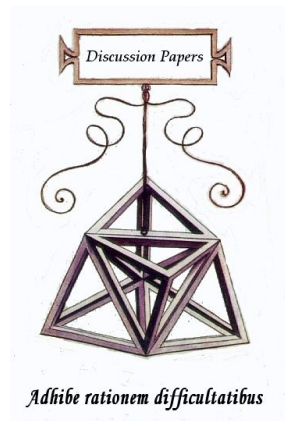




Discussion Papers

Collana di

E-papers del Dipartimento di Economia e Management – Università di Pisa



Domenico Colucci, Chiara Franco, Vincenzo Valori

Endowment effects at different time scenarios: the role of ownership and possession

Discussion Paper n. 279

August 2021

Discussion Paper n. 279, presentato: Agosto 2021

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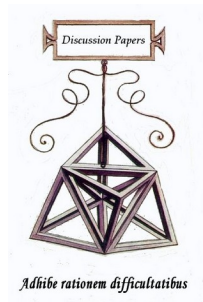
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luogotenenziale 31 agosto 1945, n. 660.

Si prega di citare così:

Colucci D., Franco C., e Valori V. (2021), "Endowment effects at different time scenarios", Discussion
Papers del Dipartimento di Economia e Management - Università di Pisa, n. 279, ISSN 2039-1854,
(<http://www.ec.unipi.it/ricerca/discussion-papers>).

Discussion Paper
n. 279



Domenico Colucci, Chiara Franco, Vincenzo Valori

Abstract

The central issue of the wide literature about the endowment effect is the search for an explanation of the fact that the selling price of a good will be higher than that at which a person is willing to buy that same good, once they own it. The experimental evidence is not unanimous in replicating the results found by Kahneman et al. (1990 and 1991). The challenge is that of disentangling the several determinants that may be at work in generating the final effect, as the loss aversion is not considered the only explanation.

We dig deeper by examining two of these likely determinants which remain understudied: the first is the impact that the amount of time of ownership can have on the endowment effect. The second is the type of item (non-material good and exchange goods) used to test the effect. Through an online questionnaire we investigate these aspects by using three different goods: a mug, an Amazon Gift Card and a quarterly subscription to Spotify. We also test whether the endowment effect occurs in different time scenarios, that is if participants imagine to own the good for one day, one week or one month.

We find that the endowment effect clearly appears for all types of goods while less clear results take shape when considering the duration of the ownership.

Keywords: WTA/WTP gap; endowment effect; ownership experience, fungible goods, services, exchange goods

JEL: D12, D91

Endowment effects at different time scenarios: the role of ownership and possession

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August 27, 2021

Abstract

The central issue of the wide literature about the endowment effect is the search for an explanation of the fact that the selling price of a good will be higher than that at which a person is willing to buy that same good, once they own it. The experimental evidence is not unanimous in replicating the results found by Kahneman et al. (1990 and 1991). The challenge is that of disentangling the several determinants that may be at work in generating the final effect, as the loss aversion is not considered the only explanation. We dig deeper by examining two of these likely determinants which remain understudied: the first is the impact that the amount of time of ownership can have on the endowment effect. The second is the type of item (non-material good and exchange goods) used to test the effect. Through an online questionnaire we investigate these aspects by using three different goods: a mug, an Amazon Gift Card and a quarterly subscription to Spotify. We also test whether the endowment effect occurs in different time scenarios, that is if participants imagine to own the good for one day, one week or one month. We find that the endowment effect clearly appears for all types of goods while less clear results take shape when considering the duration of the ownership.

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1 Introduction

The endowment effect is one of the building blocks that have been part of behavioral economics since its very beginning. While in the neoclassic economic theory, ownership of an item does not have any influence on its evaluation, research has nevertheless experimentally verified that this may not be always the case. In particular, this type of effect has emerged from the observation that people give higher importance to what they own and they are going to value a good more than when they do not own a good and have to buy it. For this reason, a significant divergence between what people are willing to pay (WTP) to buy the good and what they are willing to accept to sell it (WTA) is to be expected.

Starting from Kahneman, Knetsch and Thaler (1990 and 1991) a burgeoning literature has started to go deeper into the study of this effect but mainly identifying it as a consequence of loss aversion. According to this interpretation, the sale of an object is perceived by the seller as a loss with respect to their reference point, while the purchase is perceived by the buyer - who does not yet own the good and therefore does not incorporate it into their reference point

- as a gain. Thus, if individuals are loss-averse, their tendency will be to value the objects they consider selling more than they value the objects they consider buying. This implies that the selling price of a good will be higher than that at which a person is willing to buy that same good. Similarly, as Gal (2006) argues, it is the propensity to remain within the boundaries of the status quo that generates the endowment effect, whose psychological explanation is grounded in the propensity for inertia.

The roots of the endowment effect, however, are not limited to the loss aversion alone; other possible explanations have been provided, as the initial insights of prospect theory (Kahneman and Tversky, 1979) and subsequent models of reference dependence (such as the status quo bias, see Samuelson and Zeckhauser, 1988) have since been extended in various directions. For example, Koszegi and Rabin (2006) hypothesized that the reference point is determined not so much by current ownership of a good, but more importantly by expectations about expected future outcomes. From their perspective, loss aversion is not the main determinant of the endowment effect - although they do not rule out that it plays an important role in many other market phenomena - but rather the possibility of participating (or not participating) in a market for the asset owned.

From a methodological point of view, experiments have been used from the beginning to address the issue. The first work in this direction is in Knetsch (1989), showing the endowment effect in a basic experimental context: participants are randomly endowed with one of two available goods having approximately the same value and then they are given the opportunity to exchange the possessed good with the other one. In this situation we should expect a number of transactions involving about half of the subjects but the number observed is actually significantly lower, giving a possible confirmation of the existence of an endowment effect. Later, Kahneman, Knetsch and Thaler, (1990) refines the investigation by studying this phenomenon in a series of 8 experiments in which assets can be exchanged for money and presenting evidence suggesting that people's preferences depend on their reference positions.

However, these experimental results are not universally accepted. Plott and Zeiler (2005, 2007) have argued that the effect found in these studies is not evidence of reference point dependent preferences. While Knetsch, and many of those who followed him, interpreted the exchange asymmetry as evidence of a special form of preferences related to loss aversion, Plott and Zeiler tested an alternative explanation by postulating that these asymmetries were the result of subjects' misunderstandings and misconceptions regarding the nature of the experimental task (primarily related to the complexity of the Becker-deGroot-Marschak method used to elicit preferences) as well as biases introduced by the experimental procedures. To test this conjecture, Plott and Zeiler conducted a series of experiments altering the traditional experimental design in an attempt to reduce both confusion and procedure-driven influences. This allowed them to demonstrate that asymmetries can be made to appear or disappear in a given group of subjects by modifying the procedures used. These works have in turn been criticized (see e.g. Fehr, Hakimov, Kübler, 2015) and the debate is ongoing.

In all classical experiments, the endowment effect follows from the attribution of ownership of a good, interpreting this phenomenon as a consequence of the loss aversion one would suffer by depriving oneself of the good. In this scheme, however, the two factors of ownership attribution and loss aversion become confused. Morewedge et al. (2009) conducted two experiments in which they attempted to distinguish between these two factors by separating the seller/buyer conditions from the owner/non-owner conditions. In accordance with the classical demonstrations of the endowment effect, they acknowledge that a lower value is attached to a mug by non-owner buyers rather than owner sellers. In the same way, when the roles are reversed, that is buyers become owners and sellers become non owners, it is found that the effect does not occur suggesting that ownership and not loss aversion causes the endowment effect in the standard experimental

paradigm.

A second source of confusion is that legal ownership and possession tend to coincide in the classical experimental design. However, recent literature on the endowment effect has suggested that actual legal ownership may not be necessary to cause the endowment effect. For example, Reb and Connolly (2007) perform an experiment in which ownership and possession are separated. The results suggest a significant effect of possession, but not ownership, on the monetary valuation of the object. Focusing more in depth into the characteristics of the ownership, Bagga et al. (2020) give recent evidence on the fact that also "non-ownership", such as rent and borrowing can give rise to some sort of endowment effect. They find that what is relevant is the psychological ownership rather than just the legal possession.

Indeed, further attempts to go deeper in the search for the ultimate reasons underlying the endowment effect come from psychological research: one such direction concerns the fact that people may overlap their choice with their self. The so called self hypothesis gives evidence of the fact that the item is associated with the idea people have of themselves, that is the ownership of an item creates a linkage with the self of the owner so that they are going to value the item more not because they feel pain in giving it away but because they the item is "theirs" (Gawroski et al. 2007, Morowedge, 2009).

Chatterjee, Irmak, and Rose (2013) and Alexopoulos, Šimleša, and Francis (2015) employ the concepts of loss aversion as well as ownership to propose explanations of the phenomenon through models based on self-improvement in response to threat. Specifically, they argue that the endowment effect is a response to a threat of the self that arises in the case of selling an owned object, when fear of the potential loss of the self-associated object is experienced. Thus, the endowment effect is the result of both the object-self association created by possession (ownership profile) and the consideration of selling the self-associated object (loss aversion). The threat for the self created by these two elements, in turn motivates self-improvement by assigning a higher valuation to the given object. Within this stream of research some papers also explore the role of emotions as determinants of the effect; for example, Martinez et al. (2011) show that two decision-related emotions, regret and disappointment, can have distinct effects on object valuation.

The endowment effect can also be triggered by unexpected stimuli. Building on the idea that perceived control is a key driver of psychological ownership, Brasel and Gips (2014) study the effect of various types of computer interfaces (touchpads, touchscreens, ...) and show that an endowment effect is more likely when subjects also own the device used: selecting a product on a proprietary device is closer to touching the product itself, increasing its psychological ownership.

One crucial area, which has been largely neglected, has to do with the time of possession: in the original framework the endowment effect should occur immediately after coming into possession of the good. This idea is however challenged only by Strahilevitz and Loewenstein (1998). Across 4 different experiments they provide evidence (1) that valuation increases with the duration of possession, and (2) that past possession experiences also influence the valuation of the good. Psychological adaptation appears to play a role in generating a greater endowment effect over time. Also Wang, Ong, and Tan (2015) examined how an object's ownership history - which captures the origins of how an object is obtained - affects its valuation. In their experiment, they find a significant effect in treatments involving various sequences of acquisition/loss of asset ownership. No other studies, to our knowledge, further investigate the "time" dimension of the endowment effect.

As clearly pointed out in Kahneman, Knetsch, and Thaler (1990), one consequence of the endowment effect being caused by loss aversion is that this should not occur for exchange goods. This view is partially at odds with Van Dijk and Van Knippenberg (1996) who show - in an experiment in which value is induced on tokens by means of lotteries - that the endowment effect

also occurs for exchange goods as long as their value is uncertain. Van de Ven, Zeelenberg, and van Dijk (2005) reinforce this view by investigating curiosity effects: if curiosity can only be satisfied by withholding the exchange good, then this can lead to the emergence of disparities between purchase and sale prices.

An indirect argument in support of the hypothesis that the endowment effect does not occur for exchange goods is provided by Novemsky and Kahneman (2005), who start from the idea that the “intentions” of the agents define the nature of an asset as consumption good or exchange good. Such intentions can inhibit (in the case of exchange goods) or produce (for consumption goods) loss aversion. Therefore, if loss aversion is an essential element for the emergence of the endowment effect, it must be concluded that this should not occur for exchange goods. More recently, Svirsky (2014) addresses this issue performing an experiment with coins, chocolate coins, and chocolate coins described as tokens and finding no endowment effect for either money or a consumer good labeled as an exchange good.¹

The role of the type of item in the endowment effect has also been studied by Jaeger et al. (2020), who consider, using the time-shifted rationality approach, whether the effect can vary and to which degree according to the item considered. They find that the endowment effect can actually vary in magnitude across item, being for the large part due to the evolutionary mechanisms.

Having briefly sketched the quite relevant and wide literature on the endowment effect, we can sum up by saying that even though many different determinants of the effect have been considered so far, some of them such as the role of time since possession as well as the type of item traded are still under-researched. Our paper is an attempt to fill this gap by examining whether the endowment effect is going to occur considering different periods of possession as well as different items: a mug, an Amazon gift card and a full subscription to the Spotify streaming service. Through the submission of an online questionnaire we are able to test whether the endowment effect is present not only right after “owning” the good but also whether the effect is still present after one hour, one week and one month.

The paper is organized as follow: Section 2 presents the aims of the study, Section 3 describes in detail the questionnaire and Section 4 the subject pool. Section 5 offers some comments on the results obtained while Section 6 concludes.

2 Aims of the study

We build on previous literature related to two strands of research in the area of the endowment effect: (1) the dependence on the type of asset (tangible goods vs. non-material goods vs. exchange goods) and (2) the effect of prolonged ownership (instant vs. long-run endowment effect).

Concerning the first issue (dependence on the type of asset), there are two aspects that must be discussed, regarding exchange goods and non-material goods, respectively.

The emergence of an endowment effect in the case of exchange goods is still debated. In experiments reported in Kahneman, Knetsch, and Thaler (1990), subjects are endowed with induced value tokens that can be exchanged. No endowment effect was found in this situation, prompting the authors to conclude that the endowment effect does not occur for exchange goods. This fact also appears to be consistent with the loss aversion/reference point adaptation theory: Kahneman, Knetsch, and Thaler (1991) ascribe it to the lack of loss aversion with respect to

¹One attempt to resolve this dispute comes from an adversarial collaborative project (see Bateman et al., 2005) in which two different hypotheses - regarding whether or not loss aversion emerges in the case of exchange goods - are tested in a large experiment consisting of 10 treatments: the results, although not conclusive, suggest that the WTA/WTP disparity emerges even in the presence of exchange goods.

money exchanged for other goods in a normal transaction.² As we saw in the introduction, this view is confirmed by some studies (e.g. Svirsky, 2013) and disputed by others (e.g. van Dijk and van Knippenberg, 1996, specifically with respect to the case of exchange goods whose value is uncertain). Despite some attempts to settle the controversy (e.g. Bateman et al, 2005) the evidence is insufficient to end the debate.

The second aspect regards non-material goods (as opposed to tangible goods), which is a class of assets for which the endowment effect has not been sufficiently studied.

As we have seen above, legal ownership (intended as the attribution of the right of ownership) and possession of the asset (intended as physical possession) have different consequences for the endowment effect and can be treated separately. In doing so, Reb and Connolly (2007) document that it is primarily physical possession and not legal ownership that is the cause of the endowment effect. But if the feeling of possession requires tangibility, then non-material goods require additional attention: in this case, it is possible that the endowment effect does not occur (or occurs only slightly) if material possession is the main driver of the phenomenon.

We investigate the case of exchange goods by referring to an Amazon Gift Card, which gives the owner the right to make purchases on the Amazon platform up to a predetermined amount. Concerning non-material goods, we consider a quarterly subscription to Spotify, a popular online music streaming service.

The following questions relating to the issue of the dependence of the endowment effect on the type of asset arise from the above analysis:

a) Is there indeed no endowment effect in the case of an exchange good comparable to legal tender (but different from money), as postulated by standard theory?

b) Does the endowment effect occur in the case of non-material assets, for which physical possession cannot be ascribed?

Regarding the second issue (effect of prolonged ownership), we start from the theoretical explanation based on the concept of loss aversion and adaptation to new reference points. Traditionally, the literature on this topic refers to an instantaneous endowment effect, meaning that the adaptation to the new reference point brought about by obtaining ownership of the asset occurs immediately. On the other hand, it is possible that, while part of the adaptation occurs quickly, the process is more prolonged in time and therefore a greater endowment effect occurs after longer time intervals.

Indeed, as mentioned above, Strahilevitz and Loewenstein (1998) show that the endowment effect does not end instantaneously after the acquisition of ownership of the asset and it is affected by prolonged ownership. In their experiment, prolonged possession refers to time periods of 20 minutes in one study and one hour in the other, but they do not clarify whether longer durations can further influence the endowment effect. Indeed as they themselves acknowledge, although the effect of such short differences in ownership duration attests to the strength of the effect, it is not possible to generalize the results to much longer ownership durations out of their experiment.

We intend to add to this issue and try to answer the following questions:

c) Does the WTA continue to increase after periods of time of one day, one week or longer?

d) After how long (if so) does prolonged possession cease to have an effect on WTA?

e) Does this adaptive process lead the valuation of the asset to gradually converge to a new equilibrium?

To answer the five questions we resort to an online questionnaire whose details will be presented in the following section. The study has been pre-registered on aspredicted.org (#71055, 20 July 2021).

²Experimental support for this hypothesis is also found in Novemsky and Kahneman (2005)

3 The Questionnaire

Data are collected via a questionnaire administered through the Qualtrics^{XM} platform and consisting of the following steps:

1. **Information and consent form.**
2. **Instructions and comprehension check.** A comprehension check question is introduced to familiarize participants with the "multiple list method" we use to elicit values, and to minimize noise due to confusion.
3. **Main treatment.** The main treatment comes in five different versions, corresponding to the five experimental conditions whose details will be discussed below.
4. **Attention level check.** The verification of the level of attention is introduced to ensure minimal control over the quality of the responses collected. It demonstrated some effectiveness, having resulted in the cancellation of a percentage of responses around 15%.
5. **Final survey.** The final survey is divided into two parts. A first part collects information on some consumption habits relevant to the questionnaire, while a second part collects impressions on the effectiveness of the questionnaire design.

The estimated duration of the questionnaire is 6 minutes and the remuneration is £0.80 (or £8.00 per hour, equivalent to €9.4 or \$11.2 at the exchange rates in effect at the time the questionnaire is administered).

In the Appendix are shown all the screenshots related to the Buyer condition followed by example screenshots related to other conditions, so as to facilitate the comparison.

3.1 Treatment conditions

The questionnaire has a between-subject design for the variable "*duration of ownership*" and a within-subject design for the variable "*nature of the asset*". In total we have five conditions, differing for the duration of ownership described.

1. **Buyer condition: No ownership.** Subjects are presented with a scenario in which they are shown an asset and have the possibility to get such asset or alternatively to get some money.
2. **Seller condition: Ownership.** Subjects are presented with a scenario in which they are given an asset and have the possibility to keep such asset or to trade it with alternative amounts of money. Four specifications of the seller condition are considered.
 - 2a **Immediate:** The choice between keeping or trading is to be taken *immediately after* becoming the owner of the asset.
 - 2b **Day:** Choice to be taken *one day after* becoming the owner of the asset.
 - 2c **Week:** Choice to be taken *one week after* becoming the owner of the asset.
 - 2d **Month:** Choice to be taken *one month after* becoming the owner of the asset.

Each participant is assigned to one of the five conditions.

Regarding the within-subject component related to the nature of the asset, each subject is asked questions regarding each of three asset types: tangible good (represented by a mug), non-material (represented by a quarterly subscription to Spotify), and medium of exchange (represented by an Amazon gift card with a nominal value of \$100). We adopt a counterbalancing design, such that the order of appearance of the three asset types (tangible, non-material, exchange) is randomized for every subject, to control for possible order effects.

3.2 Conditions implementation

Each asset is briefly introduced and accompanied by a picture. We keep the differences among conditions to a minimum, while aiming to induce the necessary identification with the different scenarios. In the baseline conditions (Buyer and Immediate Seller) - by which we intend to measure the usual WTA-WTP gap - the differences are limited to one word in the description of the context (“You have been shown . . .” vs “You have been given . . .”) and the verbs describing the possible actions (“Get the asset” and “Get the money” vs “Keep” and “Trade”) – see e.g. Figure 1.

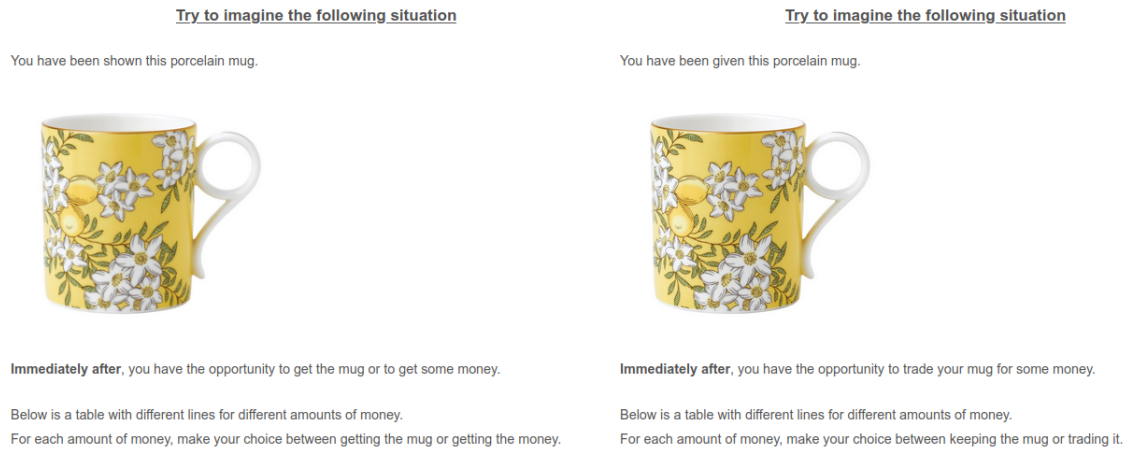


Figure 1: Comparison between the buyer and the seller conditions

Try to imagine the following situation

You have been given this porcelain mug.



PAY ATTENTION. THIS IS IMPORTANT!
Please think about the following situation for 10 seconds

You keep it for **one day**, in which you have the opportunity to observe it at your leisure (without using it), and imagine how and where to use it.

After one day, you have the opportunity to trade your mug for some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between keeping the mug or trading it.

Figure 2: "Day" condition

In the "protracted ownership" conditions (Day, Week and Month) we add the sentence "You keep it for one day/week/month, in which you have the opportunity to observe it at your leisure (without using it), and imagine how and where to use it" in order to give the necessary salience to the temporal framing of the decision to be made. In addition to presenting the imaginary context, we also ask subjects to pause and think about the situation for a few seconds (10, 20 or 30 seconds, in the three conditions Day, Week or Month, respectively). Although this pause is not mandatory, we believe that it might help the process of identification which is crucial in an incentive-free environment such as this one (see e.g. Figure 2, showing the phrasing chosen for the Day condition).

3.3 Data collection

Data are collected using a two-step "multiple list method" (MPL). We decided in favor of this method, as opposed to the alternative of asking subjects to directly provide a value for the goods, which is commonly used with incentive schemes à la Becker-DeGroot-Marschak (BDM). The main disadvantage of MPL is that it takes more time and effort from the subjects: in our setup, each valuation requires participants to tick 11-12 boxes, while a direct revelation would only ask participants to type a single number. On the other hand, since there is no clear incentive scheme in the questionnaire (given that participation is paid at a flat rate), we felt that it would be easier for subjects to achieve the desired goal (i.e., to assign a value to the assets) with a mechanism steering them towards it through successive steps. In addition, our decision is also supported by the results of Brebner and Sonnemans (2018) showing that the MPL and the BDM methods produce approximately the same valuations of WTA and WTP in incentivized contexts and suggesting that "when only few valuations with a relatively low resolution are needed, MPL seems to be a practical choice".

In our questionnaire, in the first stage of each question, participants must choose whether to

get the asset or to get the money (in the Buyer condition; to keep or to trade the asset in the Seller condition) for five different amounts of money, which remain unchanged across the five treatment conditions. Once the first choice is made, we ask them to refine their choices in a smaller interval (see Figures 3 and 4).

	Get the mug	Get the money
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 6.00	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input type="radio"/>
\$ 12.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>

Figure 3: First stage Multiple List for a mug in the Buyer condition

	Get the mug	Get the money
\$ 6.00	<input checked="" type="radio"/>	<input type="radio"/>
\$ 6.50	<input type="radio"/>	<input type="radio"/>
\$ 7.00	<input type="radio"/>	<input type="radio"/>
\$ 7.50	<input type="radio"/>	<input type="radio"/>
\$ 8.00	<input type="radio"/>	<input type="radio"/>
\$ 8.50	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input checked="" type="radio"/>

Figure 4: Second stage, 6-9 interval, Multiple List for a mug in the Buyer condition

Values are elicited in dollars within different intervals and with different steps for the three assets:

Mug. Values in 0 – 18. Steps: 3 in the first stage and 0.5 in the second stage.

Spotify subscription. Values in 0 – 30. Steps: 5 in the first stage and 1 in the second stage.

Amazon gift card. Values in 40 – 100. Steps: 10 in the first stage and 2 in the second stage.

Finally, before closing the questionnaire we administer a short survey with two purposes:

- Collect data on the habit of using the online services involved in the survey (Spotify and Amazon) to check for a possible consequential effect (this part is mandatory).
- Collect impressions on the effectiveness of the framing used to set up the questions and in particular on the part regarding the duration of ownership (this part is voluntary).

4 Subject pool

The questionnaire was administered through the Prolific platform between 12 and 28 July 2021. Overall a total of 516 subjects participated.³ The following tables illustrate the demographic characteristics of the pool.

Number of subjects, by gender	
Sex	#Subjects
Female	252
Male	260

Age of subjects		
mean_age	median_age	sd_age
27.36008	24	9.497755

In addition to balancing by gender, we also imposed a certain allocation balance to the various conditions:

Number of subjects in each condition by gender		
cond	Female	Male
buyer	48	52
day	53	50
month	51	49
now	50	60
week	50	49

The subjects consisted in individuals whose first language was English, because we wanted to make sure that there was a full understanding of the questions and their logic. The current country of residence of participants is shown in the following table:

³Of these, for 4 subjects the information about their gender was not known, due to a Prolific situation of “Data Expired”.

Number of subjects, by Current Country of Residence	
Current Country of Residence	#Subjects
Australia	20
Canada	53
Ireland	31
Italy	1
New Zealand	10
United Kingdom	146
United States	255

It took an average of 5'53" for subjects to complete the questionnaire, thus making the hourly payment equal to £8.15 (equivalent to €9.57 or \$11.40).

5 Results

We worked out each subjects assessment of the three goods on the basis of the questionnaire choices in the Multiple List stages, so as to define the variables corresponding to willingness to pay or willingness to accept for the given good for the given treatment condition. Therefore we computed the following variables:

XXXBuyer_WTP, XXXNow_WTA, XXXDay_WTA, XXXWeek_WTA, XXXMonth_WTA

where in turn XXX can be one of "Mug", "Amazon" and "Spotify". The resulting mean values are shown in table 1:

	Buyer	Now	Day	Week	Month
Mug	3.86	6.51	7.50	6.52	7.58
Amazon	78.38	88.46	92.18	92.93	92.14
Spotify	12.24	16.60	17.15	19.26	17.24

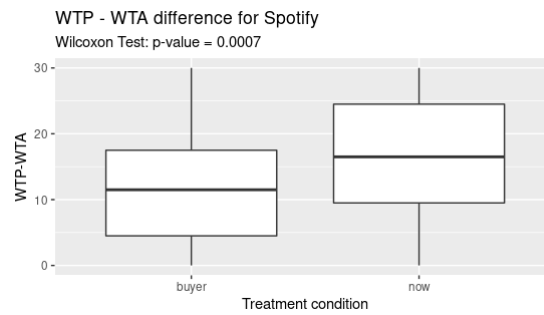
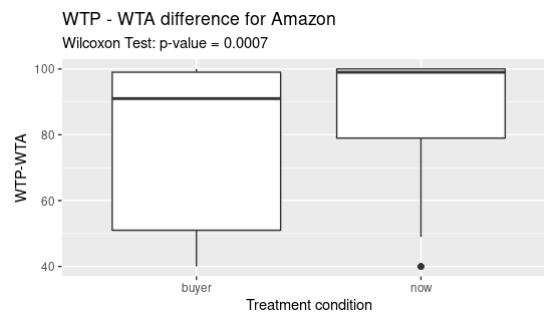
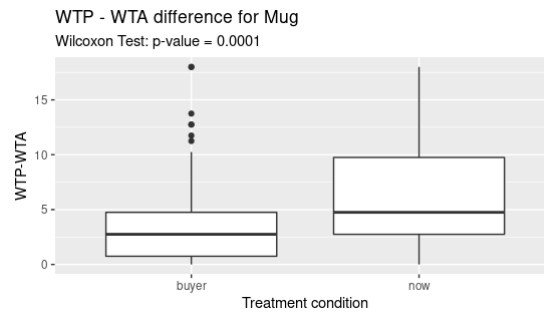
Table 1: Mean values for WTP and WTA at different time scenarios

Preliminary analysis using the Kruskal-Wallis rank-sum test makes it clear that for all three assets there are effects determined by the various conditions studied and that these effects are mainly determined by the difference between WTP and (instant) WTA. Indeed (see table 2) the K-W test rejects the null hypothesis with very low p-values when all 5 conditions are considered, while it does not reject the null hypothesis when it is applied only to the "seller" conditions.

	Mug	Amazon	Spotify
Buyer + Seller conditions	0.0000	0.0000	0.0000
Seller conditions only	0.2818	0.105	0.2499

Table 2: Kruskal-Wallis test: p-values

One clear feature suggested by these average values is that there is a gap between willingness to pay for each good when buying and willingness to accept money when selling. Indeed the following pictures demonstrate the existence of a statistically significant difference for all three goods.

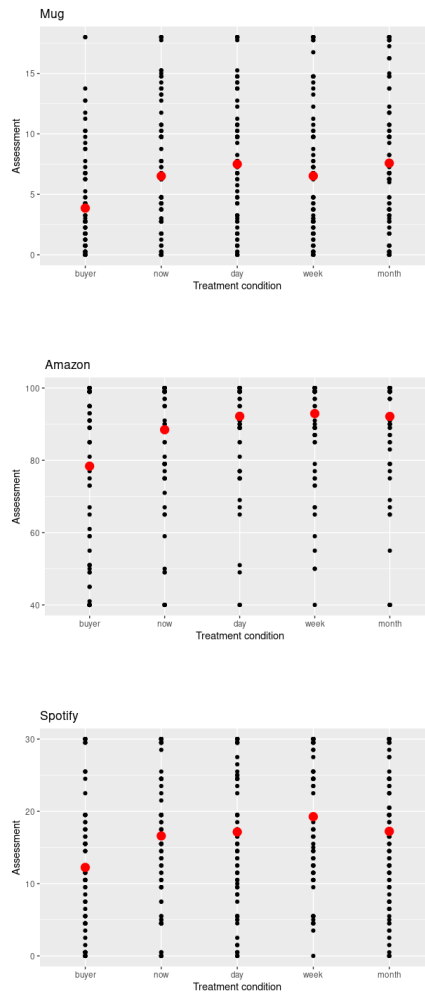


Concerning the differences between the “Now” evaluation of the WTA and those under different time scenarios (that is between treatment condition 2a and 2b, 2c and 2d) the evidence is mixed as can be inferred from the following table, where we report outcomes of Wilcoxon rank-sum test of the null hypothesis of equal median in the distributions of the WTA in the Now and the Day, Week and Month conditions for the three different goods.

	Day	Week	Month
Mug	0.066	0.513	0.096
Amazon	0.084	0.014	0.026
Spotify	0.340	0.030	0.329

Table 3: Wilcoxon test for differences wrt to the “Now” WTA: p-values

Inspection of Table 3 does not suggest any clear pattern of how the duration of “possession” affects the valuation of the objects by the subjects in the virtual context of the questionnaire: what can be said is that there appear to be differences in the valuation of the three objects for different durations of ownership. The following three images give a pictorial intuition of a possible model of behavior in which both an instant endowment effect as well as a long-term endowment effect are exhibited: the latter, however, lacks the expected characteristics of stability and regularity.



The results confirm the occurrence of the endowment effect for tangible goods (mug). Moreover, with respect to the two questions in section 2 concerning the dependence of the endowment

effect on the type of good, we can answer that the endowment effect clearly appears both in the case of the exchange good (Amazon Gift Card) and in the case of the non-material good (Spotify).

Instead, with respect to questions concerning the effect of ownership duration on WTA, the results are less clear. We can observe that the long-term endowment effect does not occur with the same intensity and timing for the three types of assets. For the mug (tangible good) the largest effect is observed after one day, while for the Amazon Gift Card (exchange good) and Spotify (non-material good) the largest effect is observed after one week. The interesting feature is that in none of the three cases, neither the peak of the WTA is reached at the longest possible ownership duration, nor do we observe the expected adjustment path to the new equilibrium value - which we would have imagined with increasing values and decreasing increments in the transition from one period to the next of longer duration. Indeed the Jonckheere-Terpstra test for an ordered alternative hypothesis reveals a (strong) statistically significant trend in the data when all 5 conditions are considered. Instead, when it is applied only to the "seller" conditions, the J-T test detect a statistically significant trend only in one case out of three (Amazon) while the null hypothesis is not rejected for the mug and for Spotify (see table 4 with detailed p-values).

	Mug	Amazon	Spotify
Buyer + Seller conditions	0.0000	0.0000	0.0000
Seller conditions only	0.2563	0.0299	0.2678

Table 4: Jonckheere-Terpstra test: p-values

Finally, to check whether some demographic attribute played a role in shaping the results, we perform a linear regression analysis with the WTA of the asset as the dependent variable, the five ownership conditions, gender, age, and the current country of residence as the predictors. We also included a dummy variable "Framing", related to the survey question that asked subjects whether they felt influenced by the specific framing they faced (see Figure 19 in the appendix) with the answer "Yes" coded as "1".

The model is significant ($p < 0.01$ for all assets). As expected, ownership conditions are the most important explanatory variables. None of the others seems to play a relevant role. A difference emerges between the mug and the other two assets. In the case of the mug not all the treatment variables are significant, while the framing variable is: those who believe they were influenced by the framing rated the cup - on average - more. On the other hand, for Amazon and Spotify there is no effect of framing while all the ownership conditions are significant. Also residence in some countries (Canada, USA and UK) shows some small effects, although marginal and specific for each of the three goods. Detailed results are shown in Table 5.

	<i>Dependent variable:</i>		
	Mug WTA (1)	Spotify WTA (2)	Amazon WTA (3)
Now	1.300 (0.831)	11.110*** (2.803)	4.730*** (1.578)
Day	2.114*** (0.811)	14.058*** (2.736)	4.700*** (1.541)
Week	0.607 (0.820)	14.369*** (2.766)	6.868*** (1.557)
Month	2.393*** (0.823)	13.953*** (2.776)	5.359*** (1.563)
Framing	2.911*** (0.525)	-1.462 (1.771)	1.009 (0.997)
Male	0.865* (0.513)	-1.612 (1.731)	-0.433 (0.974)
Age	0.007 (0.028)	-0.084 (0.093)	-0.058 (0.052)
Canada	-0.082 (1.420)	3.155 (4.790)	-5.181* (2.697)
Ireland	-1.316 (1.544)	-0.292 (5.209)	-2.986 (2.933)
Italy	-1.060 (5.129)	10.305 (17.306)	-1.201 (9.744)
New Zealand	-1.888 (2.223)	-3.088 (7.501)	-2.919 (4.223)
United Kingdom	-2.152* (1.298)	-1.815 (4.380)	-3.766 (2.466)
United States	-0.428 (1.243)	-0.122 (4.194)	-3.982* (2.361)
Constant	4.336*** (1.444)	82.583*** (4.873)	17.386*** (2.743)
Observations	394	394	394
R ²	0.150	0.110	0.077
Adjusted R ²	0.121	0.079	0.046
Residual Std. Error (df = 380)	4.913	16.578	9.334
F Statistic (df = 13; 380)	5.170***	3.606***	2.450***

Note: Standard deviations in parentheses

*p<0.1; **p<0.05; ***p<0.01

Table 5: Regression analysis of assets valuations

6 Discussion and concluding remarks

The results of our analysis are twofold. First, the emergence of the Instant Endowment Effect is documented for all types of goods. While in the case of tangible goods this is now a unanimously accepted fact, with respect to both non-tangible goods and exchange goods the literature has not yet reached consensus conclusions. In particular, the evidence we have documented of an endowment effect for non-material goods calls into question the fact that this phenomenon must be primarily attributable to the physical possession of the good itself and not to the abstract attribution of a property right over it. As far as exchange goods are concerned, so far the

emergence of the endowment effect was traced back to some form of uncertainty about the value of the good itself, which in our case is not present since the nominal value of the Amazon voucher is certain: it remains to be ascertained whether an element of uncertainty may depend on a lack of familiarity with the electronic marketplace where this voucher can be spent, a hypothesis that deserves further future investigation.

Second, regarding the effect of prolonged possession on the endowment effect, the results are less clear. While some upward trend in this effect over time is detected, the results do not exhibit the regularity patterns we would expect. One possible, obvious inference is that the effects of prolonged possession may not be unambiguous. On the other hand, these ambiguities could also be the result of the particular approach we have followed in this paper. Indeed, one possible explanation for this absence of the expected regularities is that the design of the questionnaire was not sufficiently effective in inducing in the subjects the necessary identification with the situation represented. Indeed it is well known that individuals have difficulty predicting the impact that experienced emotions (affects) may have on their decisions (see Loewenstein et al., 2003 about the *projection bias* and Bardsley et al., 2010, §6.4.3 for a more comprehensive discussion), and the same may be true in our case where the subtle differences induced by prolonged possession of an asset may be difficult to anticipate in the absence of actual experience.

A second source of disruption, although related to the previous one, might be the absence of incentives, which are often necessary to motivate subjects toward tasks of higher cognitive effort such as imagining the consequences of different time scenarios. The large variance of the data we collected could be a symptom of this fact: for example, Smith and Walker (1993) and Camerer and Hogarth (1999) show that one of the most robust effects of the presence of incentives in the experimental setting is to reduce the variance of the data collected, especially in judgment tasks that are responsive to better effort. These considerations lead us to believe that an interesting possible development of this study is to organize an incentivized experiment: many of the questions left unanswered could in this way find an answer.

7 Appendix: Questionnaire screenshots

1. The following set of 16 screenshots shows the full path presented to participants in the “Buyer” condition who successfully completed the questionnaire.

Welcome

This study is part of academic research that aims at understanding how people evaluate objects/services.
The potential benefit of the study is a better scientific comprehension of the psychological underpinnings that govern economic decision-making.

The task
You will have to answer at most 7 questions followed by a short survey.
We ask that you focus on the task, empathize with the situations described, and try to avoid any distractions.

Risks and Benefits
Your participation in this study does not involve any specific physical or emotional risk to you.
You have the right to withdraw your consent or discontinue participation at any time for any reason.
Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled.
You will receive the specified compensation after the study is completed.

Your privacy
No personal or identifying information will be collected during the study.
Your data will be anonymous and confidential, meaning that any information you provide cannot be traced back to you.
The results of this study may be published in journal articles and/or presented at conferences.

Contact
You can reach out to the researcher (Vincenzo Valori, email: vincenzo.valori@unifi.it) if you have any questions related to this study.

Clicking on the **I Agree** button below indicates that:

- You have read the above information;
- You are at least 18 years old;
- You voluntarily agree to participate.

If you do not wish to participate in this research study, please decline participation by clicking on the **I Disagree** button.

I Agree

I Disagree




Figure 5: Welcome and consent form

Instructions

Please read carefully

In the following questionnaire, you will be asked to say, for a certain asset that will be shown and described to you, whether you would rather **get the asset**, or **get a certain amount of money**.

Your answers will be collected in tables similar to the one you can see below.

In each row, corresponding to a certain amount of money, you will have to tick the box corresponding to the alternative you choose.

RULES:

In your answers you are allowed to:

- 1) **Always choose to get the asset.**
- 2) **Always choose to get the money.**
- 3) Choose to **get the asset up to a certain amount of money offered, and to get the money for any amount above that.**

So you can either stick to the same choice in all rows or choose "get the asset" up to a certain row and "get the money" from then on.

Instead, you are not allowed to choose "get the money" in one line and "get the asset" in the following one.

TO GO TO THE QUESTIONNAIRE:

We now ask you to demonstrate that you have understood the instructions.

Fill in the following table as you wish, but in such a way as to **comply with the rules above**. If you fail to do so, **you will be excluded from the questionnaire**.

	Get the asset	Get the money
\$ 10.00	<input type="radio"/>	<input type="radio"/>
\$ 20.00	<input type="radio"/>	<input type="radio"/>
\$ 30.00	<input type="radio"/>	<input type="radio"/>
\$ 40.00	<input type="radio"/>	<input type="radio"/>
\$ 50.00	<input type="radio"/>	<input type="radio"/>



Figure 6: Buyers' instructions and comprehension check

Try to imagine the following situation

You have been shown this porcelain mug.



Immediately after, you have the opportunity to get the mug or to get some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between getting the mug or getting the money.

	Get the mug	Get the money
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 6.00	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input type="radio"/>
\$ 12.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>



Figure 7: Mug WTP elicitation, first stage



You have chosen to get the porcelain mug when the amount offered is \$ 6.00 or less, and to get the money when the amount offered is \$ 9.00 or more.
Please refine your choice for values between \$ 6.00 and \$ 9.00.

	Get the mug	Get the money
\$ 6.00	<input checked="" type="radio"/>	<input type="radio"/>
\$ 6.50	<input type="radio"/>	<input type="radio"/>
\$ 7.00	<input type="radio"/>	<input type="radio"/>
\$ 7.50	<input type="radio"/>	<input type="radio"/>
\$ 8.00	<input type="radio"/>	<input type="radio"/>
\$ 8.50	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input checked="" type="radio"/>



Figure 8: Mug WTP elicitation, second stage, interval 6-9

Try to imagine the following situation

You have been shown this Spotify Premium Card, allowing to have full access to the music streaming service for 3 months.



Immediately after, you have the opportunity to get the Spotify Premium Card or to get some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between getting the Spotify Premium Card or getting the money.

	Get the Spotify Premium Card	Get the money
\$ 5.00	<input type="radio"/>	<input type="radio"/>
\$ 10.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>
\$ 20.00	<input type="radio"/>	<input type="radio"/>
\$ 25.00	<input type="radio"/>	<input type="radio"/>



Figure 9: Spotify WTP elicitation, first stage



You have chosen to get the Spotify Premium Card when the amount offered is \$ 25.00 or less.
Please refine your choice for values above \$ 25.00.

	Get the Spotify Premium Card	Get the money
\$ 25.00	<input checked="" type="radio"/>	<input type="radio"/>
\$ 26.00	<input type="radio"/>	<input type="radio"/>
\$ 27.00	<input type="radio"/>	<input type="radio"/>
\$ 28.00	<input type="radio"/>	<input type="radio"/>
\$ 29.00	<input type="radio"/>	<input type="radio"/>
\$ 30.00	<input type="radio"/>	<input type="radio"/>



Figure 10: Spotify WTP elicitation, second stage, interval 25-30

Try to imagine the following situation

You have been shown this Amazon Gift Card worth \$100.00, which can be spent on the Amazon web store.



Immediately after, you have the opportunity to get the Amazon Gift Card or to get some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between getting the Amazon Gift Card or getting the money.

	Get the Amazon Gift Card	Get the money
\$ 50.00	<input type="radio"/>	<input type="radio"/>
\$ 60.00	<input type="radio"/>	<input type="radio"/>
\$ 70.00	<input type="radio"/>	<input type="radio"/>
\$ 80.00	<input type="radio"/>	<input type="radio"/>
\$ 90.00	<input type="radio"/>	<input type="radio"/>



Figure 11: Amazon WTP elicitation, first stage



You have chosen to get the Amazon Gift Card when the amount offered is \$ 80.00 or less, and to get the money when the amount offered is \$ 90.00.

Please refine your choice for values between \$ 80.00 and \$ 90.00.

	Get the Amazon Gift Card	Get the money
\$ 80.00	<input checked="" type="radio"/>	<input type="radio"/>
\$ 82.00	<input type="radio"/>	<input type="radio"/>
\$ 84.00	<input type="radio"/>	<input type="radio"/>
\$ 86.00	<input type="radio"/>	<input type="radio"/>
\$ 88.00	<input type="radio"/>	<input type="radio"/>
\$ 90.00	<input type="radio"/>	<input checked="" type="radio"/>



Figure 12: Amazon WTP elicitation, second stage, interval 80-90

Additional question

You have been shown this closed ACME parcel.



It is important for us that you pay attention in this study.

Please answer this question by ticking "Get the money" in all the lines.

Otherwise, the questionnaire will not be considered valid and you will not be paid.

	Get the box	Get the money
\$ 1.00	<input type="radio"/>	<input type="radio"/>
\$ 2.00	<input type="radio"/>	<input type="radio"/>
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 4.00	<input type="radio"/>	<input type="radio"/>
\$ 5.00	<input type="radio"/>	<input type="radio"/>



Figure 13: Attention check question, buyers' version

A quick final survey and you are done!

Have you ever heard about online music streaming services?

YES

NO



Figure 14: Final survey, part 1, question 1

Do you already have a subscription to some music streaming/download service?

YES, to Spotify

YES, to another music streaming/download service (iTunes, Deezer, ...)

NO



Figure 15: Final survey, part 1, question 2

How often do you shop on amazon?

Never bought anything on Amazon

Occasionally

Regularly



Figure 16: Final survey, part 1, question 3

Are you an Amazon Prime subscriber?

YES

NO



Figure 17: Final survey, part 1, question 4

Before we conclude...

It is important for us to understand if the way the questions were presented is effective for our purposes.

If you have an extra minute and would like to help us, we would like to ask you (at most) 2 more questions that can help us understand and possibly improve our research. If so, please select "YES".

Otherwise, select "NO" to go to the end.

Thank you anyway for participating in our survey.

YES, I want to help.

NO, let me go to the end of the survey.



Figure 18: Final survey, part 2, consent

In one question, you were asked to decide whether to get the **mug** or the money (for different possible amounts).

Your answer gives us a measure of how desirable the mug is to you.

Specifically, you were asked to give your assessments "**immediately after**" seeing the mug.

Do you think your answers would have been different if you had been asked to decide "**after one day**" (or "**after one week**", or "**after one month**")?

YES, I think that my answers could have been different as a consequence of a different time period specified in the question

NO, I think the specific time period stated in the question was irrelevant.



Figure 19: Final survey, part 2, question 1, buyers' version



Help us to understand how a different time scenario might have affected your answer.

Use the following table to compare how desirable the mug would have appeared to you compared to the "immediately after" case in the other time scenarios.

For example, by selecting the column "little less" in the row "after one day", you mean that the mug would have been a little less desirable to you with respect to the "immediately after" case.

	much less	less	little less	about the same	little more	more	much more
Immediately after	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After one day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After one week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After one month	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Figure 20: Final survey, part 2, question 2, buyers' version

2. The following set of 6 screenshots shows examples of the alternative versions for the instructions, choice page, and attention check in the other treatment conditions.

Instructions
Please read carefully

In the following questionnaire, you will be asked to say, for a certain asset that will be shown and described to you, whether you would rather **keep** it, or **trade** it in exchange for a certain amount of money.

Your answers will be collected in tables similar to the one you can see below.
In each row, corresponding to a certain amount of money, you will have to tick the box corresponding to the alternative you choose.

RULES:

In your answers you are allowed to:

- 1) **Always choose to keep** the asset.
- 2) **Always choose to trade** the asset.
- 3) Choose to **keep the asset up to a certain amount of money offered, and to trade it for any amount above that.**

So you can either stick to the same choice in all rows or choose "keep" up to a certain row and "trade" from then on.

Instead, you are not allowed to choose "trade" in one line and "keep" in the following one.

TO GO TO THE QUESTIONNAIRE:

We now ask you to demonstrate that you have understood the instructions.

Fill in the following table as you wish, but in such a way as to **comply with the rules above**. If you fail to do so, **you will be excluded from the questionnaire**.

	Keep	Trade
\$ 10.00	<input type="radio"/>	<input type="radio"/>
\$ 20.00	<input type="radio"/>	<input type="radio"/>
\$ 30.00	<input type="radio"/>	<input type="radio"/>
\$ 40.00	<input type="radio"/>	<input type="radio"/>
\$ 50.00	<input type="radio"/>	<input type="radio"/>



Figure 21: Sellers' instructions and comprehension check

Try to imagine the following situation

You have been given this porcelain mug.



Immediately after, you have the opportunity to trade your mug for some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between keeping the mug or trading it.

	Keep	Trade
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 6.00	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input type="radio"/>
\$ 12.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>



Figure 22: Mug WTA elicitation, first stage

Try to imagine the following situation

You have been given this porcelain mug.



PAY ATTENTION. THIS IS IMPORTANT!

Please think about the following situation for 10 seconds

You keep it for **one day**, in which you have the opportunity to observe it at your leisure (without using it), and imagine how and where to use it.

After one day, you have the opportunity to trade your mug for some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between keeping the mug or trading it.

	Keep	Trade
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 6.00	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input type="radio"/>
\$ 12.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>



Figure 23: Mug WTA elicitation, one day ownership, first stage

Try to imagine the following situation

You have been given this porcelain mug.



PAY ATTENTION. THIS IS IMPORTANT!

Please think about the following situation for 20 seconds

You keep it for **one week**, in which you have the opportunity to observe it at your leisure (without using it), and imagine how and where to use it.

After one week, you have the opportunity to trade your mug for some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between keeping the mug or trading it.

	Keep	Trade
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 6.00	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input type="radio"/>
\$ 12.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>



Figure 24: Mug WTA elicitation, one week ownership, first stage

Try to imagine the following situation

You have been given this porcelain mug.



PAY ATTENTION. THIS IS IMPORTANT!
Please think about the following situation for 30 seconds

You keep it for **one month**, in which you have the opportunity to observe it at your leisure (without using it), and imagine how and where to use it.

After one month, you have the opportunity to trade your mug for some money.

Below is a table with different lines for different amounts of money.

For each amount of money, make your choice between keeping the mug or trading it.

	Keep	Trade
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 6.00	<input type="radio"/>	<input type="radio"/>
\$ 9.00	<input type="radio"/>	<input type="radio"/>
\$ 12.00	<input type="radio"/>	<input type="radio"/>
\$ 15.00	<input type="radio"/>	<input type="radio"/>



Figure 25: Mug WTA elicitation, one month ownership, first stage

Additional question

You have been given this closed ACME parcel.



PAY ATTENTION. THIS IS IMPORTANT!
It is important for us that you pay attention in this study.

Please answer this question by ticking "trade" in all the lines.

Otherwise, the questionnaire will not be considered valid and you will not be paid.

	Keep	Trade
\$ 1.00	<input type="radio"/>	<input type="radio"/>
\$ 2.00	<input type="radio"/>	<input type="radio"/>
\$ 3.00	<input type="radio"/>	<input type="radio"/>
\$ 4.00	<input type="radio"/>	<input type="radio"/>
\$ 5.00	<input type="radio"/>	<input type="radio"/>



Figure 26: Attention check question, sellers' version

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