimental method is well suited. Ownership as found in the field environments can influence preferences through a number of forces unrelated to a “kink” in the utility function at a reference point as postulated by endowment effect theory.<sup>2</sup> In principle, such forces can be controlled in the laboratory but our results demonstrate that such forces are not well controlled by the particular procedures typically used to support endowment effect theory. The experimental environment typically used is not as simple as it seems.

Fortunately, laboratory experimental procedures can be modified to separate the predictions of competing theories. By contrast, testing endowment effect theory against classical preference theory in the field would add complexities making it impossible to identify the theory at work due to the various extraneous forces triggered by ownership creation. By peeling away the previously unrecognized complexities and by using several subtle variations of controls and replications that would be very difficult if not impossible to implement in the field, we are able to identify the theory that better explains observed exchange asymmetries.

The paper is organized as follows. Part I provides background including a recap of the design of, results from exchange experiments, and provides evidence of the proliferation of the interpretation of exchange asymmetries as support for endowment effect theory in both the economics and law literatures. The prevalence of this particular interpretation prompted our investigation. Part II discusses particular procedures that might create exchange asymmetries. Endowment effect theory predicts that the presence of ownership will result in a reluctance to exchange and therefore we should observe exchange asymmetric in each of our five treatments. On the other hand, if procedure-driven theories such as signaling theory, other-regarding

preferences and information aggregation and cascade theory explain observed asymmetries then differences in experimental procedures will produce divergent results even when ownership is held constant across designs. Part III discusses the basic design features of our experiments and their results. We start with a set of baseline procedures, which reliably produces exchange asymmetries. We then assess the influence of a collection of controls without establishing the independent influence any particular control. Additional experiments initiate an investigation of the effects and interdependencies of individual controls. The main result is that exchange asymmetries are not robust to changes in the procedures used to observe choices. Ownership is the one feature held constant across all experiments; therefore, our results reject the claim that endowment effect theory explains observed asymmetries. Finally, Part IV concludes that our results, in combination with results from Plott and Zeiler (2005), strongly suggest that theories related to procedures, as opposed to the structure of preferences as postulated by prospect theory, explain observed exchange asymmetries. As such, our results call into question proposed legal policies that rely on the results of standard “endowment effect” experiments.

## **I. Background**

Knetsch (1989) was the first to report results from exchange experiments to directly test the reversibility of indifference curves. The experiments involved two groups of subjects. Each subject in the first group was given a mug and then asked to complete a questionnaire.<sup>3</sup>

Following the questionnaire, the subjects were shown candy bars and told that they could each have one in exchange for the mug. The subjects were instructed to hold up a piece of paper with the word “trade” written on it if the candy bar was preferred to the endowed mug. To reduce transaction costs, the experimenter immediately executed all desired trades by taking candy bars

to the subjects wishing to exchange. Using a second group of subjects, the same experiment was performed except that each subject in this group was endowed with a candy bar and given an option to trade it for a mug.

The results were quite striking. Of the 76 subjects endowed with mugs, 89 percent chose to keep the mug. The possibility that subjects simply preferred the mugs to the candy bars was ruled out by the fact that, of the 87 subjects endowed with candy bars, 90 percent chose to keep the endowed candy bar rather than exchange it for a mug. From these results, Knetsch concluded that subjects' choices depended on their endowments. He suggested that the dramatic asymmetry resulted from subjects "[weighing] the loss of giving up their initial reference entitlement far more heavily than the foregone gains of not obtaining the alternative entitlement." In other words, he interpreted the observed behavior as resulting from loss aversion.<sup>4</sup>

Other researchers have obtained similar results using Knetsch's design. William T. Harbaugh et al. (2001) used simple exchange experiments with children to test whether market experience affects reluctance to trade and found that observed exchange asymmetries were independent of market experience levels. In addition, John A. List (2003, 2004) reports results from exchange experiments also designed to study whether market experience affects exchange asymmetries. He found that subjects with market experience tend not to display exchange asymmetries. For those without market experience, however, he observed a significant asymmetry in choices. Finally, Eric van Dijk and Daan van Knippenberg (1998) conducted exchange experiments to test the effects of the comparability of consumer goods on the reluctance to trade. Subjects were "rewarded" with a bottle of wine (half one kind and half another) in exchange for participating in the study. Subjects were then allowed to trade with one another. The results suggest that subjects were reluctant to trade in general and were more

reluctant to trade when they perceived substantial differences between the endowed good and the alternate good.

The results from these simple exchange experiments have been interpreted by many as support for endowment effect theory, loss aversion and/or prospect theory. Richard Thaler (1980) interprets observed asymmetries from a variety of settings as resulting from prospect theory and loss aversion. In particular, Thaler posits that the endowment sets the reference point and that selling moves one in the direction of a loss and buying in the direction of a gain. To avoid losses, individuals state high values when asked how much they would be willing to accept to give up the endowment. Later Daniel Kahneman, Knetsch and Thaler (1990) summarize the results reported by Knetsch (1989) and interpret the data as support for endowment effect theory (see also Kahneman, et al. (1991) and Thaler (1992)). They then argue that the data support prospect theory.<sup>5</sup>

This interpretation of exchange experiment results has bled into legal scholarship as well. In separate experimental literature reviews, Russell Korobkin (2003) and Jeffrey J. Rachlinski and Forest Jourden (1998) refer to Knetsch's (1989) results as evidence of the existence of an endowment effect. Jeffrey E. Stake (1995, 2001), Ian Ayres and Fredrick E. Vars (1998), Henry E. Smith (2000), and M. Gregg Bloche (2003) also use Knetsch's results as evidence of the existence of an endowment effect (i.e., evidence for endowment effect theory) and/or support for loss aversion and prospect theory.<sup>6</sup> More importantly, a number of legal commentators advance policy prescriptions that are, in part, responses to implications of endowment effect theory.<sup>7</sup>

It is important to note that several theories have been posited to explain WTP-WTA gaps and exchange asymmetries, and these theories should not be confused with endowment effect theory. As described, endowment effect theory holds that the utility function includes a "kink,"

which leads to differing evaluations of gains and losses. That is, for the *same* good the gain from acquiring it is less than the loss from giving it up. Endowment effect theory should not be confused with theories about the potential role of ownership in the creation of features of goods that hold special values, such as sentimental value, emotional attachment, familiarity, etc. These alternative theories posit that such sources of value are reflected in offers to sell (see, e.g., Lee Anne Fennell (2005) (fn. 107); Cass R. Sunstein (1986) (p. 1151); Rachlinski and Cynthia R. Farina (2002) (p. 605), and Thomas F. Cotter (1997) (p. 62)). That is, these theories describe ownership as being associated with phenomena that transform the features of goods so that the good to be given up is not the same as the good that was acquired. It is important to note that such possibilities are not the subject of endowment effect theory, which theorizes that the good and all features of the good are the same when buying and selling but the kink in the utility function creates an asymmetry in choices due to loss aversion.

## **II. Experimental Procedures under Investigation**

In this Part, we elaborate on our conjectures about why the experimental procedures, as opposed to endowment effect theory, are responsible for observed asymmetries.

### **A. Method and language used to endow subjects**

The specific method used to determine which good to endow and the language used to convey the method of determination might trigger procedure-driven explanations for observed asymmetries. Specifically, whether subjects are told that the endowed good is chosen through some random process or whether they perceive it as being chosen by the experimenter might influence subject choices over goods. Both signaling theory and theories of other-regarding preferences suggest the importance of this seemingly innocuous procedure.

While the method used to determine and explain the endowment might influence subject choices in myriad ways unrelated to loss aversion, we offer two specific possibilities. First, the language typically used to convey the nature of the endowment might cause subjects to perceive the endowed good as a gift from the experimenter. For example, imagine that the experimenter, after distributing the endowed good, “X,” announces, “X is yours. You own X. I am giving X to you.”<sup>8</sup> Subjects might perceive this language as indicating that X is a gift from the experimenter, even though the experimenter might simply intend to convey that subjects now own X. Given this perception, subjects might hesitate to trade the “gift” for the alternate good in deference to the experimenter. In other words, rather than choosing between a simple mug and a simple pen, each subject is choosing between a mug, which was a gift from the experimenter, and a pen.<sup>9</sup>

Second, subjects might perceive the method used to determine the good chosen for the endowment as containing information. A subject who perceives the experimenter as exercising some judgment in determining which good to endow reasonably might view the experimenter as having special information about the relative value of the goods. The choice of the endowment good might serve as a signal about the relative value of the goods.<sup>10</sup> By engaging in particular actions, the experimenter might unintentionally reveal what subjects perceive as information about the relative value of the endowment. A subject who is indifferent between the endowed good and alternate good, or has not thought much about the relative value of the goods, might base choices on a perceived signal and do so instinctively.

To test these alternative explanations, we employed two different procedures for determining which good to endow. The first procedure focuses on language we suspect encourages the subjects to perceive the endowment as a gift. When the endowed goods were distributed, the experimenter announced, “I’m giving you X. It is a gift. You own it. It is yours.”

The second procedure was designed to convey that the determination of the endowment resulted from a random process—a process through which the experimenter exercised no judgment. Subjects were told that the endowed good was determined by a coin flip before the start of the experiment.<sup>11</sup> If exchange asymmetries result from the involvement of the experimenter in determining the endowment, we should observe an asymmetry when employing the first procedure but not the second. If, instead, loss aversion explains observed asymmetries we should observe an asymmetry regardless of the procedure employed.

### **B. Suggestions of Relative Value**

When conducting exchange experiments, experimenters have tended to incorporate procedures to establish a “reference point,” in this case ownership vis-à-vis the endowed good, prior to asking them to choose one of the goods. For example, subjects often are asked to fill out questionnaires while the endowed good is in front of them. Presumably, this is thought to provide subjects enough time to understand they own the endowed good.

A close examination of the procedures, however, reveals that experimenters, intent on emphasizing ownership, possibly establish more than a reference point by inadvertently signaling that the endowed good is more valuable than the alternate good. For example, emphasizing ownership (e.g., “This good is yours. You own it. It belongs to you.”) in an attempt to ensure that subjects understand they own the endowed good might signal to the subjects that it is more valuable than the alternate good. Alternatively, this sort of language might be interpreted as a signal from the experimenter that the “correct” choice is to retain ownership of the endowed good.

To test whether this feature of the procedures might lead to exchange asymmetries, we altered the standard procedures (i.e., those likely employed by Knetsch (1989)) in two ways.

First, when we distributed the endowments, we simply said, “These X’s are yours.” This is in contrast to emphasizing ownership by saying, “I’m giving you X. It is a gift. You own it. It is yours.” Second, the forms subjects used to communicate their choices simply instructed, “Please circle the item you wish to take home with you.” The form included three choices: “X,” “Y,” and “I DON’T CARE.” This is in contrast to stating the choices as “I want to keep my X,” and “I want to trade my X for a Y.” If exchange asymmetries are caused by experimental procedures that suggest relative value, then modifying such procedures potentially will impact choices. On the other hand, if endowment effect theory explains exchange asymmetries, then these subtle changes in language should not affect choices, and asymmetries will persist.

### **C. Location of endowed good at time of choice**

Where the endowed good is located at the time subjects make their choices might influence their decisions. In standard exchange experiments, the experimenter places the endowed good immediately in front of the subjects. As with other procedures analyzed previously, it could be that subjects perceive the position of the endowed good relative to the alternate good as a signal of relative value.

To control for this feature of the procedures we altered the standard procedures in a simple way. After presenting subjects with the endowed good and allowing them to inspect it while completing the questionnaires, we replaced the endowed good with the alternate good (reminding subjects that they still owned the endowed good even though it was not sitting in front of them). If exchange asymmetries are caused by signals of relative value produced by the location of the goods, then removing this sort of signal will influence exchange asymmetries (or result in reverse asymmetries). On the other hand, if endowment effect theory explains exchange

asymmetries, then this change in procedures should not affect choices, and asymmetries will persist.

We constructed an additional treatment (referred to as the “transaction costs test”) to investigate a second conjecture about how the location of the endowed good might influence choices. Specifically, if a subject is indifferent between the endowed good and the alternate good, even very slight transaction costs (e.g., requiring a subject to raise his hand if he wishes to trade or to take any sort of action to initiate a trade such as the physical exchange of the endowment for the alternate good) might encourage him to keep the good within reach. That slight transaction costs can influence choices when subjects are near indifferent is well known (Plott and Smith, (1978)). Indeed, Chapman (1998) speculated that some of her results were due to reluctance to trade because subjects were “truly indifferent between the two items and trading involved transaction costs.” Many experimenters (e.g., Knetsch (1989)) have incorporated procedures to eliminate (or at least reduce) transaction costs in an attempt to rule them out as a direct cause of observed asymmetries (e.g., hand delivering the alternate good to subjects). Complete removal has proved difficult, however. Few, if any, have been able to conclude definitively that they are not an important driver of observed asymmetries.

We took a different approach to investigate whether transaction costs explain observed asymmetries. We used the standard procedures except that we asked subjects to make choices while the alternate good, rather than the endowed good, was within their reach.<sup>12</sup> If subjects are indifferent between the goods and transaction costs make subjects reluctant to trade, we should observe a “reverse” asymmetry when subjects make choices while the alternate good is in front of them. Put simply, transaction costs will result in subjects keeping the alternate good rather

than trading back for the endowed good. On the other hand, if endowment effect theory accounts for observed asymmetries, we should observe subjects trading to retrieve their endowed goods.<sup>13</sup>

#### **D. Public revelation of choices**

Signals as sources of information about value can enter through yet another aspect of the procedures typically employed in studies that report exchange asymmetries. In most reported exchange experiments, including Knetsch's (1989) experiment, subjects are asked to raise their hands if they wish to trade the endowed good for the alternate good. The resulting public revelation of choices might cause a "cascade" of sorts, as those who are contemplating choosing one good might observe, as hands begin to go up or stay down, that most others seem to prefer one good over the other. Public revelation of choices might trigger cascades if subjects view other subjects' decisions as signals about the goods' relative value. That subjects interpret the choices of others as signals of value is well established (Anderson and Holt (1997); Hung and Plott (2001), Barner, Feri, and Plott (2005)).

To control the influence of public revelation of choices on behavior, we used forms to allow subjects to report their choices privately. This ensures that subjects' choices are independent of other subjects' choices. If exchange asymmetries are due to the public nature of choice elicitation, then allowing subjects to communicate their decisions privately should eliminate them. On the other hand, if endowment effect theory explains asymmetries, then the elicitation mechanism should not significantly influence the results.

The following Part reports results from five exchange experiments that implement various sets of the procedures discussed in this Part.

### **III. Experiment Designs and Results**

The experimental design reflects the study's primary purpose: to investigate the possibility that classical preference theory together with certain procedures, as opposed to endowment effect theory, account for observed exchange asymmetries. To test this conjecture we alter the design in an attempt to rule out procedure-driven explanations. This is accomplished by a demonstration that asymmetries can be made to appear or disappear in a given subject pool by altering procedures while leaving the predictions of endowment effect theory intact. That is, the test calls for a demonstration of a change in behavior suggested by other well-established, competing theories when endowment theory predicts no change in behavior.

Multiple competing theories such as signaling or other-regarding preferences can work to influence choices through different procedures; therefore, we first test the alternative explanation by controlling simultaneously for all competing theories. If changes in procedures do not result in changes in choices, we can conclude that the data support endowment effect theory. On the other hand, if the results suggest that procedures influence choices, as is the case in the experiments reported here, we can begin to explore the impact of subsets of procedures to establish robustness of the initial result and to initiate a deeper investigation of the channels through which the procedural influences work.

Section A reports results from two treatments, which taken together demonstrate that controls affect choices. Endowment effect theory predicts we will observe an exchange asymmetry in both treatments studied given that ownership is present in both. We observed an asymmetry, however, only in the treatment void of any experimental controls to rule out alternative explanations related to procedures. From this, we conclude that the procedures, and not endowment effect theory, account for observed exchange asymmetries.

Section B reports a set of results that tests robustness of our initial results and moves us a step toward understanding the effects of individual procedures and possible interactions between them. The analysis provides insights into not only which procedures (or combinations of procedures) seem to be driving differences in elicited choices but also the alternative theories that might be at work. While endowment effect theory predicts asymmetries in all three treatments, we observe asymmetries in only one of the three treatments (when differences are measured at the 5 percent level). Table 1 summarizes the features of each design. Table 2 provides details regarding each session conducted including the date, person(s) who ran the experiment, the subject pool and the goods used. We also summarize the results for each session individually in Table 2. We drew our subjects from pools of Caltech students and Georgetown law students.

#### **A. Asymmetries Depend Strongly on Procedures**

To test for whether the collection of procedures affects subject choices, we conducted two treatments. The baseline treatment contains none of the controls we identified as important. The second treatment incorporates a full set of controls meant to remove the influence of the alternative theories mentioned above. The data support the conjecture that the nature of the procedures, and not endowment effect theory, explain observed exchange asymmetries. Specifically, we observed a significant exchange asymmetry when no controls are employed. When we control for all competing theories, however, the asymmetry disappears, contrary to what endowment effect theory would predict.

##### **i. A Baseline**

We first attempted to replicate the asymmetric exchange phenomenon that has been widely reported in the literature. We refer to this treatment as the “baseline” because it includes all procedures the alternative explanations predict would lead to an observed asymmetry. We

employ the baseline procedures to demonstrate that we can observe asymmetries in our subject pools. This set of procedures serves as a backdrop against which we assess alternative procedures.

We distributed mugs branded with university insignia to the subjects (Caltech mugs to Caltech students and Georgetown mugs to Georgetown students) and informed the subjects that they owned the mugs by announcing, “I’m giving you the mug. It is a gift. You own it. It is yours.”<sup>14</sup> While the endowed goods were located in front of the subjects, we allowed them approximately three minutes to fill out questionnaires.<sup>15</sup> After they completed the questionnaires, we allowed them to pass a few pens around the room so they could inspect them.<sup>16</sup> Once each subject had an opportunity to inspect a pen the experimenter instructed, “Please raise your hand if you want to keep the mug, the thing you own, rather than trading it for a pen.”<sup>17</sup> The experimenter then walked around the room to make any necessary exchanges. We conducted additional sessions using an identical design except that subjects were endowed with pens instead of mugs.

We collected data from 129 Georgetown law students and Caltech students. We endowed 64 subjects with mugs and 65 with pens. Eighty-four percent of the mug owners chose mugs and 28 percent of the pen owners chose mugs. A two-sample, one-tailed test of equality of proportions supports a rejection of the null hypothesis that the percentages are identical in favor of the alternative hypothesis that the percentage of mug owners that chose mugs is greater than the percentage of pen owners that chose mugs ( $p = 0.00$ ). In other words, these data reveal a statistically significant exchange asymmetry.

## **ii. Full Set of Controls**

We refer to the second treatment as the “full set of controls” because we designed the procedures to remove all avenues of procedural influence listed in Part II. This treatment tests for the existence of procedural influences even though the exact nature of the influence might not be apparent.

We began these sessions by informing the subjects that mugs and pens would be used during the experiment. Subjects were then told that a coin was flipped before the start of the experiment to determine which good, the mug or the pen, would be distributed first. We then distributed mugs to the subjects and announced, “These mugs are yours.” Next, we asked the subjects to complete the questionnaires. After the questionnaires were completed, we took the mugs from the subjects, placed them at the front of the room and distributed pens to the subjects. After providing time to inspect the pens, we asked each subject to decide which good to keep and to indicate the decision on a form.<sup>18</sup> The forms simply indicated the options and did not re-emphasize the fact that subjects owned one of the goods. Once each subject completed a form, the experimenter walked around the room to collect them and make any necessary exchanges. We conducted additional sessions using an identical design except that subjects owned pens rather than mugs.

In Table 1 we report the features of and results from this treatment. We collected data from 139 Georgetown law students, 69 endowed with mugs and 70 endowed with pens. Fifty-four percent of the mug owners chose mugs and 67 percent of the pen owners chose mugs. A two-sample, one-tailed test of equality of proportions supports the hypothesis that the percentages are identical ( $p = 0.94$ ).<sup>19</sup> In other words, we observed no exchange asymmetry under this set of procedures. Indeed, we observe a (somewhat weak) reverse asymmetry.<sup>20</sup>

These results, taken together, support the conjecture that exchange asymmetries result from experimental procedures and cannot be explained by endowment effect theory or prospect theory. The next Part reports results from experiments designed to begin an exploration of specific procedural effects and how procedures interact with one another.

## **B. Sets of Procedures and Their Interactions**

Classical preference theories suggest several mechanisms through which any specific procedure might influence choices. Thus, we turn our investigation to whether specific procedures exhibit influence over choices. Using key procedures as cornerstones, we begin an investigation into the effects of sets of specific procedures and whether procedures interact with one another. This Part reports the design features of these treatments and their results. Recall that endowment effect theory predicts asymmetries in each treatment. By contrast we observe an asymmetry in only one treatment (when measured at the 5 percent level).

### **i. Transaction Costs Test**

The transaction costs test was designed to explore whether transaction costs created by procedures might explain observed asymmetries. That small transaction costs can create asymmetries in choices when individuals are nearly indifferent was established in the 1970s. (Charles R. Plott and Vernon L. Smith, (1978)).

To test for the influence of transaction costs, we distributed mugs to the subjects and informed them that they owned the mugs. While the endowed good was located in front of them, subjects spent approximately three minutes filling out questionnaires. After they completed the questionnaires, we removed the endowed mugs and placed the mugs at the front of the room (reminding them that they still owned them) and passed around pens for their inspection. Each student then filled out a form to indicate whether he wanted to keep his mug or trade his mug for

a pen (see Appendix B). Once the subjects completed the forms by choosing one of the options, the experimenter walked around the room to collect the forms and made any necessary exchanges. We conducted additional sessions using an identical design except that subjects were endowed with pens instead of mugs.

We collected data from 101 Georgetown law students and Caltech students. We endowed 53 subjects with mugs and 48 with pens. Seventy-two percent of the mug owners chose mugs and 50 percent of the pen owners chose mugs. A two-sample, one-tailed test of equality of proportions supports a rejection of the null hypothesis that the percentages are identical in favor of the alternative hypothesis that the percentage of mug owners that chose mugs is greater than the percentage of pen owners that chose mugs ( $p = 0.01$ ). In other words, these data reveal a statistically significant exchange asymmetry. This result suggests that any transaction costs that might exist in the baseline do not account for the observed exchange asymmetry.

This result suggests that transaction costs do not drive observed exchange asymmetries. In addition, when combined with the results from the treatment employing the full set of controls, this result suggests that other modifications of the standard procedures (e.g., removing the experimenter from the determination of the endowment, etc.) possibly account for the elimination of exchange asymmetries under the full set of controls.<sup>21</sup>

## **ii. Standard Procedures**

We term this design as “standard” because of its close proximity to the procedures found in the literature. The procedures differ from the baseline only in terms of the meaning of raised hands during the choice phase of the experiment. In the baseline procedures, a subject’s raised hand signals the desire to keep the endowed good. In the standard procedures, a raised hand signals the desire to trade the endowed good for the alternate good.<sup>22</sup> This natural robustness

check might also provide insight into what sorts of signals subjects send to one another when they make public choices and how these signals interact with other procedures. Our suspicion was that the baseline procedures would produce stronger cascades and exacerbate the asymmetry. If the collection of procedures encourages subjects to trade, as suggested by the alternative theories, then many subjects will raise their hands to trade, leading to cascades of other subjects raising their hands to trade.

In Table 1 we report the features of and results from this treatment. We collected data from 96 Georgetown law students. We endowed 44 subjects with mugs and 52 with pens. Seventy-seven percent of the mug owners chose mugs and 62 percent of the pen owners chose mugs. A two-sample, one-tailed test of equality of proportions (somewhat weakly) supports a rejection of the null hypothesis that the percentages are identical in favor of the alternative hypothesis that the percentage of mug owners that chose mugs is greater than the percentage of pen owners that chose mugs ( $p = 0.06$ ). In other words, we observed a (somewhat weak) exchange asymmetry. The fact that the asymmetry observed under the standard procedures is not as large as that under the baseline procedures suggests that the existence of subtle signals might have an effect, but the effect is not sufficient to eliminate the asymmetry.<sup>23</sup>

### **iii. Ownership Emphasis**

This treatment addresses critiques of the “full set of procedural controls” treatment design and serves as another test of the robustness of our general results. Some have argued that the procedures embodied in the full set of controls might reduce the chance that subjects’ understand they actually own one of the goods, and therefore the full set of controls cannot test the influence of reference points on choices. In particular, some have suggested that lack of possession of the endowed good at the time of choice and the brief mention of ownership (e.g., “The mug is

yours.”) are insufficient to ensure that subjects understand they own the endowed good. In effect, they argue that specific features of the full set of controls make endowment effect theory irrelevant because, if one does not own a good, then no loss is contemplated when choosing between the goods.

To address this conjecture we altered the “full set of controls” treatment in three ways: (1) when endowing one of the goods, rather than saying, “The mug is yours,” we said, “The mug is yours. You own it.”; (2) the subjects made choices while in possession of the endowed good; and (3) the forms reiterated ownership of the endowed good (see Appendix B).<sup>24</sup> We altered the design in these ways to determine whether a lack of understanding of owner status caused the null result in the “full set of controls” treatment, while being careful to eliminate possible experimenter signals of value.

In Table 1 we report the features of and results from this treatment. We collected data from 87 Georgetown law students. We endowed 44 subjects with mugs and 43 with pens. Eighty-two percent of the mug owners chose mugs and 74 percent of the pen owners chose mugs. A two-sample, one-tailed test of equality of proportions supports acceptance of the null hypothesis that the percentages are identical in favor of the alternative hypothesis that the percentage of mug owners that chose mugs is greater than the percentage of pen owners that chose mugs ( $p = 0.18$ ). In other words, we did not observe an exchange asymmetry. That the result from this treatment is consistent with the result from the “full set of controls” treatment suggests that a lack of understanding of owner status does not explain the lack of asymmetry observed under the full set of controls.

In sum, it is important to stress that while procedures clearly have a strong influence on the asymmetry of choices, any inferences about how particular features of the procedures affect

choices are only conjectures at this stage. Given our results, we suspect that interaction effects exist between various procedures and the information contained in Table 1 is insufficient to understand them.

#### **IV. Discussion and Conclusions**

Many have advance observed exchange asymmetries as support for endowment effect theory and underlying prospect theory. These are very general theories about the nature of preferences, which, if accepted, have substantial implications for applied economics in complex field settings. While we do challenge the general accuracy of endowment effect theory we do not challenge prospect theory, which has been explored in different experiments. We, however, do challenge the interpretation of exchange asymmetries as providing empirical support for either of them. Knetsch's (1989) discovery of asymmetries in exchange experiments is interesting and certainly should not be dismissed, but our results suggest that his discovery cannot be explained by endowment effect theory. The experiments we report, along with those reported by others, suggest that the procedures used in the experiments and aspects of classical preference theory account for the patterns of observed choices.

Well-established theories of economics suggest the mechanism through which the procedures influence choices to produce observed exchange asymmetries. Intuitions derived from them are based on two broad classes of variables. First, other-regarding preferences, specifically the regard subjects have for the experimenter, might influence choices in exchange experiments. These preferences are known to operate during experiments and, in the case of exchange experiments, could be activated by aspects of procedures that might ingratiate the subject vis-à-vis the experimenter (e.g., gift language). This theory is related to theories that hold

that the context in which ownership is granted generates an independent source of value and that value accounts for observed exchange asymmetries as opposed to loss aversion.

Second, signals built into the experimenter's actions and language choices (or the actions of others) in combination with the possibility of asymmetric information about the relative value of the goods might influence choices. Subjects might interpret experimenter emphasis on ownership as indicating that the experimenter has information about the relative value of the goods that the subjects do not. Similarly, the choices of others might be interpreted as reflections of private information about the relative value of the goods. Such influences are well known in the information aggregation and cascade literature.

It is important to note that our results demonstrate much more than the possibility that arbitrary changes in procedures might influence subject choices. Classical preference theory is consistent with the pattern of results. The experimental economics literature has demonstrated that other-regarding preferences and various signals about the relative value of the goods can influence choices. By implementing procedures that collectively control for the various routes of influence classical preference theories suggest, a substantial difference in choice behavior is observed under the full set of controls (when we neutralize these influences) and the treatments implementing the standard and baseline procedures (when we do not control for these influences). Our results remain strong in robustness checks, which attempt to ensure that subjects feel they own the endowed good while avoiding signals that might act as sources of information about relative value. The results from the transaction costs treatment suggest that the transaction costs variable does not explain a significant portion of the variation observed across treatments even when classical preference theory suggests it might. We hasten to add that our understanding of procedural influences is incomplete but our general conclusion stands: endowment effect

theory does not seem to explain observed exchange asymmetries.

Our empirical results suggest that either no “endowment effect” of the sort predicted by prospect theory exists in these experiments or the effect is sufficiently weak that other phenomena easily swamp it. If asymmetries of observed choices are to be interpreted as strong evidence about the principles that operate when individuals make choices, then such asymmetries should be robust against subtle features of procedures and variations in the set of procedures used to conduct experiments.

In closing, we call the reader's attention to a common interpretation mistake. It is tempting to interpret our results as demonstrating that the endowment effect is context-dependent. Previous claims of this sort abound in the literature and represent a tendency to reconcile results that do not support endowment effect theory by pointing to various contextual features.<sup>25</sup> This “context-dependent” interpretation places an awkward strain on endowment effect theory in an effort to find support for it. Consider a typical example of context-created value: a good received as a gift from a friend. Value is created by the context because, as a gift from a special individual, it is unique and thus valued differently from otherwise identical goods. One does not need to resort to a “kink” in a utility function to explain the value created in such contexts. Such values reflect special attributes of the good created by the context and are unrelated to loss aversion, a key property of endowment effect theory. Furthermore, such context-dependent theories destroy the generality and robustness of the theory, which is the source of power and relevance of any theory in applied work.

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**Table 1: Design Features and Continuum of Results**  
(from no asymmetry to statistically significant asymmetry)

	Full Set of Procedural Controls	Strength of Controls Test	Standard Procedures	Transaction Costs Test	Baseline Procedures
Endowed good immediately in front of subject at time of choice	NO	YES	YES	NO	YES
Experimenter chose and gave OR randomly assigned which good to endow	RANDOMLY ASSIGNED	RANDOMLY ASSIGNED	EXPERIMENTER CHOSE AND GAVE	EXPERIMENTER CHOSE AND GAVE	EXPERIMENTER CHOSE AND GAVE
Experimenter purposefully and repeatedly emphasized ownership	NO	NO	YES	YES	YES
Choices made by public show of hands OR use of private forms	FORMS	FORMS	HANDS (TRADE ENDOWED GOOD)	FORMS	HANDS (KEEP ENDOWED GOOD)
(# mug owners, # pen owners)	(69,70)	(44,43)	(44,52)	(53,48)	(64,65)
(# mug owners that chose mugs, # pen owners that chose mugs)	(37, 47)	(36, 32)	(34, 32)	(38,24)	(54,18)
(percent mug owners that chose mugs, percent pen owners that chose mugs)	<b>(54% , 67%) diff = -13%</b>	<b>(82% , 74%) diff = 8%</b>	<b>(77% , 62%) diff = 15%</b>	<b>(72% , 50%) diff = 22%</b>	<b>(84% , 28%) diff = 56%</b>
Result †	<b>p = 0.94 ‡</b>	<b>p = 0.18</b>	<b>p = 0.06</b>	<b>p = 0.01</b>	<b>p = 0.00</b>

Overall, we observed a general preference for the mug. Of the 618 subjects that participated (including pilots), 398 (or 64 percent) chose mugs. This is statistically significantly greater than 50 percent ( $p = 0.00$ ). This general mug preference, however, does not affect our results as we measured asymmetries by comparing the percentage of mug owners that chose mugs and the percentage of alternate good owners that chose mugs. This measurement controls for the overall mug preference. † Results are from two-sample tests of equality of proportions (null hypothesis: proportions are equal; alternate hypothesis: percent mug owners that chose mugs > percent of pen owners that chose mugs). ‡ If we use an alternate hypothesis of  $H_a$ : percent of mugs owners that chose mugs < percent of pen owners that chose mugs, the p value is equal to 0.06. This (weakly) supports a hypothesis that a “reverse” asymmetry exists.

**Table 2: Summary of Sessions**

	Date	Experimenter	Subject Pool	# mug owners / # chose mug	# alt. good* owners / # chose mug
<b>Full Set of Procedural Controls</b>	Jul 14 04	Zeiler	Gtown JD	8 / 5 [1]** (63%)	9 / 5 [1] (56%)
	Jul 15 04	Zeiler	Gtown JD	6 / 4 [1] (67%)	7 / 4 [1] (57%)
	Jul 26 04	RAs	Gtown JD	10 / 6 [1] (60%)	5 / 2 [1] (40%)
	Jul 27 04	RAs	Gtown JD	5 / 4 [1] (80%)	5 / 4 [0] (80%)
	Aug 03 04	RAs	Gtown JD	9 / 1 [1] (11%)	18 / 12 [1] (67%)
	Sept 20 04	Zeiler	Gtown JD	17 / 8 [3] (47%)	14 / 11 [1] (79%)
	June 21 05	Zeiler and RA	Gtown JD	4 / 2 [1] (50%)	N/A
	June 23 05	Zeiler and RA	Gtown JD	5 / 2 [0] (40%)	8 / 6 [2] (75%)
	June 27 05	Zeiler and RA	Gtown JD	5 / 5 [0] (100%)	4 / 3 [1] (75%)
			<b>TOTAL</b>	69 / 37 [9] ( <b>54%</b> )	70 / 47 [8] ( <b>67%</b> )
<b>Strength of Controls Test</b>	Mar 30/Apr 3 06	Zeiler and RAs	Gtown JD	8 / 5 (63%)	14 / 10 (71%)
	June 12 & 14 06	Zeiler and RA	Gtown JD	12 / 10 (83%)	15 / 12 (80%)
	June 13 & 15 06	Zeiler and RA	Gtown JD	24 / 21 (88%)	14 / 10 (71%)
				<b>TOTAL</b>	44 / 36 ( <b>82%</b> )
<b>Standard Procedures</b>	Sept 01 04	Zeiler and RA	Gtown JD	15 / 12 (80%)	30 / 18 (60%)
	April 14 05	Zeiler and RA	Gtown JD	9 / 6 (67%)	11 / 9 (82%)
	June 30 05	Zeiler and RAs	Gtown JD	20 / 16 (80%)	11 / 5 (45%)
				<b>TOTAL</b>	44 / 34 ( <b>77%</b> )
<b>Transaction Costs Test</b>	Jun 4 03	Zeiler	Caltech UG	28 / 19 (68%)	28 / 14 (50%)
	Jun 8 and 10 03	Zeiler	Gtown JD	13 / 10 (77%)	10 / 5 (50%)
	Jun 25 04	Zeiler	Gtown JD	12 / 9 (75%)	10 / 5 (50%)
				<b>TOTAL</b>	53 / 38 ( <b>72%</b> )
<b>Baseline Procedures</b>	Aug 2004	Plott and RA	Caltech	9 / 7 (78%)	8 / 2 (25%)
	Aug 18 04	Plott	Caltech	7 / 5 (71%)	N/A
	Sept 9 04	Zeiler and RA	Gtown JD	17 / 14 (82%)	17 / 3 (18%)
	April 26 05	Zeiler and RA	Gtown JD	8 / 7 (88%)	15 / 6 (40%)
	June 17 05	Zeiler and RAs	Gtown JD	8 / 8 (100%)	7 / 2 (29%)
	June 29 05	Zeiler and RA	Gtown JD	8 / 7 (88%)	8 / 2 (25%)
	July 10 05	Zeiler and RA	Gtown JD	N/A	10 / 3 (30%)
	July 11 05	Zeiler and RA	Gtown JD	7 / 6 (86%)	N/A
				<b>TOTAL</b>	64 / 54 ( <b>84%</b> )

\* In each session except for the first session conducted on June 4, 2004, we used pens as the alternate good. During the first session, we used candy bars.

\*\* The numbers enclosed in square brackets indicate the number of subjects who reported indifference between the two goods by circling "DON'T CARE" on the decision record (see Appendix C). The numbers in parentheses indicate the percentage of subjects who chose mugs.

## Appendix A: A Sample Questionnaire

1. The current U.S. Secretary of State is _____. How likely is it that your answer is correct? _____ % (enter likelihood between 0% and 100%)
2. Bucharest is the capital city of _____. How likely is it that your answer is correct? _____ % (enter likelihood between 0% and 100%)
3. The author of the novel The Phantom of the Opera is _____. How likely is it that your answer is correct? _____ % (enter likelihood between 0% and 100%)
4. The actor _____ plays the U.S. President on the TV series The West Wing. How likely is it that your answer is correct? _____ % (enter likelihood between 0% and 100%)
5. What does the acronym NASA stand for? _____ How likely is it that your answer is correct? _____ % (enter likelihood between 0% and 100%)

## Appendix B: Sample Transaction Record for Transaction Costs Test

Transaction Record*
<input type="checkbox"/> I want to keep my mug.
<input type="checkbox"/> I want to trade my mug for a pen.

\*This form was used in sessions in which we endowed subjects with mugs. Subjects were asked to check one box. Similar forms, with obvious modification, were used in sessions in which we endowed subjects with pens.

## Appendix C: Sample Decision Record for Sessions Using Full Set of Procedural Controls

DECISION RECORD
Please circle the item you wish to take home with you.
MUG                      PEN
DON'T CARE

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\* Charles R. Plott, Edward S. Harkness Professor of Economics and Political Science, Division of the Humanities and Social Sciences, 228-77, California Institute of Technology, Pasadena, CA 91125. [cplott@hss.caltech.edu](mailto:cplott@hss.caltech.edu).

Kathryn Zeiler, Visiting Professor of Law, New York University School of Law, Vanderbilt Hall, Room 310D, 40 Washington Square South, New York, NY 10012; Associate Professor of Law, Georgetown University Law Center, [zeiler@law.georgetown.edu](mailto:zeiler@law.georgetown.edu); [www.georgetown.edu/faculty/kmz3/](http://www.georgetown.edu/faculty/kmz3/). The financial support of the National Science Foundation, and the Laboratory of Experimental Economics and Political Science is gratefully acknowledged. We thank numerous Georgetown students for excellent research assistance and several Caltech and Georgetown students who helped conduct the experiments.

<sup>1</sup> Many have referred to endowment effect theory (or prospect theory) as the leading explanation for observed “endowment effects.” See e.g., Raban and Rafaeli (2003); List (2006); Jolls (2005).

<sup>2</sup> For example, the means through which ownership is acquired could be important. One might hesitate to trade a trophy awarded at the end of a competition for a physically identical trophy. In addition, the ability to thoroughly inspect while in possession can be a source of information about the good’s properties and thus might lead to adjustments in valuation in the presence of risk aversion.

<sup>3</sup> The questionnaire supposedly was devised as an instrument to allow the subjects a chance to “experience” ownership of the endowed goods for a period of time on the theory that such time would allow them to understand they own the endowed good.

<sup>4</sup> In similar experiments designed to test the assumption of transitivity of preferences, Knetsch (1992 and 1995) obtained nearly identical results. Knetsch (1995) interprets these results as support for loss aversion and prospect theory as well.

<sup>5</sup> Werner Guth, Jan P. Krahnert and Christian Rieck (1997), Gwendolyn C. Morrison (1998), Gretchen Chapman (1998), Nira Liberman et al. (1999), Leaf Van Boven et al. (2000), Stephen Wu (2001), Van Boven et al. (2003), Gail Tom (2004), and Steffen Huck et al. (2005) also invoke Knetsch’s results as evidence of endowment effect theory, loss aversion and/or prospect theory.

<sup>6</sup> Other legal scholars have challenged the existence and stability of the endowment effect. See e.g., Curran and Rubin (1995) and Arlen (1998).

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<sup>7</sup> See, e.g., Rachlinski and Jourden (1998) (arguing that injunctive remedies, as opposed to damages remedies, impede trade because injunctions are perceived as endowments and owners are resistance to giving up rights they own due to the endowment effect) and Stake (2001) (arguing that the theory of loss aversion “provides a strong framework” for maintaining legal rules related to adverse possession).

<sup>8</sup> While the exact language used by experimenters in previous experiments is often not reported, the description of the experiments suggests that subjects perceived the endowed good as a gift. For example, Knetsch (1989) indicates that “76 were *given* a coffee mug,” and that “87 participants in the second group were offered an opportunity to make the opposite trade of giving up a candy bar, which had been *given* to them initially...” (emphasis added).

<sup>9</sup> We thank Richard Lazarus for pointing this out as a potentially important variable. Fremling and Posner (1999, p. 27) focus on a need for subject anonymity to avoid any public display of choices and any associated public signal of personal traits or attitudes.

<sup>10</sup> That subjects gather information by observing the actions of others is well established (e.g., see Plott (2000)).

<sup>11</sup> Specifically subjects were told, “Before the start of the experiment, a coin was flipped to determine which good, the mug or the pen, to distribute. It came up heads, which means that we start with the mugs (or pens). The subjects in the other room will start with the pens (or mugs).”

<sup>12</sup> See Part III.B.i. for specific procedures employed in the transaction cost treatment.

<sup>13</sup> Of course, it could be that transaction costs and endowment effect theory, in combination with one another, make subjects reluctant to trade. If this is the case, then our results might only provide evidence about which effect overpowers the other in particular contexts..

<sup>14</sup> We obtained the mugs from campus bookstores for roughly \$5 apiece. We removed the price tags from all goods prior to conducting the sessions.

<sup>15</sup> Appendix A contains a typical questionnaire. Subjects’ answers to the questions were irrelevant to our study. We employed the questionnaires so that our results would be comparable to previously reported results. Each session lasted for less than ten minutes and subjects possessed the endowed good for roughly three to five minutes before making their choices. This is roughly the same amount of time provided in other experiments of this kind.

<sup>16</sup> We obtained the pens, labeled with the name of the subjects’ university, from campus bookstores for approximately \$5 apiece. In one session we used candy bars that were not labeled with the name of the university but cost roughly the same as the other goods.

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<sup>17</sup> The standard procedures ask subjects to raise their hands if they want to *trade* the endowed good for the alternate good. It seems reasonable to assume that a majority with raised hands is easier to detect than a majority that remains with hands down.

<sup>18</sup> See Appendix C for a sample of the forms used during these sessions. We gave subjects an opportunity to indicate indifference between the goods by circling the option “DON’T CARE.” None of the subjects asked which good would be received upon choosing this option. Each subject who chose “DON’T CARE” received the good in her possession at the time she completed the form. Only 17 of the 139 subjects reported indifference; therefore, the results from statistical tests of differences of proportions are virtually identical when we include and exclude these data.

<sup>19</sup> We tested the null hypothesis of equality against an alternative hypothesis that the percentage of mug owners that chose mugs was greater than the percentage of pen owners that chose mugs.

<sup>20</sup> When the alternative hypothesis is framed as “the percentage of pen owners that chose mugs is greater than the percentage of mug owners that chose mugs,” a two-sample test of equality of proportions results in a p-value of 0.06.

<sup>21</sup> It also suggests that the results obtained when implementing the full set of controls are not driven by the fact that the endowed good is not in front of the subjects when they are choosing between the two goods.

<sup>22</sup> Of all the designs we study, the “standard procedures” design seems most similar to Knetsch’s (1989) procedures (hence the label). Knetsch (1989) does not include the exact language used to convey ownership to the subjects. Therefore, our language (i.e., “I’m giving you the mug. It is a gift. You own it. It is yours.”) might not exactly match the language he used.

<sup>23</sup> In a separate test, we investigated whether the order in which the experimenter presents the goods to the subjects matters (see Harrison et al. (2005) for a general discussion of how order effects tend to confound results). We made a simple change to the standard procedures: We presented subjects with the alternate good before presenting them with the endowed good. During these sessions, we distributed mugs to the subjects and informed them that the mugs did not belong to them but that they should inspect them because we would give them an opportunity to obtain one later in the session. We then asked the subjects to complete the questionnaires. After the questionnaires were completed, we removed the mugs, placing them at the front of the room, and distributed pens to the subjects. Once each subject possessed a pen the experimenter announced, “These pens are yours.” Subjects then completed forms to

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indicate whether they wanted to keep the endowed good or trade it for the alternate good. The experimenter walked around the room to collect the forms and make any necessary exchanges. We conducted additional sessions using an identical design except that the sessions started with pens rather than mugs.

We collected data from 50 Georgetown law students. We endowed 17 subjects with mugs and 33 with pens. Seventy-one percent of the mug owners chose mugs and 64 percent of the pen owners chose mugs. The proportions are not statistically significantly different ( $p = 0.31$ ; power = 0.0675). This result differs from those obtained using the standard procedures; but the treatment changed both the public nature of the choice and the order of presentation. Since the effect is small relative to the “standard treatment,” but large relative to baseline, and because multiple variables are at work, we chose not to pursue this line of investigation. The question of order of presentation remains open.

<sup>24</sup> In most sessions, the forms said, “I want to keep *my* mug,” and “I want to trade *my* mug for a pen.” In the sessions conducted on March 30, 2006 and April 3, 2006, however, we used forms that said, “I want to keep *the* mug,” and “I want to trade *the* mug for a pen.”

<sup>25</sup> See e.g., Arlen et al. (2002, p. 4) (“Existing evidence on the endowment effect suggests that it is pronounced in certain circumstances yet muted (or absent) in others. Much like other deviations from rational choice, the existence and magnitude of the endowment effect is context dependent.”); Korobkin (2003, p. 1235) (“The broad array of experiments testing the endowment effect demonstrates that the effect is robust across different types of endowments, but it is not universally apparent nor equally striking across contexts.”).