THE EFFECT OF ANONYMITY ON THE WTA-WTP GAP IN

ENDOWMENT EFFECT GAMES

An Honors Fellow Thesis

by

GREGORY COHEN

Submitted to Honors and Undergraduate Research
Texas A&M University
in partial fulfillment of the requirements for the designation as

HONORS UNDERGRADUATE RESEARCH FELLOW

May 2012

Major: Economics

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Approved by:

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Associate Director for Honors and Undergraduate Research: Duncan MacKenzie

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ABSTRACT

The Effect of Anonymity on the WTA – WTP Gap in
Endowment Effect Games. (May 2012)

Gregory Cohen
Department of Economics
Texas A&M University

Research Advisor: Dr. Alex Brown
Department of Economics

I conducted experiments to determine whether anonymity affects the gap between the

willingness to accept (WTA) and willingness to pay (WTP) in endowment effect games.

Earlier research theorizes complete anonymity is necessary to eliminate the

contamination of "signaling" within the endowment effect game. The "signaling" results

when buyers over-value their items and sellers under-value the items they are trading for

to signal they are good bargainers, which leads to suboptimal decisions. I find that the

difference between an anonymous treatment and a non-anonymous treatment yield WTA

– WTP gaps that are not statistically significant. I utilize a dictator game to ensure my

anonymity procedure is sufficient.

ACKNOWLEDGMENTS

NOMENCLATURE

IDN	Identification Number
KKT	Kahneman, Knetsch, and Thaler (1990)
PZ	Plott and Zeiler (2005)
WTA	Willingness to Accept
WTP	Willingness to Pay

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CHAPTER I

INTRODUCTION

Endowment effect theory

Endowment effect theory was introduced in 1980 by Richard Thaler. He theorized an

"endowment effect" occurs when an item becomes part of an individual's belongings.

When an individual considers an item as his own property, he or she views giving up

that item as a loss. According to loss aversion theory, losses are weighed more heavily

than gains, and this causes the individual who owns an item to give it more value than

someone who does not own it. In short, the "endowment effect" refers to the extra value

an owner gives an item in his possession (Thaler 1980).

Kahneman, Knetsch and Thaler

The first major endowment effect experiment was conducted by Kahneman, Knetsch and

Thaler. Kahneman, Knetsch and Thaler (1990), henceforth known as KKT, performed an

experiment involving the trading of mugs. In the experiment, half the subjects were

given mugs and were labeled "sellers." The remaining subjects, known as "buyers,"

were allowed to examine the mugs, though they were not owners, and had the

opportunity to buy a mug. Each group was asked to provide their best price for an item:

_____

This thesis follows the style of the *American Economic Review*.

for buyers, it was the price they would be willing to pay, or WTP, and for sellers, it was the price they would be willing to accept, or WTA. According to economic theory, the average WTA and average WTP should be the same, revealing the market value of the mug, but KKT found an asymmetry in the data. According to their data, the WTA was about 1.5 to 2 times the WTP (Kahneman, Knetsch, and Thaler 1990). Owners of a mug were attaching more value to the mug than those who did not own a mug. KKT attributed the difference to an "endowment effect."

This KKT "mug experiment" has been a hotbed of behavioral economics controversy since its publication. Criticism includes whether the language used caused the effect (Franciosi et al. 1996), whether loss aversion adversely affects both parties (Bateman et al. 2005), whether the degree of substitutability between products being traded differs (Shogren et al. 1994), whether there is a different loss aversion factor involved (Brown 2005) and whether imprecise preferences cause the disparity (Dubourg, Jones-Lee, and Loomes 1994).

Plott and Zeiler

The most notable study contesting the KKT results was published by Plott and Zeiler (2005), henceforth known as PZ. PZ theorized that by removing subject contamination and misconceptions about the mechanism used in the experiment, the WTA – WTP gap would disappear. After repeating the KKT experiment using their own procedure to eliminate as much contamination and misconceptions as possible, PZ found no statistical

difference between the WTA and WTP (Plott and Zeiler 2005). Since this finding, scholars have debated whether PZ actually proved KKT wrong, or if other factors accounted for the elimination of the WTA – WTP gap shown by KKT, such as an endowment effect not present in KKT (Isoni, Loomes, and Sugden 2011) or repeated markets affected the endowment effect (Loomes, Starmer, and Sugden 2003).

Anonymity in Plott and Zeiler

One way in which PZ prevents contamination of the WTA – WTP gap data is by making their experiment anonymous. PZ, citing Fremling and Posner (1999), theorized that even if only the experimenter knows who the subject is, their payout amount, and no other person in the room, a subject may still adjust his or her behavior in order to be seen as a "better bargainer" by the experimenter. In most cases this behavior is not in the best interest of a subject and leads to a smaller payout (Fremling and Posner 1999). PZ theorized this lack of anonymity could have contributed to the WTA – WTP gap and therefore made their experiment anonymous. The justification which PZ uses, though, is based on social preference. The effect of anonymity on social preference games is well documented in dictator games (Hoffman, McCabe, and Smith 1996; Eckel and Grossman 1996; Burnham 2003; Charness and Gneezy 2008). PZ and consequent experimenters assume anonymity is just as important to endowment effect games as it is to dictator game, a hypothesis which may not necessarily be correct.

Anonymity's effect on endowment and dictator games

The effect anonymity has on dictator games and other social preference games are most likely caused by a lack of guilt. Charness and Gneezy (2008) illustrated this by comparing anonymous dictators to dictators who knew they were giving to a charity. The dictators giving to a charity, on average, donated more than their anonymous counterpart due to a guilt aversion (Charness and Dufwenberg 2006). When someone is playing anonymously, they are disconnected from the beneficiary and do not suffer from guilt aversion and therefore their donations decrease. Endowment effect games, unlike dictator games, do not have a zero-sum component. In PZ, as long as a player indicates they are willing to pay or willing to accept at a certain threshold, the trade was made: their decisions did not rely on others. This eliminates the idea that subjects would suffer from guilt aversion while making their offers. Therefore, assuming that anonymity affects endowment effect based off social preference games is incorrect.

Fremling and Posner (1999) state anonymity is important to endowment effect games because a lack of complete anonymity, even from the experimenter, will lead subjects to try and "signal" they are greater negotiators by either selling for a higher price or buying at a lower price. Although the difference between complete anonymity and complete disclosure would be affected by this notion, the difference between complete anonymity and moderate anonymity (i.e. screen protectors and silence) is much less important. In a moderately anonymous setting, although there may be a motive to "signal," there are motives in the opposite direction which may counteract the "signal." For example, envy

may play a role in endowment effect games (Kirchsteiger 1994). Subjects who are not able to complete any transactions may feel envious of those who do complete transactions and may adjust their prices as time goes on to avoid envy. If rewards are paid after each round, the envy will build in those who are signaling, and the signaling effect will be either counterbalanced or exceeded.

To test whether anonymity does have an effect on the WTP – WTA gap, I will perform two PZ style experiments. In the first experiment, subjects will remain anonymous to each other only. In the second experiment subjects will be anonymous to all parties involved. Complete anonymity will be fulfilled by not allowing any party, including the experimenters, to know either the name or appearances of the subjects and the amount of compensation they will receive. This will be done by using two treatments. In the first treatment, the experimenter will know the identity of the subjects and their performance. In the second treatment, the experimenter will only know the identity and the identification number of a subject, while an assistant will know the identification number and the compensation the subject receives. The results of the two PZ style experiments will be compared and the WTP – WTA gaps will be analyzed to determine whether they are significantly different. I hypothesize that there will be no difference in the WTP – WTA gap exhibited in the endowment effect game. Since it is well documented that there is an anonymity effect in the dictator game, a Hoffman, et al. (1996) experiment will also be conducted to illustrate my experiment is sufficiently anonymous.

CHAPTER II

METHOD

My experimental method was a modified form of the PZ experimental method (Plot and Zeiler 2005). All forms and instructions can be found in the appendix and are available upon request.

Treatment 1: Non-anonymous treatment

The first treatment consisted of 52 subjects across two groups. The subjects were randomly drawn from the Texas A&M University Economics Department's database (ORSEE) of subjects willing to participate in departmental treatments. The subjects were randomly assigned identification numbers ranging from $1 - 30$. Unused numbers were noted and left out of the treatment. Subjects were then separated into buyers and sellers by pairing identification numbers (IDN) with a random number. The random numbers, produced by a random number generator in Excel, were then ranked in ascending order and the top half of the generated numbers were labeled as buyers and the bottom half were labeled as sellers. Subjects were then asked to sit in an assigned area. Seats were separated by large dividers and subjects could not see the actions of other players. Subjects were reminded by the instructor that they were not allowed to communicate throughout the treatment. Instruction sheets (available in the appendix) were then handed out to the subjects and mugs were handed out to the sellers. Subjects were then allowed to ask clarification questions regarding the instruction sheets.

Subjects were then asked to begin Treatment 1. Subjects first participated in two practice rounds to familiarize themselves with the elicitation method. In the two practice rounds, henceforth known as Practice Rounds 1 and 2, subjects were given a theoretical token of a given value. Subjects were then asked to indicate at which prices they were willing to buy or sell the token and which prices they were not willing to buy or sell the token on a form, illustrated in Figure 1. Subjects could only be identified by the identification number to keep their personal information confidential. Subjects could

FIGURE 1. EXAMPLE OF THE ELICITATION METHOD

still be connected to their buying and selling behavior through their receipts, and therefore this treatment was not sufficiently anonymous. Subjects were given a period to complete their form and were then asked to fold their form in half as the experimenter

picked up the forms. The forms were given to the assistant who collated the data to form receipts. The assistant was able to see the subjects and observe the behavior within the room. After the forms were given to the assistant, a clearing price was then chosen by rolling a 10 sided die. A randomly chosen subject was asked to roll the die and then the number was announced to the class. For example, if a seven was rolled, the clearing price would be the seventh number, or $0.70 in Figure 1. Those who were willing to buy or sell at or above the clearing price made the trade while those who were not willing were unaffected. There was no penalty to those who did not make a trade. All subjects with a token were given the value of the token at the end of the treatment. Subjects did not depend on one another to execute a trade to keep from contaminating the data with other regarding behavior.

The experimenter then described the optimal behavior for Practice Round 1. Sellers were told it was in their best interest to sell at any price above the value of the token while buyers were told it was in their best interest to buy at any price below the value of the token. This was done to ensure subjects understood the purpose of the treatment and to make them familiar with the elicitation method. Subjects then started Practice Round 2 in which the first practice round was repeated but with different token values and a price range from $0.20 to $2.00. Subjects were once again told what the optimal behavior would have been for Practice Round 2.

For the third round, henceforth known as the Mug Round, sellers were asked to look at the mugs on their desk and were told that they now owned the mug. The mugs were simple maroon mugs with a Texas A&M University logo, a popular mug type at the university, and could be purchased for $3.00 at a local store. Sellers were told they had the opportunity to sell the mugs in the next round to a buyer. Sellers were then asked to allow buyers to examine the mug for a short period, then the mug was promptly returned to the seller. In the next round, both buyers and sellers were asked to indicate, using forms similar to Figure 1, at which prices they were willing to buy or sell the mugs. The prices ranged from $0.50 to $5.00. After indicating at which prices they would buy and sell the mugs, the forms were collected and a random subject was asked to roll the die at the front of the room. The number rolled on the die corresponded to the different prices on the sheet with 1 corresponding to $0.50 through 0 corresponding with $5.00, or the tenth number. The mugs remained with the sellers until the end of the treatment.

After the Mug Round was finished, subjects participated in a standard dictator game. Since it is known how anonymity affects dictator games, I am using the dictator game to make sure my sample is drawn from a similar population and my elicitation method produces results to similar studies, such as Hoffman, et al. (1996). Subjects were separated again using a second randomly generated sequence of numbers. Each IDN was matched with a random number and the random numbers were placed in ascending order. The top half of the random numbers became dictators and was matched with the remaining numbers, which were receivers. It did not matter whether the subject was

previously a buyer or seller, since the grouping was random. Every subject was given

either a dictator form or a receiver form, along with the same general instructions (found

in the appendix). The elicitation method, which can be found in Figure 2, was similar to

the elicitation used in the first half of the treatment. Dictators were given $5 and asked to

indicate how much money they would like to keep for themselves. Receivers were given

a Round 4 form similar to Figure 2, but they were given $0. Subjects were asked to fill

out the form and then fold the forms in half while the experimenter collected the

ID Number: _____

Round 4

You currently own $_____.

Please indicate how much money you would like to keep for yourself. $_____

FIGURE 2. EXAMPLE OF THE DICTATOR GAME ELICITATION METHOD

forms from the subjects. Subjects were then asked to fill out a standard survey for the

Economics department. This survey (found in the appendix) asked general demographic

questions for use in regression analysis. While the subjects filled out their forms, receipts

were created and distributed. Subjects received the amount they won in the games and a

$10 attendance fee. Subjects provided information such as their name and signature for

departmental accounting purposes on the receipts. After the subjects finished, they

brought their forms to an assistant who handed each subject their payments individually.

All sellers were asked to bring their mugs with them. Those who sold their mugs returned them to the assistant and those who did not sell their mugs were allowed to take the mugs with them. As buyers returned their receipts, they were given a mug if they indicated they were willing to buy the mug at the price. Subjects were then asked to leave the room silently.

Treatment 2: Anonymous treatment

The anonymous games had the same elicitation methods as Treatment 1, and therefore it will not be discussed in detail in this section. I will discuss the key differences in the methods of Treatment 2 and Treatment 1 which made the treatment anonymous. Treatment 2 consisted of 2 groups, comprised of a total of 50 subjects taken from the same sample as Treatment 1. Unlike Treatment 1, subjects checked in for the treatment with a third party, who was not allowed in the room during the treatment. As subjects entered the room, they were once again given an IDN with a receipt at their desk. On the receipt, they were asked to fill out all of the information that was needed for accounting purposes and their IDN. The third party entered the room and checked to make sure the subjects filled out all of the information in the receipt correctly, but did not look at the IDN given to the subject. The receipts were then sealed in an envelope and brought to a location where none of the experimenters could match the information. The names and accounting information were later matched with the payment information by an outside party who did not know how the money was made. The third party then left the room.

The experimenter distributed the forms and handouts in a similar manner to Treatment 1. Unlike Treatment 1, the experimenter was only allowed to know what the subject's appearance and their IDN, to maintain anonymity. To help reinforce the anonymity of the treatment, the experimenter stated, "Note that the experimenter will not be able to link any specific subject to a subject identification number. Therefore the experimenter will not know subject payoffs by individual. After the treatment, a third party will come in and distribute your earnings. The experimenter will not be able to link you to your identification number, and the third party will be unable to link you and your payment." This information could also be found on the instruction sheets. After each round, the experimenter reiterated the previous statement to keep subjects aware of their anonymity. The forms, including the dictator game, were collected in a similar manner after each round as Treatment 1. Unlike Treatment 1, the assistant sat facing the wall so he could not see the identity of any of the subjects. The assistant could only match the payment information to the IDN.

After the dictator game, subjects were once again given the surveys and asked to fill them out. The assistant put the cash earned by each subject in an envelope and labeled it with the IDN and a second envelope with a slip noting whether a subject were allowed to keep their mug or not. The experimenter took the envelopes to the subjects who were allowed to leave individually and silently. The third party sat outside the room and looked inside of the mug envelope and gave or took mugs according to the slips. The third party was not allowed to see the envelope containing the payments and did not see

the payments or the IDN of the subject. Subjects were not allowed to wait outside the room to see the payments or whether the subject received a mug or not, in order to maintain anonymity.

Note that the experimenter only knew the face and the IDN of the subject, the assistant only knew the number and the payments, the third party only knew the names and faces, while the outside individual only knew the names and the payment totals and not how the payments were made. Since the identity of the person could not be matched to the amount a subject made during each round, the treatment was sufficiently anonymous. No party had enough information to match a subject to how they made money during the treatment. Since the subject knew that nobody would be able to match how they made their money with his or her identity, subjects should not change their behavior to impress the experimenter.

Data analysis

I collected the data and entered it into a spreadsheet. The data was then transferred to Stata 12 for statistical analysis. I used a Wilcoxon-Mann-Whitney test to first determine whether the underlying distribution of the anonymous subjects was statistically significantly different than the distribution of the non-anonymous subjects. Second, I used a Wilcoxon-Mann-Whitney test with only buyers and only sellers to determine whether the buyers' distributions differed or the sellers' distributions differed. I then used the Pearson χ^2 median test to determine whether the anonymous and non-

anonymous treatments are drawn from distributions which contain the same median. By evaluating both the median and the distribution differences between the anonymous and non-anonymous groups, I was able to determine if anonymity has an effect on the mug price, WTA, and WTP.

CHAPTER III

RESULTS

Summary statistics

Each subject revealed their valuation of the mug as well as how much money they wanted to keep in the dictator game. Treatment 1 consisted of two non-anonymous groups with sample sizes of 22 and 30 subjects, respectively. Treatment 2 consisted of two anonymous groups with sample sizes of 20 and 30, respectively. The two treatments totaled 102 subjects. Table 1 lists the summary statistics for each group and the pooled data for both the anonymous and non-anonymous treatments.

In Treatment 1, the mean WTA response in Group 1 was $3.27 (median = $4.00) and the mean WTP response was $2.95 (median = $3.00). The mean WTA response of Group 2 was $2.83 (median = $3.00) and the mean WTP response was $2.80 (median = $3.00). In Treatment 2, the mean WTA response in Group 3 was $3.20 (median = $3.00) and the mean WTP response was $2.70 (median = $3.00). Finally, Group 4 had a mean WTA response of $2.93 (median = 3.00) and a mean WTP response of $3.00 (median = $3.00). The mean amount kept in the dictator game was $4.00, $3.35, $4.45, and $4.14 in Groups 1 through 4, respectively.

TABLE 1: SUMMARY STATISTICS

Treatment	Anonymous	Treatment	Mean	Median	Std. Dev.
Treatment 1: Group 1	No	Mug Price	3.11	3.00	1.4714
		WTA	3.27	4.00	1.5869
(n=22)		WTP	2.95	3.00	1.4045
		Dictator	4.00	4.75	1.1871
Treatment 1: Group 2	No	Mug Price	2.82	3.00	1.1024
		WTA	2.83	3.00	1.0293
(n=30)		WTP	2.80	3.00	1.2071
		Dictator	3.35	3.00	1.2403
Treatment 2: Group 3	Yes	Mug Price	2.95	3.00	1.4039
		WTA	3.20	3.00	1.0328
(n=20)		WTP	2.70	3.00	1.7192
		Dictator	4.45	5.00	0.9560
Treatment 2: Group 4	Yes	Mug Price	2.97	3.00	1.2726
		WTA	2.93	3.00	1.4622
(n=30)		WTP	3.00	3.00	1.1019
		Dictator	4.14	4.50	0.9889
Pooled Data Treatment 1	No	Mug Price	2.94	3.00	1.2667
		WTA	3.02	3.00	1.2844
		WTP	2.87	3.00	1.2693
(n=52)		Dictator	3.64	3.00	1.2385
Pooled Data Treatment 2	Yes	Mug Price	2.96	3.00	1.3126
		WTA	3.04	3.00	1.2903
		WTP	2.88	3.00	1.3561
(n=50)		Dictator	4.27	5.00	0.9666

Anonymity and the WTA-WTP gap

The primary result is the lack of a difference in mug values between the anonymous and non-anonymous treatments. Since the values of WTA and WTP do not differ significantly between anonymous and non-anonymous treatments, I conclude that the WTA – WTP gap is not significantly different between the two treatments. To test whether there is a statistically significant difference between the anonymous and non-anonymous treatments, I used both a Wilcoxon-Mann-Whitney and a Pearson χ^2 median test. The Wilcoxon-Mann-Whitney test examines whether the underlying distributions of the dependent variable are significantly different between the anonymous and non-anonymous treatments. The Pearson χ^2 median test (henceforth known as a median test) determines whether the anonymous and non-anonymous treatments are drawn from distributions which contain the same median.

First, I found the data does not exhibit a difference in the value subjects gave the mugs. As shown in Table 2, the z value for the Wilcoxon-Mann-Whitney test was 0.051 (p-value of 0.9595). This means I cannot reject the null hypothesis and the anonymous and non-anonymous mug values have equal distributions. The Median Test has a Pearson χ^2 value of 7.317 (p-value of 0.695). For this value, the null hypothesis is also rejected and the anonymous and non-anonymous mug values contain the same median.

TABLE 2: WILCOXON-MANN-WHITNEY AND PEARSON χ^2 TESTS

	Wilcoxon-Mann-Whitney Test			Pearson χ^2 Median Test		
	z	p-value	Conclusion (α=0.05)	Pearson χ^2	p-value	Conclusion (α=0.05)
Mug	0.051	0.9595	Can't Reject H_0	7.317	0.695	Can't Reject H_0
WTA	0.181	0.8560	Can't Reject H_0	7.011	0.535	Can't Reject H_0
WTP	-0.048	0.9620	Can't Reject H_0	4.888	0.844	Can't Reject H_0

Next, I found the data does not exhibit a difference in the amount subjects were WTA for a mug in both the anonymous and non-anonymous treatments. The tests for WTA, exhibited in Table 2, illustrate that the distribution and median of the anonymous and non-anonymous amount subjects were willing to accept were identical. This is exhibited by both the z-value of 0.181 (p-value of 0.8560) and the Pearson χ^2 value of 7.011 (p-value of 0.535), which both reject the null hypothesis.

Finally, I found the data does not exhibit a difference between the amounts subjects were willing to pay for a mug in both treatments. The Wilcoxon-Mann-Whitney Test had a z-value of -0.048 (p-value of 0.9620), which rejects the null hypothesis. Therefore, the distribution of the amount the subject is willing to pay is the same for both the anonymous and non-anonymous treatments. I can also reject the null hypothesis of different medians due to the Pearson χ^2 value of 4.888 (p-value of 0.844).

Since I did not find any significant difference in the mug value, the WTA, or the WTP, it can be assumed that anonymity does not significantly affect the WTA – WTP gap exhibited in endowment effect games. This lack of significant difference in these values

could signal a flawed elicitation method or an ineffective anonymity procedure. To test whether my anonymity procedure was correct and my samples were similar to other studies, I performed a dictator game for both anonymous and non-anonymous treatments. In Group 1, there was a mean of $4.00 (median = $4.75), shown in Table 1). In Group 2, the mean was $3.35 (median = $3.00). The mean for Groups 3 and 4 were $4.45 (median = $5.00) and $4.14 (median = $4.50), respectively.

Not only was the mean higher in Groups 3 and 4 than it was in Groups 1 and 2, the z-value for the Wilcoxon-Mann-Whitney test was -1.895 (p-value of 0.0580), which is close to rejecting the null hypothesis of equal distributions. This lack of significance can be partially attributed to the test being two-tailed. A one-tailed test is more applicable to the situation because the likelihood of a dictator donating more money than he keeps is highly unlikely. Therefore, the one-tailed p-value of 0.0290 is more accurate, which leads to a rejection of the null hypothesis. A one-tailed two-sample t test with unequal variances had a t-value of -2.048 (p-value = 0.0230). This value leads to a rejection of the null hypothesis that there is no difference between the means. This suggests that the mean amount anonymous dictators keep is higher than the mean amount non-anonymous dictators keep. This evidence, along with the Wilcoxon-Mann-Whitney test, supports the findings of Hoffman, et al. (1996), providing evidence that the anonymity procedure is satisfactory.

CHAPTER IV

CONCLUSIONS

The primary problem studied in this paper is not simply whether a WTA – WTP gap can be observed. It was proven in KKT that a WTA – WTP gap can be observed, while Plott and Zeiler (2005) furthermore observed the gap can diminish, or even disappear, under certain circumstances. My research focuses on whether anonymity affects the WTA – WTP gap. As my results show, controlling for anonymity is not necessary to obtain similar results to Plott and Zeiler (2005). My results show it is likely that anonymity has no effect on the WTA – WTP gap exhibited in Plott and Zeiler (2005) or similar endowment effect experiments.

Although KKT exhibits a WTA – WTP gap, I use Plott and Zeiler (2005) as the control treatment for multiple reasons. Although no statistically significant gap is created through the use of this procedure, I chose Plott and Zeiler for not only the consistency in their results, but for their replicable procedures and their anonymity procedure. It is important to note that it is not significant whether the initial treatment contained a WTA – WTP gap. Since I am comparing two treatments with all factors other than anonymity held constant, I am framing my treatments in relative terms.

My findings can be interpreted in several ways. Each explanation is merely speculation, but provides theoretical answers as to why there is no difference between the WTA –

WTP gap. First, subjects did not adjust their strategies to be seen as better bargainers. Subjects must make decisions based on how much they value a mug. This decision involves examining the mug and analyzing whether he or she would like to take a risk and accept less than the value of the mug. Subjects must also take into account the odds of their value being rolled as well. Due to the complexity of the decision, subjects do not think to adjust their strategy to be seen as better bargainers. Alternatively, subjects adjust their strategies to be seen as better bargainers, but other factors counteract this effect. The envy of not winning a mug may counteract the adjustment to their strategy. Another factor that would counteract the strategy adjustment is set forth by Hoffman, et al. (1996). Subjects will adjust their strategy in order to increase their reputation for being charitable. This strategy counteracts the need to be seen as a better bargainer, and, along with the other factors, completely negates the effect of the need to be seen as a better bargainer.

Another explanation for the lack of an endowment effect in either treatment could be the use of repetition. To familiarize subjects with the elicitation method, I used two practice rounds which could have caused subjects to become "experienced traders." According to KKT, subjects who engage in multiple rounds of trading may realize that over-valuing or under-valuing the item being traded is not optimal. They will then adjust their strategies and no longer over-value or under-value the item that is being traded. Since my experiment had two practice rounds, subjects may have realized they were trading inefficiently and changed their strategy when the mug round was started. The subjects

would then all trade at the optimal price in either an anonymous or non-anonymous situation, and there would be no difference in the mug valuation between buyers and sellers.

Another explanation for a lack of a WTA – WTP gap is subjects did not feel attached the mug. Subjects may not experience feelings of ownership of a mug given as a gift (Loewenstein and Issacharoff 1994). Loewenstein and Issacharoff (1994) found subjects who earn their mug through a task value the mug at a higher price than those who are given the mug. A lack of attachment to a mug could cause a lack of an endowment effect exhibited in both the anonymous and non-anonymous treatments. This is unlikely, considering KKT's results, which show an endowment effect even though the mugs were given as gifts instead of earned.

Finally, the lack of a WTA-WTP gap could not be explained by an incorrect anonymity procedure. If subjects did not believe they were truly anonymous during the anonymous treatment, then there would be no changing variable between the two groups and no difference in answers would be expected. To assess the sufficiency of my anonymity procedure, I included a dictator game in my treatments. Hoffman, et al. (1996) discovered a statistically significant difference between the amount of money that anonymous dictators and non-anonymous dictators kept in the dictator game. I was able to match my dictator game results to the results of Hoffman, et al. (1996) and therefore conclude that my procedure was sufficiently anonymous.

Although I find that anonymity does not affect the WTA – WTP gap, more research should be conducted to determine the rationale behind this conclusion. Further research must be done to determine whether the practice rounds could have caused subjects to become "experienced traders" and whether it causes a difference between the WTA – WTP gap exhibited in anonymous and non-anonymous endowment effect games. An experiment can also be done which replicates my procedure using mugs which are earned, instead of given, to determine whether giving mugs to the subjects causes a lack of an endowment effect.

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APPENDIX

The Endowment Effect Game – Buyer Anonymous

INSTRUCTIONS

This is an experiment in individual decision making. Our purpose is to study technical issues
involved in decision making. Various research foundations have provided funds for this research.
We will conduct two hypothetical rounds and one paid round.

When prompted, please write your identification number on the top of your page. Note that the experimenter will not be able to link any specific subject to a subject identification number. Therefore the experimenter will not know subject payoffs by individual. After the experiment, a third party will come in and distribute your earnings. The experimenter will not be able to link you to your identification number, and the third party will be unable to link you and your payment.

ID Number: _____

Please write your ID Number in the box on the computer screen.

ROUND 1

In this market the objects being traded are tokens. You are a buyer, so you have an opportunity to
buy a token which has a value to you of $_____. It has this value to you because the experimenter will give you this much money for it.

Using the form marked **Round 1**, please indicate whether you prefer to: (1) Buy a token at each price and cash it in for the sum of money indicated above, or (2) Not buy a token at this price.
After you have finished, please place your form in the envelope and pass it to the front of the room. Afterwards, one of the prices listed below will be selected at random and any exchanges will take place at that price. If you have indicated you will buy at this price you will be given a token and will receive this amount of money; if you have indicated that you will not buy a token at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
 (1) Your decision can have no effect on the price actually used because the price will be selected at random.

(2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

Below is an example of **Rounds 1-3**:

For each price indicate your decision by marking an X in the appropriate column.

Your token is worth $<u>0.10</u>. ← This subject's token is worth $0.10.

	I Will Buy The Token	I Will Not Buy The Token
If the price is $0.10	X	
If the price is $0.20		X

This subject is willing to buy a token for $0.10, but not $0.20.

ROUND 2
(Identical to Round 1 using different token value)

Please use the form labeled **Round 2** for this part of the experiment.

ROUND 3
You do not own a mug. You have the option of buying one.

Using the form labeled **Round 3**, please indicate whether you wish to: (1) Pay that amount of money and buy a mug, or (2) Not buy a mug at this price.

After you have finished, please place your form in the envelope and pass it to the front of the room. Afterwards, one of the prices will be selected at random and any exchanges will take place at that price. If you have indicated you will buy at this price you will be given the amount for the mug and your mug will be given to a buyer; if you have indicated that you will not buy a mug at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
(1) Your decision can have no effect on the price actually used because the price will be selected at random.
(2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

The Endowment Effect Game – Buyer Non-Anonymous

This is an experiment in individual decision making. Our purpose is to study technical issues
involved in decision making. Various research foundations have provided funds for this research.
We will conduct two hypothetical rounds and one paid round.

When prompted, please write your identification number on the top of your page.

ID Number: _____

Please write your ID Number in the box on the computer screen.

In this market the objects being traded are tokens. You are a buyer, so you have an opportunity to
buy a token which has a value to you of $_____. It has this value to you because the experimenter will give you this much money for it.

Using the form marked **Round 1**, please indicate whether you prefer to: (1) Buy a token at each price and cash it in for the sum of money indicated above, or (2) Not buy a token at this price.
After you have finished, your form will be picked up by the experiment. Afterwards, one of the prices listed below will be selected at random and any exchanges will take place at that price. If you have indicated you will buy at this price you will receive a token and it can be redeemed for its value; if you have indicated that you will not buy a token at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
 (1) Your decision can have no effect on the price actually used because the price will be selected at random.
 (2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

Below is an example of **Rounds 1-3**:
For each price indicate your decision by marking an X in the appropriate column.

Your token is worth $\underline{0.10}$. ← This subject's token is worth $0.10.

	I Will Buy The Token	I Will Not Buy The Token
If the price is $0.10	X	
If the price is $0.20		X

ROUND 2
(Identical to Round 1 using different token value)

Please use the form labeled **Round 2** for this part of the experiment.

ROUND 3
You do not own a mug. You have the option of buying one.

Using the form labeled **Round 3**, please indicate whether you wish to: (1) Give that amount of money and buy a mug, or (2) Not buy a mug at this price.

After you have finished, your form will be taken up by the experimenter. Afterwards, one of the prices will be selected at random and any exchanges will take place at that price. If you have indicated you will buy at this price you will give the amount of money equal to the price of the mug for the mug; if you have indicated that you will not buy a mug at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
(1) Your decision can have no effect on the price actually used because the price will be selected at random.
(2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

The Endowment Effect Game – Seller Anonymous

INSTRUCTIONS

This is an experiment in individual decision making. Our purpose is to study technical issues
involved in decision making. Various research foundations have provided funds for this research.
We will conduct two hypothetical rounds and one paid round.

When prompted, please write your identification number on the top of your page. Note that the experimenter will not be able to link any specific subject to a subject identification number. Therefore the experimenter will not know subject payoffs by individual. After the experiment, a third party will come in and distribute your earnings. The experimenter will not be able to link you to your identification number, and the third party will be unable to link you and your payment.

ID Number: _____

Please write your ID Number in the box on the computer screen.

ROUND 1

In this market the objects being traded are tokens. You are a seller, so you have an opportunity to
sell a token which has a value to you of $_____. It has this value to you because the experimenter will give you this much money for it.

Using the form marked **Round 1**, please indicate whether you prefer to: (1) Sell a token at each price, or (2) Not sell a token at this price and cash it in for the sum of money indicated above.
After you have finished, please place your form in the envelope and pass it to the front of the room. Afterwards, one of the prices listed below will be selected at random and any exchanges will take place at that price. If you have indicated you will sell at this price you will give a token and will receive this amount of money; if you have indicated that you will not sell a token at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
 (1) Your decision can have no effect on the price actually used because the price will be selected at random.
 (2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

Below is an example of **Rounds 1-3**:

For each price indicate your decision by marking an X in the appropriate column.

Your token is worth $0.20. ◄——— | This subject's token is worth $0.20. |

	I Will Sell The Token	I Will Not Sell The Token
If the price is $0.10		X
If the price is $0.20	X	

ROUND 2
(Identical to Round 1 using different token value)

Please use the form labeled **Round 2** for this part of the experiment.

ROUND 3
You now own a mug. You have the option of selling one to a buyer.

Using the form labeled **Round 3**, please indicate whether you wish to: (1) Receive that amount of money and sell a mug, or (2) Not sell a mug at this price.

After you have finished, please place your form in the envelope and pass it to the front of the room. Afterwards, one of the prices will be selected at random and any exchanges will take place at that price. If you have indicated you will sell at this price you will be given the amount for the mug and your mug will be given to a buyer; if you have indicated that you will not sell a mug at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
(1) Your decision can have no effect on the price actually used because the price will be selected at random.
(2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

The Endowment Effect Game – Seller Non-Anonymous

This is an experiment in individual decision making. Our purpose is to study technical issues
involved in decision making. Various research foundations have provided funds for this research.
We will conduct two hypothetical rounds and one paid round.

When prompted, please write your identification number on the top of your page.

ID Number: _____

Please write your ID Number in the box on the computer screen.

In this market the objects being traded are tokens. You are a seller, so you have an opportunity to
sell a token which has a value to you of $_____. It has this value to you because the experimenter will give you this much money for it.

Using the form marked **Round 1**, please indicate whether you prefer to: (1) Sell a token at each price and cash it in for the sum of money indicated above, or (2) Not sell a token at this price.
After you have finished, your form will be picked up by the experiment. Afterwards, one of the prices listed below will be selected at random and any exchanges will take place at that price. If you have indicated you will sell at this price you will give a token and will receive this amount of money; if you have indicated that you will not sell a token at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
 (1) Your decision can have no effect on the price actually used because the price will be selected at random.
 (2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

Below is an example of **Rounds 1-3**:

For each price indicate your decision by marking an X in the appropriate column.

Your token is worth $<u>0.20</u>. ← | This subject's token is worth $0.20.

	I Will Sell The Token	I Will Not Sell The Token
If the price is $0.10	_____	___X___
If the price is $0.20	___X___	_____

ROUND 2
(Identical to Round 1 using different token value)

Please use the form labeled **Round 2** for this part of the experiment.

ROUND 3
You now own a mug. You have the option of selling one to a buyer.

Using the form labeled **Round 3**, please indicate whether you wish to: (1) Receive that amount of money and sell a mug, or (2) Not sell a mug at this price.

After you have finished, your form will be taken up by the experimenter. Afterwards, one of the prices will be selected at random and any exchanges will take place at that price. If you have indicated you will sell at this price you will be given the amount for the mug and your mug will be given to a buyer; if you have indicated that you will not sell a mug at this price then no exchange will be made and you do not receive anything.

Notice the following two things:
(1) Your decision can have no effect on the price actually used because the price will be selected at random.
(2) It is in your interest to indicate your true preferences at each of the possible prices listed below.

Dictator Procedure (Non-Anonymous)

In this experiment each of you will be paired with a different person within your room. You will not be told who these people are either during or after the experiment. The other person will also not be told who you are either during or after the experiment.

The experiment is conducted as follows: When the experiment begins, you will be asked to reenter your identification number on the form labeled **Round 4**. Then, half of you will fill out the form labeled **Round 4**. You will then make a decision on how much money you will keep. You will then enter the amount in the box provided on the form. For example, if you will keep $7, you will put a 7 on the line provided. This is an example only; the actual decision is up to each person. Once you have made your decision, please wait for the rest of the people to make their decisions.

The other half will be asked to sit silently until all of the decisions have been made. The forms will then be collected by the experimenter.

After all of the people have submitted their decisions, please wait silently as the experimenter prepares your payment. The experimenter will then have you individually come up with your identification number and trade it for an envelope containing a receipt and your payment. Once you have received your envelope, please fill out the pertinent information on the receipt **and leave the receipt face down with the experimenter.** Please keep the money within the envelope as you silently gather your things and leave the room.

Dictator Procedure (Anonymous)

In this experiment each of you will be paired with a different person within your room. You will not be told who these people are either during or after the experiment. The other person will also not be told who you are either during or after the experiment.

When prompted, please write your identification number on the form labeled **Round 4**. Note that the experimenter will not be able to link any specific subject to a subject identification number. Therefore the experimenter will not know subject decisions. After the experiment, a third party will come in and distribute your earnings. The experimenter will not be able to link you to your identification number, and the third party will be unable to link you and your payment.

The experiment is conducted as follows: you will see an amount of money on the screen. You will then make a decision on how much money you will keep. You will then enter the amount on the line provided on the form labeled **Round 4**. For example, if you will keep $7, you will put a 7 on the line provided. This is an example only; the actual decision is up to each person. Once you have made your decision, please wait for the rest of the people to make their decisions.

After everyone has finished filling out the forms, you will then place your form in an envelope and pass it to the front of the room.

After all of the people have submitted their decisions, please wait silently as the experimenter prepares your payment. Remember, the experimenter does not know the identity of each person. The experimenter will then have a third party come in to hand out the envelopes containing payments. Once you have received your envelope, please fill out your name and pertinent information on the receipt **and leave the receipt face down on your desk.** Please keep the money within the envelope as you silently gather your things and leave the room.

Round 1

For each price indicate your decision by marking an X in the appropriate column.

If you buy a token, it is worth $_____ .

	I Will Buy The Token	I Will Not Buy The Token
If the price is $0.10	_____	_____
If the price is $0.20	_____	_____
If the price is $0.30	_____	_____
If the price is $0.40	_____	_____
If the price is $0.50	_____	_____
If the price is $0.60	_____	_____
If the price is $0.70	_____	_____
If the price is $0.80	_____	_____
If the price is $0.90	_____	_____
If the price is $1.00	_____	_____

Round 2

For each price indicate your decision by marking an X in the appropriate column.

If you buy a token, it is worth $____.

	I Will Buy The Token	I Will Not Buy The Token
If the price is $0.20	_____	_____
If the price is $0.40	_____	_____
If the price is $0.60	_____	_____
If the price is $0.80	_____	_____
If the price is $1.00	_____	_____
If the price is $1.20	_____	_____
If the price is $1.40	_____	_____
If the price is $1.60	_____	_____
If the price is $1.80	_____	_____
If the price is $2.00	_____	_____

ID Number: _____

Round 3

For each price indicate your decision by marking an X in the appropriate column.

	I Will Buy The Mug	I Will Not Buy The Mug
If the price is $0.50	_____	_____
If the price is $1.00	_____	_____
If the price is $1.50	_____	_____
If the price is $2.00	_____	_____
If the price is $2.50	_____	_____
If the price is $3.00	_____	_____
If the price is $3.50	_____	_____
If the price is $4.00	_____	_____
If the price is $4.50	_____	_____
If the price is $5.00	_____	_____

ID Number: _____

Round 4

You currently own $____ .

Please indicate how much money you would like to keep for yourself. $_____

CONTACT INFORMATION

Name: Gregory Cohen

Professional Address: c/o Dr. Alex Brown
                                   Department of Economics
                                   Texas A&M University, 4228 TAMU
                                   College Station, TX 77843-4228

Email Address: greg.cohen@tamu.edu

Education: B.S. Economics, Texas A&M University, May 2012
                                   Magna cum Laude
                                   Honors Undergraduate Research Fellow