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The Endowment Effect: Loss Aversion or a Buy-Sell Discrepancy?

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In a typical endowment effect experiment, individuals state a higher willingness-to-accept to sell an object than a willingness-to-pay to obtain the object. The leading explanation for the endowment effect is loss aversion for the object. An alternative explanation is based on a buy-sell discrepancy, according to which people price the object in a strategic way. Disentangling these two explanations is the goal of this research. To this end, we introduce a third condition, in which participants receive an object and are asked how much they are willing to pay to keep it (Pay-to-Keep). Comparing the three conditions we find no evidence for loss aversion in the endowment effect setting. We found support for the buy-sell strategy mechanism. Our results have important implications for the understanding of buyer and seller behaviors, subjective value, and elicitation methods.

Keywords: endowment effect, loss aversion, buyers versus sellers, utility theory, preference elicitation

The endowment effect refers to the observation that “goods that are included in the individual’s endowment will be more highly valued than those not held in the endowment” (Thaler, 1980, p. 44). A typical endowment effect study has two conditions. The first is a willingness-to-pay (WTP) condition, in which participants (“buyers”) are asked to state their maximum WTP for an object they do not own. The second is a willingness-to-accept (WTA) condition, in which participants (“sellers”) first receive the object, and are then asked to state the minimum amount they need to be paid in order to give it up (Johnson et al., 2007; Kahneman et al., 1990; Lerner et al., 2004; Levin et al., 2002; Novemsky & Kahneman, 2005b; Sen & Johnson, 1997; Strahilevitz & Loewenstein, 1998; see Morewedge & Giblin, 2015, for review). Experiments consistently show a WTP-WTA gap, whereby selling prices are higher than buying prices.

The leading explanation for the result is loss aversion for the good. Selling an endowment is a loss of the object, and people are more intensely averse to losing than they are happy to acquire (Kahneman & Tversky, 1979). In fact, the endowment effect is often seen as the demonstration of loss aversion in a riskless context. Research has since proposed a number of cognitive mechanisms through which loss aversion for the good translates to higher selling versus buying prices (e.g., Ashby et al., 2012; Carmon & Ariely, 2000). However, there is an alternative type of mechanism, based on the strategic context of selling and buying. Values in endowment experiments are elicited using incentive

compatible mechanisms, such as price lists, second price auctions, or the Becker-DeGroot-Marschak paradigm. While under these mechanisms it is optimal to state one’s true subjective value, some participants might not understand the situation and may treat the experiment more like a common buying or selling task (Plott & Zeiler, 2005). When selling an item, one aims for a high price, and when buying an item, one tries to pay as little as possible. Consequently, buyers and sellers may not be stating their personal subjective values, resulting in the WTP-WTA gap.

It is important to contrast these two accounts of the endowment effect due to their significant and different theoretical implications. The loss aversion account speaks to theories of subjective utility pertaining to buyers’ and sellers’ personal subjective values for the object. The buy-sell strategy account, on the contrary, speaks to cognitions pertaining to market factors rather than private values. Further, the endowment effect is often used to explain behavioral phenomena such as the lack of trading in financial markets (Furche & Johnstone, 2006) and in consumer durable goods markets (Purohit, 1995). Disentangling these two accounts and assessing their relative prevalence and strength is thus important for understanding buyers’ and sellers’ psychological drivers and the ensuing market outcomes. However, to date, these two accounts have not been explicitly disentangled. The goal of this research is to explicitly isolate these two mechanisms in the endowment effect, toward a clearer understanding of the nature of the buyer-seller gap.

Loss Aversion for the Good

Drawing on the theory of loss aversion, past research has identified specific processes driving the WTP-WTA gap. For example, much research posits that the personal, subjective value of the object changes when people “focus on the foregone”—when sellers focus on the object they are losing rather than the money they will gain, the result is aversion to that loss and hence higher selling prices (Carmon & Ariely, 2000; Shu & Peck, 2011). Further, when the object contains risk, sellers pay greater attention to the upside

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Project data are publicly available at the Open Science Framework (https://osf.io/65f3j/?view_only=983ca98120b649f888638c118b333b48).

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of the risk than buyers (Ashby et al., 2012). Similarly, when the object contains positive and negative features, sellers (buyers) more greatly attend to the positive (negative) aspects of the good (Birnbaum & Stegner, 1979; Birnbaum et al., 2016). The greater focus on the upside by sellers is assumed to be due to greater aversion to losing one's positive assets, compared to buyers' motivation to acquire positive assets. Other research has presented a sequence-based explanation for the seller's focus on the positive of the good. In particular, query theory (Johnson et al., 2007) proposes that the sequence of thoughts (queries) in constructing a price depends on the status quo, in particular, the advantage of the status quo is considered first. The "advantage of the status quo" is essentially the nice thing a person currently has that the alternative state will not have. This first query is both more prominent and considered more often. Query theory thus predicts sellers will first think of the nice thing about the item that will be lost, thereby leading to higher selling prices. In sum, loss aversion for the good is the prevailing explanation for the endowment effect, and many cognitive mechanisms have been associated with it.

Other Mechanisms Influencing Subjective Valuation of the Good

A smaller body of research has also identified cognitive mechanisms influencing buyers' versus sellers' subjective valuation of the good that do not stem from asymmetric loss. For example, Irmak et al. (2013) argue that because buyers need to use the good whereas sellers no longer will, buyers will pay greater attention to the feasibility (e.g., usability) of the good whereas sellers will look at the good at a more abstract level. Thus, this explanation does not rely on asymmetric loss, but rather asymmetric construal level of the good.

Another possible mechanism for the endowment effect is an aversion to the loss of money experienced by the buyer (rather than aversion to loss of the good by the seller). In fact, the "focusing on the foregone" mechanism encompasses both loss aversion for the good and for money—buyers and sellers each focus on what they are losing, namely, money and good. Nevertheless, past research tends to attribute the endowment effect mainly to loss aversion for the good rather than for money—it is sometimes argued that there is no loss aversion for money due to money being a currency that is frequently transacted (e.g., Bateman et al., 2005; Kahneman et al., 1990; Novemsky & Kahneman, 2005a).

Buy-Sell Strategies

The explanations for the endowment effect reviewed above rest on changed personal subjective value for the object (relative to money) by buyers versus sellers. A key assumption in much of behavioral research is that WTP and WTA are representations of a person's personal subjective value for the object. In contrast, there is an entirely different type of mechanism, namely, buy-sell strategies, that does not involve a change in one's personal valuation of the good, but rather points to buyers' and sellers' differential response to the market context of the transaction. For example, sellers are more attuned to the market price of items than buyers (Isoni, 2011; Isoni et al., 2011; Weaver & Frederick, 2012), and may use expected value as a starting point for market value (Yang et al., 2013). Moreover, it has been recently shown that both

buyers and sellers produced similar estimates of the product's actual market price, and that buyers tend to provide WTP amounts that correspond to the lowest end of the market price distribution, while sellers tend to provide WTA amounts that match their beliefs about the item's market price (Achtymi et al., 2020). In this research, we use the term *buy-sell strategy* to refer to considerations of buy versus sell prices that are outside of the individual's assessment of one's personal value for the good.

The buy-sell strategy factors suggest that WTP and WTA do not simply represent personal values, but also contain the person's strategies for setting buying or selling prices in a transactional setting. While the incentives might be set such that stating one's personal value is optimal, people might not understand the complex incentives, and instead use simple heuristics they associate with the marketplace, such as offering a low buying price and a high selling price.

Despite much research on the endowment effect, the role of loss aversion for the good versus buy-sell differences as drivers has not been explicitly tested and disentangled. In this research we focus on explicitly testing for the presence of loss aversion versus buy-sell strategy differences as mechanisms for the endowment effect.

We test loss aversion for the good by introducing a new condition (in addition to WTP and WTA) that isolates the gain-loss frame change for the object. In the new condition, participants are endowed with an object (as in the WTA condition), and are asked for their WTP in order to keep it. We call this condition pay to keep (PTK). Participants in both the WTP and the PTK conditions are paying money (i.e., losing money), thus the status of money is equated between them and any role of loss aversion for money is controlled for. Buyer-seller discrepancies are also ruled out from this comparison since there is no selling in PTK.

If the driver for the WTP-WTA gap is loss aversion for the good, then the prediction is that participants in the PTK condition will state a value close to the WTA, while both are higher than the WTP since in both cases they are endowed with the object and averse to losing it. If there is no loss aversion for the good and the driver for the gap is other buy-sell discrepancies, then we expect the PTK value to be similar to the WTP, while both are lower than the WTA because only the WTA involves sellers. If both loss aversion and other mechanisms are at play, then PTK will lie between WTP and WTA, with the PTK-WTP difference reflecting loss aversion, and the remaining WTA-PTK gap reflecting other buy-sell discrepancies.

Gal and Rucker (2018) studied loss aversion using a similar condition to PTK. They examined hypothetical settings or pricing of abstract goods such as experiences and services, with the goal of testing the concept of loss-aversion more broadly. However, they did not introduce the PTK condition to the situation of giving up a real and concrete object of endowment as in the typical endowment effect experiments, and as we do in this article.

We further test the presence of buy-sell strategies by examining whether people deviate from their personal valuations for the object when setting buying and selling prices, and whether people are consciously setting buying and selling prices differently. Together, our theory and findings question the strong association between the endowment effect and loss aversion for the good, suggesting limitations to the scope of loss aversion as a phenomenon and explanatory variable.

In what follows, we report four experiments, two with real incentives. The first three experiments had similar procedures, using the PTK/WTP/WTA design, while the fourth experiment used a within-subjects WTP-WTA design.

General Method

Studies 1A and 1B—Pen Studies

Studies 1A and 1B test the role of loss aversion for the good in the endowment effect in an incentive-compatible setting. In line with the literature, we predicted that participants in the WTA condition will set a higher price for the object than those in the WTP condition. The goal of the study is to test whether participants in the PTK condition will set a price for the object similar to that in the WTP or the WTA condition.

Pen Studies Pretest

To ensure that subjects in the PTK and WTA conditions interpreted their situation as involving a potential loss of an endowed object, we conducted a pretest.

Method

Participants

We ran this study in a behavioral lab at a large public West Coast university in the United States over the course of 1 week. We decided to collect data until collecting 300 observations, 100 per condition. The lab manager stopped data collection after 320 observations ($N_{WTA} = 111$; $N_{PTK} = 104$; $N_{WTP} = 105$).

Procedure

Upon arriving to the lab participants were asked to sit at a desk with a new pen (a gel pen with the school logo) in front of them, similar to the classic experiment of Kahneman et al. (1991). Participants in the WTP condition were asked not to touch the pen, while participants in the PTK and WTA conditions were told that the pen was theirs, and they should use it for the upcoming task. We let the endowed groups touch and use the pen to enhance the feeling of endowment and possession (Peck & Shu, 2009).

Next, participants in both WTA and PTK conditions completed a 10-min filler task using the pen where they were asked to count the number of 0s on a page in a 10-page packet. Participants in the WTP condition completed the same task using a generic pencil. For each correct page they earned 50 cents, and in total they could earn up to \$5 in cash. At the end of the 10 min participants were paid accordingly in cash.

At this point, depending on the condition, participants were given the following instructions.

WTP. Participants were told that they will have the option to buy the new pen and take it home. Moreover, they were told that they can pay for the pen using the money they earned in the first task.

WTA. Participants were told that they will have the option to sell this new pen and receive money for it. They were told that they can either sell the pen and receive money for it, or not sell the pen and take the pen home with them.

PTK. Participants were told they will have the option to pay for this new pen to keep it and take it home. They were told that they can either pay for the pen using the money they earned or lose the pen.

Participants received the following question:

Which of the statements below describes your state of the world right now?

- Right now I have the pen, but face the possibility of losing the pen.
- Right now I have the pen, and there isn't any possibility of losing the pen.
- Right now I do not have the pen, but face the possibility of acquiring the pen.
- Right now I do not have the pen, and there isn't any possibility of acquiring the pen.

These questions exhaustively define the subjects' construal of their current state of ownership (have or have not), and their construal of the prospects in the next moments (possibility of acquisition/loss vs. no change). We expect participants in the WTP condition to select (c), and participants in the WTA to select (a). For the PTK condition, we predict participants will select (a), similar to WTA—they have the pen but face the possibility of losing it. An alternative prediction is that even though participants in the PTK condition had the pen, when they had to pay to keep it, they mentally reconstrue the situation as not having the pen and having to pay to gain it. If so, we expect them to choose (c). Thus, this pretest will tell us whether the PTK condition indeed adopted a loss frame given the situation, or if participants mentally reframed the situation back to a gain frame.

Results

A summary of the results is provided in Figure 1. As predicted, most participants in WTA (77%) and PTK (75%) chose frame (a), with no difference between them ($p = .91$). In contrast, most in the WTP condition (74%) chose (c), which is significantly different from the PTK condition (23%) or WTA condition (15%), $p < .001$. A similar proportion of participants in all conditions (23–26%) chose a construal that was unintended by our design. Importantly, the proportion of such “unintended” choices did not differ across conditions.

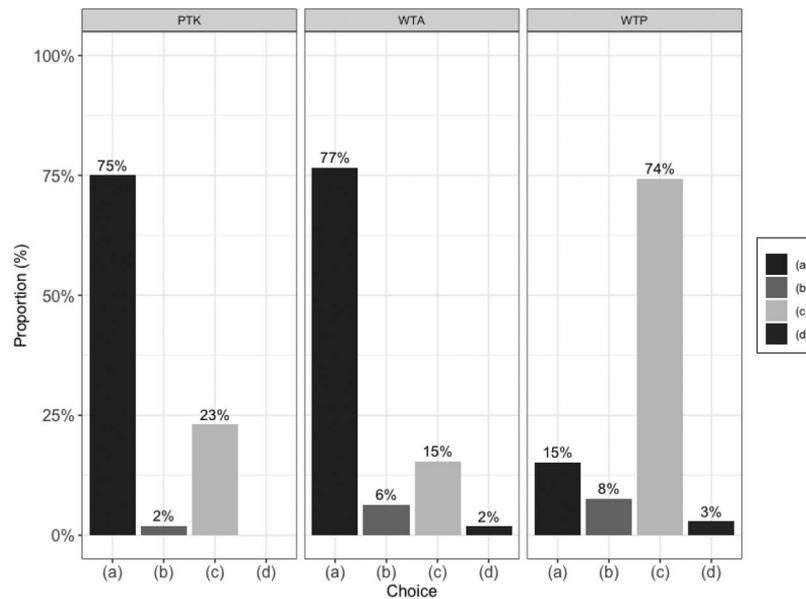
Studies 1A and 1B

Method

Participants

The first experiment (Study 1A) ran in a behavioral economics lab at a large public West Coast university in the United States over the course of one quarter. We decided to collect data until either reaching 300 observations (100 per cell) or the end of the term (out of operational necessity). In the end, we were able to recruit 81 participants by the end of the term. Eight participants were inconsistent and had multiple switch points in the multiple price list described below, and, in line with the literature, were excluded from the analysis. This resulted in a final sample of 73 subjects ($N_{WTA} = 23$; $N_{PTK} = 22$; $N_{WTP} = 28$).

Figure 1
Distribution of Statement Choices by Condition



Note. (a) Right now I have the pen, but face the possibility of losing the pen; (c) Right now I do not have the pen, but face the possibility of acquiring the pen.

The second experiment (Study 1B) ran in a different behavioral lab at the same university (in the same lab as where the pretest was run), with the same sample size target of 300 or to stop data collection at the end of the term; we were able to recruit 280 by the end of the term. Twenty-seven participants were inconsistent and had multiple switch points, thus were excluded from the analysis. This resulted in a final sample of 253 subjects ($N_{WTA} = 86$; $N_{PTK} = 82$; $N_{WTP} = 85$).

Procedure

Participants followed the exact same procedure as in the pretest, with the only exception of the dependent variable.

Depending on the condition, participants were given the following instructions.

WTP. Participants were asked to fill out a price list in which they chose between the option to buy the pen for each price or not buy it. Prices ranged between \$0.25 to \$3 in increments of \$0.25, resulting in 12 choices per participant. One of the 12 choices was selected randomly for each participant, and the participant's decision for that price was implemented.

WTA. Participants were asked to fill out a price list, similar to the WTP condition. In this condition the 12 choices were between selling the pen for a given price and keeping it. One of the 12 choices was selected randomly for each participant, and the participant's decision for that price was implemented.

PTK. Participants were told they would need to pay in order to keep the pen. They were asked to fill out a price list, similar to the WTP condition. In this condition they were asked, for each of the 12 prices, whether they would like to pay that price to keep the pen, versus not pay and lose the pen. One of the 12 choices was

selected randomly for each participant, and the participant's decision for that price was implemented.

Results and Discussion

Study 1A

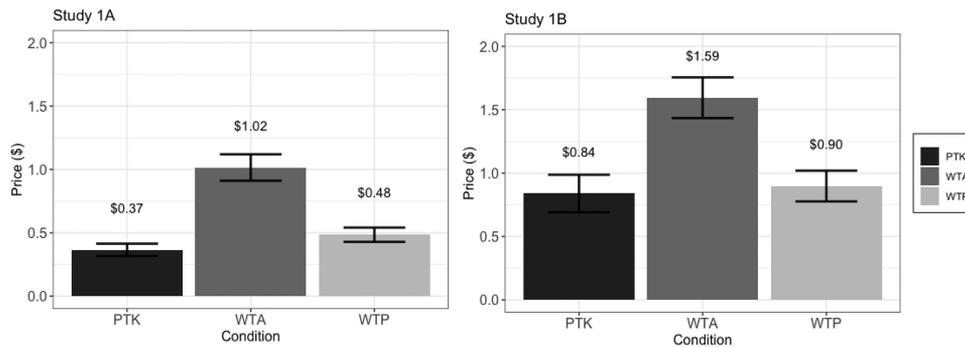
A one-way between-subjects analysis of variance (ANOVA) on valuation revealed a main effect, $F(2, 70) = 21.44$, $p < .001$, $\eta_p^2 = .38$, for the three conditions. Post hoc comparisons using the Tukey's honestly significant difference (HSD) test indicated that the mean value for WTA ($M = \$1.02$; $SD = 0.5$; 95% CI [0.8, 1.24]) was significantly higher than both WTP ($M = \$0.48$; $SD = 0.3$; 95% CI [0.36, 0.6]) and PTK ($M = \$0.37$; $SD = 0.23$; 95% CI [0.27, 0.47]), $p < .001$. However, WTP did not significantly differ from PTK ($p = .48$).

Study 1B

A one-way between-subjects ANOVA on valuation revealed a main effect, $F(2, 250) = 33.82$, $p < .001$, $\eta_p^2 = .21$, for the three conditions. Post hoc comparisons using the Tukey's HSD test indicated that the mean value for WTA ($M = \$1.59$; $SD = 0.75$; 95% CI [1.43, 1.75]) was significantly higher than both WTP ($M = \$0.90$; $SD = 0.56$; 95% CI [0.78, 1.02]) and PTK ($M = \$0.84$; $SD = 0.67$; 95% CI [0.69, 0.99]), $p < .001$. However, WTP did not significantly differ from PTK ($p = .83$). This pattern perfectly replicated that of Study 1A, despite the overall higher mean values for the pen than in Study 1A due to subject pool differences. A summary of the results is provided in Figure 2.

We used Bayes factors (BFs) to provide a direct measure of evidence for the degree to which the data supported one hypothesis

Figure 2
Average Valuation (\$) by Condition



Note. PTK = pay to keep; WTA = willingness to accept; WTP = willingness to pay.

vis-à-vis another hypothesis. We conducted a two-sided test of the loss aversion hypothesis against the null hypothesis. That is, we tested $PTK \neq WTP$ against $PTK = WTP$. This produced a BF in which the data supports the null by a factor of 5.01; this is generally considered moderate support for the null.

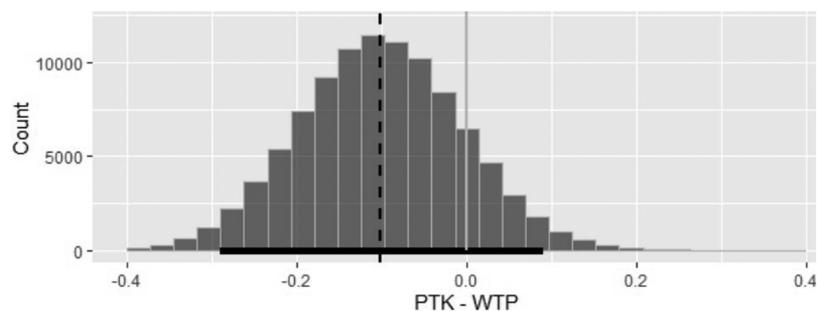
Furthermore, Bayesian estimation can also be used to assess the credibility of a null value. This can be done by examining where the null value falls within the posterior distribution of the credible parameters. The highest posterior density interval (HDI) represents where the most credible values fall, using Markov chain Monte Carlo (MCMC) sampling with 100,000 samples (the goal of the MCMC process is to generate an accurate and reliable representation of the posterior distribution). If the null value is far from the most credible values, one rejects it (Kruschke, 2013). Figure 3, using a histogram, illustrates the 95% HDI of the parameter $(PTK - WTP)$. The estimate of $(PTK - WTP)$ was -0.1 on average (dashed line) and the 95% HDI was from -0.29 to 0.09 (bolded region). Thus, the null (0; gray line) was within the most credible values. Further, 85.7% of the credible values in the simulation were less than zero, that is, in the opposite direction of the loss aversion prediction. Taken together, we did not find

support for loss aversion for the good, and found moderate support for the null hypothesis of $PTK = WTP$.

Studies 1A and 1B demonstrated a dissociation between the endowment effect and loss aversion for the object in a real choice scenario, by demonstrating a WTA-WTP gap even when there was no evidence for loss aversion for the object. Participants did not feel more strongly about keeping the pen than they did about acquiring the pen. The results suggest that the endowment effect is not driven by an aversion to losing the pen; instead, other buy-sell discrepancies are likely the main driver of the WTA-WTP gap.

A possible concern is that participants were asked to report whether they “have the pen,” which is not necessarily the same as “own the pen.” While “having” refers to “the reference state” which is usually how loss aversion is defined, “owning” refers to the more socially constructed sense of property ownership. To address this concern, we asked participants in Study 2 to report if they “owned” the item as a manipulation check. By examining both having and owning as endowment status, we can provide convergent evidence for the presence, or lack of loss aversion for the endowed object.

Figure 3
95% HDI of $(PTK - WTP)$ Using 100,000 MCMC Samples



Note. The dashed line is the mean value (-0.1) of $(PTK - WTP)$. 85.7% of the values lie below zero (gray line), contrary to the loss aversion prediction. HDI = highest posterior density interval; WTP = willingness to pay; PTK = pay to keep; MCMC = Markov chain Monte Carlo.

Study 2: Monetary Voucher

In Study 2, we aim to provide convergent evidence disentangling loss aversion and the endowment effect using a different type of product. Specifically, we implemented the PTK-WTP-WTA between-subjects design in a hypothetical scenario evaluating a monetary voucher. Previous research showed that the endowment effect occurs for both real incentive and hypothetical choices (Horowitz & McConnell, 2002). Further, we wish to provide direct evidence for the presence of buy-sell strategies in the absence of loss aversion. An essential difference between loss aversion for the good and the use of buy-sell strategies is that whereas loss aversion represents a change in personal subjective valuation for the object between buyers and sellers, a buy-sell strategy represents buyers' and/or sellers' adjustment away from their personal subjective value in response to the transaction context. Thus, in Study 2 we shed light on the extent to which buyers and sellers gave values different from their personal subjective value.

Method

Participants

Two hundred ninety-six participants ($M_{\text{age}} = 38.46$, 49% female; under a target of $n = 300$ on Amazon Mechanical Turk, recruited by CloudResearch¹; stopping rule is when CloudResearch completes data collection for the target) completed an online survey in exchange for a fixed monetary payment of \$0.25. We excluded two participants who failed an attention check; this resulted in a final sample of 294 participants ($N_{\text{WTA}} = 99$; $N_{\text{PTK}} = 98$; $N_{\text{WTP}} = 97$). Including those who failed the attention check in the analysis did not significantly alter the results.

Procedure

Participants were randomly assigned to a three-condition (WTP, WTA, PTK) between-subjects design. Depending on condition, participants were given the following instructions.

WTP. Participants were asked to imagine that they are offered the opportunity to purchase a voucher that will pay out \$100 in 6 months, and to indicate the maximum amount they are willing to pay to buy this voucher.

WTA. Participants were asked to imagine that they own a voucher that will pay out \$100 in 6 months, and to indicate the minimum amount they are willing to accept to sell this voucher.

PTK. Similar to the WTA condition, participants were asked to imagine that they own a voucher that will pay out \$100 in 6 months. Moreover, they were told that in order to keep their ownership over the voucher they will need to pay a certain amount, otherwise, the voucher will no longer be theirs. Then, they were asked to indicate the maximum amount they are willing to PTK this voucher.

To ensure participants adopted the intended ownership status, following the valuation question all participants were asked to indicate their state of ownership for the voucher at the time of evaluation. Specifically, participants were asked to choose between (order randomized):

- (A) I do not own the voucher, and I have the opportunity to acquire ownership over the voucher; and

- (B) I own the voucher, and I face the possibility of no longer being the owner of the voucher.

To test whether participants used buy-sell strategies that deviated from their personal subjective value for the voucher, participants then indicated whether the valuation they chose was equal to, lower than, or higher than their personal value of the voucher. Specifically, participants chose among (order randomized):

- (A) I set a price equal to my personal value of the voucher;
 (B) I set a price higher than my personal value of the voucher; and
 (C) I set a price lower than my personal value of the voucher.

Finally, participants reported their demographic information.

Results and Discussion

Valuation

A summary of the results is provided in Figure 4. A one-way between-subjects ANOVA on valuation revealed a main effect, $F(2, 291) = 129.8$, $p < .001$, $\eta_p^2 = .47$ for the three conditions. Replicating studies 1A and 1B, post hoc comparisons using the Tukey's HSD test indicated that the mean value for WTA ($M = \$86.81$; $SD = 20.75$; 95% CI [82.67, 90.95]) was significantly higher than both WTP ($M = \$40.34$; $SD = 28.12$; 95% CI [34.67, 46.01]) and PTK ($M = \$33.17$; $SD = 26.73$; 95% CI [27.81, 38.53]), $p < .001$). In contrast, WTP did not significantly differ from PTK ($p = .12$).

We conducted a BF analysis similar to Study 1B. We conducted a two-sided test of the loss aversion hypothesis against the null hypothesis. That is, we tested $\text{PTK} \neq \text{WTP}$ against $\text{PTK} = \text{WTP}$. This produced a BF in which the data supported the null by a factor of 1.37; this is generally considered anecdotal support for the null. Furthermore, Figure 5 illustrates the 95% HDI of the parameter estimates for $(\text{PTK} - \text{WTP})$ using MCMC sampling with 100,000 samples. The estimate of $(\text{PTK} - \text{WTP})$ was -7.42 on average (dashed line) and the 95% HDI fell from -15.3 to 0.49 (bold region). Further, 96.7% of the credible values were less than zero, contrary to the loss aversion prediction. Again, we found no evidence for loss aversion (i.e., $\text{PTK} > \text{WTP}$), and anecdotal evidence for the null hypothesis of $\text{WTP} = \text{PTK}$.

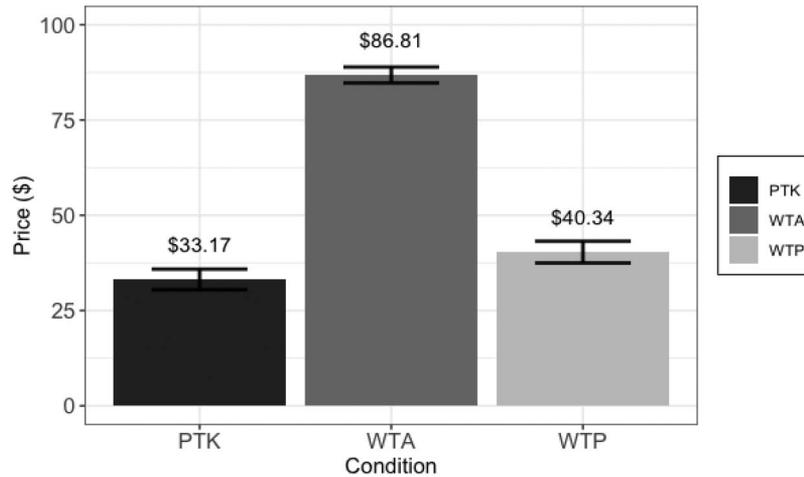
Perceived Ownership

As expected, most participants in WTA (98%) and PTK (84.7%) reported that they own the voucher and face the possibility of no longer being the owner of the voucher. The majority in the WTP condition (93.8%) reported that they do not own the voucher and have the opportunity to acquire ownership of the voucher.

To ensure that the valuation results were not driven by the few participants whose stated ownership status was different than expected, we next examined the valuations among only the participants whose stated ownership status was as intended (i.e., 98% of WTA, 84.7% of PTK, and 93.8% of WTP participants). Consistent with the full sample, the mean value for WTA ($M = \$87.26$) was significantly

¹ CloudResearch (formerly TurkPrime) is a research platform that integrates with Amazon Mechanical Turk and supports tasks that are common to the social and behavioral sciences (Litman et al., 2017).

Figure 4
Average Valuation (\$) by Condition



Note. PTK = pay to keep; WTA = willingness to accept; WTP = willingness to pay.

higher than both WTP ($M = \$41.08$) and PTK ($M = \33.77, $p < .001$). WTP did not significantly differ from PTK ($p = .13$). Therefore, even though participants in the PTK condition understood that they owned the voucher, they did not want to spend more to keep the voucher than those buying the voucher, thereby demonstrating a lack of loss aversion for the good despite the presence of a strong endowment effect.

Strategic Deviation From Personal Valuation

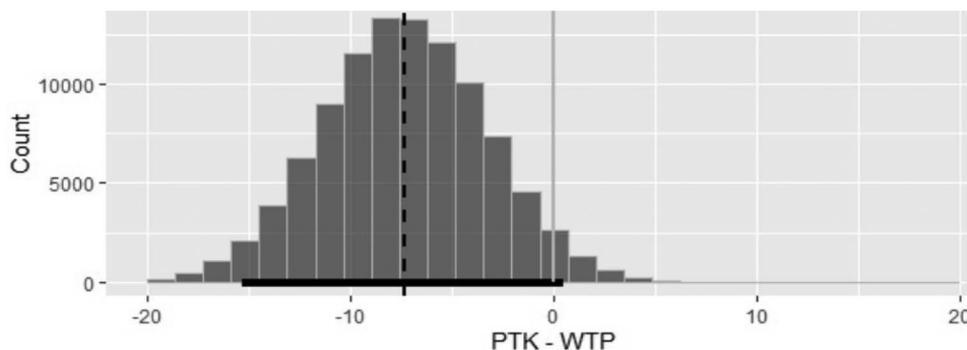
Next, we examined whether buy-sell strategies were present in the absence of loss aversion for the good. In the buyer WTP condition, only a minority of participants (26.8%) stated that their price was equal to their personal value for the voucher, whereas the majority (70.1%) reported that they set a price lower than their personal valuation of the voucher (Figure 6). This is consistent with the notion that when stating a buying price, people tend to strategically give a

lower value than their personal value in order to gain a surplus value from the transaction. The remaining 3.1% stated a value higher than their personal valuation.

The PTK condition closely mirrored the WTP condition. A minority of participants (24.5%) stated that their price was equal to their personal value for the voucher, whereas the majority (74.5%) reported that they set a price lower than their personal valuation of the voucher. The remaining 1% stated a value higher than their personal valuation. Thus, when considering paying to keep, even though participants were about to lose the object, again, the dominant strategy was to state a price lower than one's personal value.

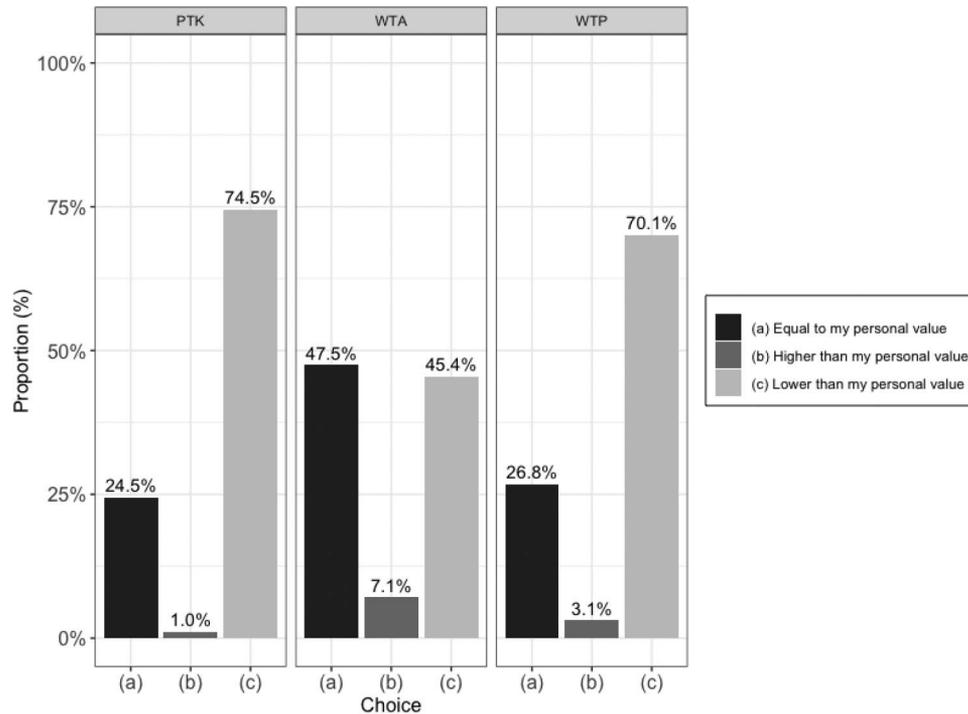
In the seller WTA condition, 52.5% of participants stated they deviated from their personal value, while 47.5% of participants named a price equal to one's personal value. Somewhat unexpectedly, among those who deviated, most of them stated a value lower (45.5%) rather than higher (7.1%) than their personal value. We conjecture that this

Figure 5
95% HDI of (PTK - WTP) Using 100,000 MCMC Samples



Note. The dashed line is the mean value (-7.42) of (PTK - WTP). 96.7% of the values lie below zero (gray line), contrary to the loss aversion prediction. HDI = highest posterior density interval; WTP = willingness to pay; PTK = pay to keep; MCMC = Markov chain Monte Carlo.

Figure 6
Distribution of Statement Choices by Condition



Note. (a) I set a price equal to my personal value of the voucher; (b) I set a price higher than my personal value of the voucher; (c) I set a price lower than my personal value of the voucher.

might be because the personal subjective values among sellers could be high in this setting, and sellers were afraid that they will not be able to sell the object at that price. Naïve sellers may not attend to the irrationality of stating a price lower than their personal value when they overly focus on the market conditions (Weaver & Frederick, 2012). Therefore, sellers strategically adjusted to the market condition, rather than simply stated their personal value for the voucher.

As ancillary evidence, we checked the personal subjective values for the good among the minority of participants that did state their personal values (26.8% of WTP, 47.5% of WTA, 24.5% of PTK participants). Among these, the mean value for WTA ($M = \$91.17$) was significantly higher than WTP ($M = \$51.15$) and PTK ($M = \39.79, $p < .001$), whereas WTP did not significantly differ from PTK ($p = .16$). That is, even when participants stated their personal valuations, there is still no loss aversion for the good. However, despite the lack of loss aversion for the good, the personal valuation did change between buying and selling for this subgroup, suggesting other mechanisms may be at play in changing subjective valuations between buyers and sellers. Some possibilities from past research include loss aversion for money, or a construal level change (Irmak et al., 2013). The psychology of sellers, in absence of loss aversion for the object, warrants further investigation in future research.

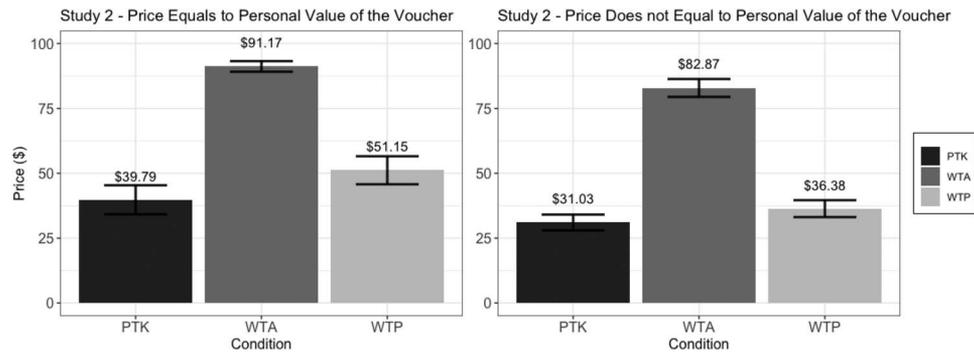
Finally, we compared those who deviated from their personal value to those who stated their personal value (right vs. left panel in Figure 7). Consistent with the pattern of deviations reported earlier, the valuations given among buyers who deviated ($\$36.38$) were significantly lower than valuations given by those who stated

their personal values ($\$51.15$; $p = .02$). A similar pattern is observed for keepers ($\$31.03$ among those who deviated vs. $\$39.79$ among those who stated their personal value), although the difference was not significant ($p = .18$). For sellers, the price among those who deviated from their personal value ($\$82.87$) was lower than those who priced at their personal value ($p = .04$), consistent with the results that more sellers stated a price lower (rather than higher) than their personal value, perhaps because they feel their personal value for the voucher might be too high for the market.

In summary, results show that inconsistent with common assumptions about value elicitation, the stated prices in the WTP, WTA, and PTK setting do not reflect one's personal subjective value for the good. Instead, the majority of people adjust away from their personal values in accordance with their lay intuitions about market transactions.

Study 2 replicated the endowment effect (WTA > WTP), while at the same time found similar valuations for WTP and PTK. Together with Studies 1A and 1B, we consistently found no support for loss aversion for the good, and moderate to anecdotal support for PTK = WTP. Study 2 further shed light on the WTA-WTP gap by showing that the majority of participants in all conditions named a price that deviated from their personal valuation for the object, thereby providing evidence of significant use of buying and selling strategies in these value elicitation tasks. This result challenges the traditional view of WTP and WTA tasks as eliciting true personal values for the object.

Figure 7
Average Valuation (\$) by Condition and Equivalence to Personal Valuation



Note. PTK = pay to keep; WTA = willingness to accept; WTP = willingness to pay.

Study 3: Within-Subjects Valuations

So far, our results demonstrated the lack of loss aversion for the good despite finding the WTA-WTP gap, and provided evidence for the use of buy-sell strategies in these tasks. In Study 3, we wish to further shed light on participants' approach to the WTP and WTA tasks, and provide convergent evidence for the buy-sell strategy mechanism as a driver of the endowment effect using a different paradigm. Specifically, we use a within-subject WTA-WTP design, where participants first give WTP and then WTA valuations (or in reverse order), with both appearing on the same page and submitted together. We predict that when the same participant is asked to report both a buying and a selling price, they will report a higher selling price than their buying price, thereby demonstrating that they knowingly engage in strategic buying and selling.

Specifically, a within-subject design taps into people's conscious beliefs about how to formulate answers for the WTP and WTA task. If participants believe that the correct response to the WTA and WTP tasks are to state one's "true" subjective value for the object, then when doing the WTP and WTA tasks side-by-side, they would seek to state the same price. For example, in the first task a participant could assess one's subjective value and give that as an answer; then in the second task, the person will not need to reassess the value and could simply enter the same price. Alternatively, a participant could assess one's subjective value in the first task, and then make a different assessment and come up with a different price in the second task. If the participant believes the right response to both tasks is one's true subjective value, then she or he may try to reconcile the two different prices by adjusting them to identical values. In contrast, if the person came up with two different prices in the two tasks and submits them as different values, it suggests the person's understanding of the WTP and WTA tasks is that they should be different. Finding a WTA higher than WTP in this within-subject setting would demonstrate the person believes in naming a higher price when selling, and a lower price in buying.

Method

Participants

One hundred ninety-six participants ($M_{\text{age}} = 38.4$, 60% female on Amazon Mechanical Turk, recruited by CloudResearch under a

target of $n = 200$; stopping rule is when CloudResearch completes data collection for the target) completed an online survey in exchange for \$0.25. We excluded three participants who failed an attention check; this resulted in a final sample of 193 participants. Including those who failed the attention check in the analysis did not significantly alter the results.

Procedure

Participants were presented with two questions (order counter-balanced) on the same screen, asking them to report both buying and selling prices for a voucher that will pay out \$100 in 6 months, as in Study 2. Specifically, participants were asked to report the maximum amount they are willing to pay to buy a voucher that will pay out \$100 in 6 months, and the minimum amount they are willing to accept to sell a voucher they currently own that will pay out \$100 in 6 months, order randomized. The two values were submitted together with a submit button at the bottom of the page. Then, all participants reported their demographic information.

Results and Discussion

Order Effect

To assess if there was an order effect, we ran a regression on the difference between buying and selling prices ($\text{WTA} - \text{WTP}$) as a function of order (WTP first and then WTA; WTA first and then WTP). This analysis revealed no effect of order ($p = .85$). Thus, for the remainder of the analysis we collapsed the data to examine valuations across both orders.

Valuation

A paired t test revealed a significant difference between buying and selling prices, $t(192) = 10.62$, $p < .001$, whereby selling prices ($M = \$80.09$) were significantly higher than buying prices ($M = \$56.75$, $p < .001$). Importantly, only 18.65% of participants' buying prices were equal to their selling prices, whereas 75.13% of participants stated a higher selling price than buying price. The remaining 6.22% gave higher buying than selling prices.

This result suggests the majority of participants do not state equal buying and selling prices that reflect a personal subjective

value for the object. Instead, they considered buying and selling as different tasks.

General Discussion

Four studies offered support for a dissociation between the endowment effect and loss aversion; the endowment effect transpired even though no loss aversion for the object was found. We demonstrated this by introducing a new PTK condition to the typical WTA-WTP paradigm that explicitly tests the presence of loss aversion for the object in the endowment effect. In Studies 1A and 1B, in an incentive compatible design, we demonstrated a WTA-WTP gap even when there is no evidence for loss aversion for the object. Participants did not feel more strongly about keeping the pen (PTK) than about acquiring the pen (WTP).

In Study 2 we replicated this finding using a hypothetical scenario. This study unpacked the WTA-WTP gap by showing that the majority of participants in all conditions named a price that deviated from their personal valuation for the object, thereby showing evidence of buying and selling strategies in these value elicitation tasks. In Study 3 we further find the WTA-WTP gap in a within-subjects design, showing that the same individuals are consciously setting higher selling prices compared to their own buying prices.

Our results thereby question the strong association in the literature between the endowment effect and loss aversion (for the object). We argue that loss aversion may not occur for mundane goods such as those in the typical endowment effect experiments. We also found prevalent use of buy-sell strategies that deviate from personal valuations for the good for both buyers and sellers, thereby suggesting that WTP and WTA tasks may not accurately capture people's subjective valuation for objects as previously assumed, and the limitations and corresponding corrections of value elicitation methods should be further studied.

Theoretical Contribution

The present research makes important theoretical contributions. Traditionally, the leading explanation for the endowment effect is loss aversion for the object, even though this mechanism has not been explicitly isolated and tested from other buy-sell discrepancies. This research is the first to explicitly test and disentangle loss aversion for the object, by adding the PTK paradigm. We test whether people indeed treasure an endowed object and are willing to pay more to keep it than to acquire it, as prescribed by loss aversion, and find no support for this account. Thus, our results suggest researchers should decouple the endowment effect from loss aversion for the object. Greater effort should be given to investigating the market strategies lay people use in buying and selling, in order to address market phenomena such as lack of trading and inefficient decision making.

It is, of course, possible that loss aversion for the object exists for endowed objects of greater psychological significance, such as those that are owned for longer, those with emotional ties (e.g., a family heirloom), or those conveying social signals. However, our results suggest loss aversion for ownership cannot explain the endowment effect in typical experiments with shallow forms of ownership. Thus, the prevalence and power of loss aversion in explaining behavioral phenomena needs to be more carefully ex-

amined by future research, in order to more clearly chart the boundaries of loss aversion.

Second, our research contributes to the understanding of WTP and WTA tasks as value elicitation methods. Study 2 showed that the majority of participants named a price that deviated from their personal valuation for the object, which goes against the traditional view that incentive compatible mechanisms, such as price lists, second price auctions or the Becker-DeGroot-Marschak paradigm, elicit participants' true subjective value in the endowment effect. Our finding suggests that people engage in buying and selling strategies in these value elicitation tasks, adjusting away from their personal valuations. Using a within-subjects paradigm, Study 3 demonstrates that people explicitly name a higher price when selling, and a lower price in buying, rather than seeking to be consistent in buying and selling prices. Our finding suggests research should further explore the lay beliefs, heuristics, and thought processes in buying and selling tasks. Moreover, value elicitation methods may need to be refined to disentangle market responses versus personal valuations.

Future Directions

In addition to the core findings above, our studies also presented specific results that are worthy of follow-up research. First, in Study 2 we found direct evidence for prevalent use of buy-sell strategy. Interestingly however, whereas most buyers named a price lower than their personal value consistent with the heuristics of "buy low," many sellers actually named a price lower than their personal value, suggesting that the way people determine selling prices may be more complicated than a simple heuristics of "sell high." Future research is thus needed to further examine the behavior of setting selling prices—how do sellers respond to situations where their personal valuations seem to be above the market valuation? Second, while this research directly tested the presence of buy-sell strategies, we also found evidence that there may be other mechanisms at play (without loss aversion for the good). In particular, Study 2 found evidence that among those who did state their personal values for buying or selling prices, selling price was also higher than buying price (while loss aversion for the object was still absent). That is, among the minority of participants that did not use buy-sell strategies, the endowment effect persisted. What unique features of selling (as opposed to merely losing) an item increase one's personal valuation of an item? Future research is needed to fully understand how sellers value objects.

Furthermore, even though there was not a significant difference, in all studies PTK was lower than WTP. Future research is needed to examine whether in general $PTK = WTP$, or there are situations where the price for keeping can be even lower than the price for buying, and if so, why. In general, it would be interesting to more deeply examine the emotions and thoughts in the keeper versus the buyer condition in future research.

Context of the Research

This project was motivated by a desire to understand the role of loss aversion and buy-sell strategies in the endowment effect. In particular, we wanted to conduct a direct test of loss aversion for the object, the prevailing explanation for the endowment effect in the literature, against the buy-sell strategies alternative. We conclude that the WTA-WTP gap in our studies provide direct evi-

dence for buy-sell strategies but no evidence for loss aversion for the object.

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