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# Understanding the WTA-WTP Gap through Attitudes, Feelings, Uncertainty and Personality

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## Abstract

We present an experiment designed to study the psychological basis for the willingness to accept (WTA)-willingness to pay (WTP) gap. Specifically, we conduct a standard WTA-WTP economic experiment to replicate the gap and include in it 5 additional instruments to try to follow the psychological processes producing it. These instruments are designed to measure 5 psychological constructs we consider especially relevant: 1) attitudes, 2) feelings, 3) familiarity with the target good, 4) risk attitudes and 5) personality. Our results provide important new insights into the psychological foundations of the WTA-WTP disparity, which can be used to organize some major previous results and cast serious doubts on the claim that the gap might be just a consequence of inappropriate experimental practice.

*JEL classification:* C91; D03

*PsycINFO classification:* 3920

*Keywords:* Behavioural economics; Choice behaviour; Decision making

## 1. Introduction

The disparity between willingness to accept (WTA) and willingness to pay (WTP) measures of value is without a doubt one of the most widely documented phenomena in behavioural economics. Typically, individuals who are endowed with an object require a minimum amount of money for giving it up (WTA) which is substantially higher than the maximum amount individuals who are not endowed with it are willing to pay to acquire the same object (WTP). This WTA-WTP gap is strongly at odds with most traditional economic approaches, according to which endowment should not affect valuations, beyond the minor difference in wealth position it usually implies. In fact, the WTA-WTP disparity has been one of the most important empirical phenomena supporting the spread of reference-dependent approaches within economics and decision research, most prominently Prospect Theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992) and its related reference-dependent model for riskless choice (Tversky and Kahneman, 1991).

During the last decades, WTA-WTP gaps have been reported in hundreds of experiments, studied under a myriad of conditions, explained from numerous points of

view and also been the centre of some important controversies (see Horowitz and McConnell, 2002, for a review). Regarding the latter, it is of special significance a prominent line of research within economics which purports to show that the WTA-WTP disparity and similar exchange asymmetries are just a consequence of mistakes made by inexperienced subjects (see, for example, Knez et al., 1985; Bookshire and Coursey, 1987; Coursey et al., 1987; Shogren et al., 1994; List, 2003, 2004) or even merely the consequence of different instances of inappropriate experimental practice (see, for example, Plott and Zeiler, 2005, 2007).<sup>1</sup> So, it is fair to say that, despite the overwhelming volume of evidence on the WTA-WTP gap accumulated to date, researchers are still far from agreement on the nature of the disparity and even on its very existence.

In this paper, we present an experiment designed to study the psychological basis for the WTA-WTP gap. Our strategy is to conduct a standard incentive compatible WTA-WTP economic experiment with market goods (in this case, bottles of wine) to replicate the disparity, including in it 5 additional instruments aimed at identifying the psychological processes producing it. The instruments we introduce are intended to measure 5 psychological constructs we consider especially important: 1) subjects' attitudes towards the target good, before and after receiving it, 2) subjects' feelings about owning the good, 4) subjects' familiarity with the good, 3) subjects' risk attitudes and 5) subjects' personalities. A better understanding of the psychological foundations for the gap will in turn provide: (i) an improved comprehension of the circumstances under which it can be expected to appear, (ii) a better assessment of the different conflicting positions about it and (iii) sounder criteria for model building and selection.

There are numerous previous studies relating the WTA-WTP disparity to specific psychological processes. An exhaustive review of them is beyond the scope of the present paper. The additional instruments we introduce in our experiment, and the constructs we measure through them, are especially well suited to test some specific hypotheses about the psychological foundations of the WTA-WTP gap. A brief explanation of these hypotheses and their relationship to the relevant literature is given in section 2.2, after the experimental design is explained in detail.

Our results demonstrate that attitude change, of any kind, is not a necessary condition for the WTA-WTP disparity to appear, as some researchers have claimed. On the contrary, an enhancement in subjects' positive feelings produced by receiving and getting to own the target good seems to account for an important part of the gap. Aversion to loss generated by uncertainty regarding the target good is the other main source for the disparity we identify. We also find that different personality profiles are associated with high/low monetary valuations in the WTA and WTP treatments, which shows that the type of individuals giving high/low valuations to the good changes with endowment. Finally, our results confirm our most fundamental hypothesis that two different phases contribute to the WTA-WTP disparity, which correspond to different psychological processes: a) a first *phase of ownership* and b) a second *phase of possible loss*.

These findings show a psychological complexity behind the WTA-WTP gap which is rarely taken into account and provide a useful guide to organize some important previous results (see section 4). They also suggest that repeated market interaction and exhaustive experimental control (in the Plott and Zeiler's, 2005, sense) can be devices

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<sup>1</sup> It is important to note that Plott and Zeiler's (2005) results have been recently strongly challenged by Isoni et al. (Forthcoming).

that reduce the disparity by undermining the necessary psychological underpinnings for it to appear. So, it might be misguided to claim that these devices elicit more “true” preferences. They just elicit different preferences, triggered by different psychological processes, which do not correspond with the only situations of interest to economics.

In section 2, we explain the experimental design, elaborate on the main hypotheses the experiment is intended to test and relate them briefly to the relevant literature. In section 3, the results are presented and, in section 4, their main implications are discussed.

## 2. The experiment

### 2.1. Design

Our experimental design revolves around what can be considered one of the standard versions of a WTA-WTP economic experiment. Specifically, we implemented a between-subjects design with two different treatments. One of them is the *Choice treatment*, in which subjects valued the target good without being endowed with it. This treatment would normally be labelled as WTP treatment, but the particular elicitation mechanism we employed (explained below) made us substitute “WTP” by “Choice”. The other one is the *WTA treatment*, in which subjects valued the same target good after being endowed with it. The only difference between the two treatments is endowment.

The target good used in the experiment was a bottle of cheap Spanish red wine, with a retail price of 2.75€ The experiment was run in Spain, so the good was a really common product with plenty of substitutes. However, the enormous quantity of red wines available in Spain made it very unlikely that subjects knew the price of this specific product.

The elicitation mechanism used to obtain the monetary valuations for the good was a version of the Becker-DeGroot-Marschak (1964) procedure (BDM). Every subject was given a table with a list of monotonically increasing amounts of money, ranging from 0€ to 10€ in steps of 0.25€ In the Choice treatment, subjects had to state for every amount if they preferred the bottle of wine displayed in front of them or the money.<sup>2</sup> In the WTA treatment, subjects had to state for every amount if they preferred to keep the bottle they had been endowed with or to exchange it for the money. In general, this procedure generated a single switch point from preferring the bottle to preferring the money, which represents the Choice price in the Choice treatment and WTA in the WTA treatment. It is important to note that this elicitation mechanism puts subjects in both treatments in virtually the same wealth position and avoids also misconceptions produced by framing the tasks as buying and selling. In this context, it seems reasonable to label the first treatment as Choice treatment instead of WTP treatment.<sup>3</sup>

At the end of the sessions, one of the amounts of money in the list was selected at random and subjects received their final payoffs according to their choice for that particular amount. If they had stated that they preferred the bottle, they were actually given the bottle in the Choice treatment and they just kept the bottle in the WTA

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<sup>2</sup> In the Choice treatment, there was a bottle of wine for every three subjects in the room and they could examine it before making their decisions.

<sup>3</sup> This elicitation procedure has been used in some other studies before (see, for example, Loewenstein and Adler, 1995; Strahilevitz and Loewenstein, 1998; Lerner et al., 2004).

treatment. If, on the contrary, they had chosen the money, they were given the selected amount. In the WTA treatment, they also had to give up the bottle in this case. In addition to that, every subject was given a show-up fee of 5€ for participating in the study.

This basic part of the experiment was intended to replicate the WTA-WTP disparity using a standard design, while avoiding misconceptions as much as possible. Additionally, 5 other instruments were included in the experiment to try to follow the psychological processes producing the WTA-WTP gap. Let us explain them one by one.

*1) Measurement of subjects' attitudes towards the target good, before and after receiving it.*—Two different attitude measurements were performed in both treatments. The first one (AM1) was done at the beginning of the sessions, before subjects in the WTA treatment received the bottle of wine (see table 3 for the exact structure of the experimental sessions). It consisted of 5 different items, all of which were 7 point Likert-type scales from -3 to 3, with a neutral point at 0. The 5 items were designed to measure general liking, attitude towards having the good, attractiveness, design and quality.<sup>4</sup>

The second attitude measurement (AM2) was done after subjects in the WTA treatment had already received the good and owned it for a few minutes (see table 3). It consisted of 6 different items, all of which were 7 point Osgood-type (or semantic differential) scales from -3 to 3, with a neutral point at 0. The 6 items were designed to measure appearance, attractiveness, quality, taste, refinement and general liking.

It is important to note that although the two different attitude measurements are aimed at characterising subjects' attitudes towards the target good (before and after owning it respectively), direct within-subject comparisons between them are not really meaningful. Each measurement deliberately follows the logic of a different elicitation mechanism (Likert-type versus Osgood-type psychometric scales, see companion electronic paper) and the items contained in them do not measure exactly the same constructs. This methodology fits well the between-subjects nature of standard WTA-WTP experiments like the one replicated in the present paper and it also minimizes the possibility of contamination between the two different attitude measurements.

*2) Measurement of subjects' feelings about owning the good.*—The measurement of subjects' feelings about owning the good (FM) was performed in both treatments, after subjects in the WTA treatment had already received the good and owned it for a few minutes (see table 3). It consisted of 8 different items, 4 measuring positive feelings and 4 measuring negative ones. All of the items were 4 point adjective rating scales from 0 to 3. The positive adjectives were happy, pleased, good and excited. The negative ones were upset, uncomfortable, awkward and bad.

Adjective rating scales have a long tradition in emotion research and they have been shown to successfully capture individuals' feelings in a wide range of domains (see Larsen and Fredrickson, 1999, for an overview). The fact that subjects rate adjectives representing feelings makes them fundamentally different from attitude-measurement scales. Note also that although feelings are ideally measured right after they are produced, adjective rating scales can be expected to elicit meaningful self-reported feelings following considerable time spans (see Larsen and Fredrickson, 1999).

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<sup>4</sup> The exact wording of all the items can be found in appendix C.

3) *Measurement of subjects' familiarity with the good.*—The measurement of subjects' familiarity with the target good was done using a binary item presented at the end of the first attitude measurement (AM1). Specifically, subjects were asked “under normal conditions, would you buy a bottle of wine like this one?”

4) *Measurement of subjects' risk attitudes.*—A measurement of subjects' risk attitudes was performed, using the multiple-lottery choice task displayed in table 1.<sup>5</sup> The task consists of ten different lotteries, every one of which is represented in one of the rows of the table. In every lottery subjects can win a certain amount of money ( $x$ ) with a certain probability ( $p$ ) and otherwise (with probability  $1 - p$ ) nothing. What subjects have to do is to choose (and mark) one of the ten lotteries. The winning probabilities go from 1 to 0.1 in steps of 0.1 and the amount associated to each probability is constructed according to the following expression:

$$E(L_i) = p_i \cdot x_i = c + (1 - p_i) \cdot t, \tag{1}$$

$$\Rightarrow x_i = \frac{c + (1 - p_i) \cdot t}{p_i},$$

where  $E(L_i)$  is the expected value of lottery  $L_i$ , with  $i \in \{1, \dots, 10\}$  designating one of the 10 lotteries in the table.  $c$  is a constant which is fixed in this case to 1€ Finally, parameter  $t$  can be interpreted as introducing a risk premium, which generates an increase in the lotteries' expected values as we move from safer to riskier options. The premium increases with the value of  $t$ . In this case  $t = 10$ , so that the approximate increment in expected value between two adjacent lotteries is 1. In other words, the table begins with a sure amount of 1€ which is increased as winning probabilities are decreased, resulting in linear increments in expected values as we move downwards along the table.

The structure of the task implies that choosing lotteries closer to the top of the table means being more risk averse. All risk neutral and risk loving subjects should choose the lottery at the bottom of the table. Intuitively, refusing a higher expected value to avoid a higher risk of getting 0 means being more risk averse. Table 2 shows the coefficients of relative risk aversion implied by choosing each one of the lotteries, assuming the following standard utility function with constant relative risk aversion (CRRA):

$$U(x) = \frac{x^{1-r}}{(1-r)}, \tag{2}$$

where  $r$  is the coefficient of relative risk aversion. As can be seen in table 2, the coefficients decrease as we move downwards along the table. So, choosing closer to the top means being more risk averse.

The measurement of risk attitudes was done as a part of different experimental sessions run a few weeks before with the same subjects. In those sessions, what is

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<sup>5</sup> This task was originally introduced by Sabater-Grande and Georgantzís (2002). Thereafter, it has been also used in other experiments on choice under risk (see, for example, Brañas et al., 2007; Brañas et al., 2008).

known as the “random-lottery incentive system” (see Starmer and Sugden, 1991; Cubitt et al., 1998) was applied, so that subjects were paid according to the result of playing out the lottery they had selected in one of the choices they made during the session. None of those sessions involved WTP or WTA tasks or consumer goods of any type.

5) *Measurement of subjects’ personalities.*—Subjects’ personalities were measured using the NEO Five-Factor Inventory (NEO-FFI) (Costa and McCrae, 1992), which is a reduced version of the Revised NEO Personality Inventory (NEO PI-R) (Costa and McCrae, 1992). The NEO PI-R is one of the most widely used, studied and accepted personality tests nowadays. Both the NEO PI-R and the NEO-FFI measure what is known as the “Big Five” personality factors. The Five Factor Model (FFM) of personality is a purely descriptive, empirically-driven, model of human personality over which psychologists in the field have reached considerable consensus during the last decades. The model comes from a long tradition of data-driven personality research based on factor analysis and its success in predicting behaviour has been shown in numerous studies and domains (see John and Srivastava, 1999, for a review). The Big Five factors are Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A) and Conscientiousness (C).

The NEO-FFI consists of 60 items, all of which are 5 point Likert-type scales from “strongly disagree” to “strongly agree”. The items are always statements proved to be representative of particular personality traits. Subjects in both treatments responded to this test.

Table 3 shows the exact structure of the experimental sessions. All of them began with a general explanation of the experiment. After that, every single part was thoroughly explained before subjects started responding to it. Before the elicitation of the monetary valuations, the incentive system was explained in detail and subjects were given an example of the consequences of their decisions. The whole experiment was conducted using pen and paper. A total of 102 students of the University Jaume I, Castellón, Spain, participated in the experiment, 53 of them in the Choice treatment and 49 in the WTA treatment.

## 2.2. Hypotheses

The 5 additional instruments we introduce in the basic WTA-WTP experiment are especially well suited to test some specific hypotheses about the psychological processes producing the WTA-WTP gap. This section presents the main hypotheses tested and places them within the relevant literature. It is important to note that, as will be shown in section 3, our experiment provides more interesting results than just a test of these hypotheses. However, they are useful as main points around which the design and the results revolve.

There are 6 main hypotheses we test, which we will call *H1*, *H2.1*, *H2.2*, *H3*, *H4* and *H5*. *H1* is more fundamental and general in nature than the rest and *H5* is qualitatively different in that it refers to individual heterogeneity in WTP and WTA measures. Table 4 contains a summary of the hypotheses and the instruments involved in testing them. Let us now discuss them one by one.



*H1.—2 different phases contribute to the WTA-WTP gap, which correspond with different psychological processes: A) a first phase of ownership and B) a second phase of possible loss.*

At present, the most widely used psychological explanation for the WTA-WTP gap is by far prospect theory's idea of loss aversion (see Kahneman and Tversky, 1979; Tversky and Kahneman, 1991; Tversky and Kahneman, 1992). This account of the disparity was first proposed by Thaler (1980), who coined for it the popular term "endowment effect". Since then, the loss aversion explanation has been repeatedly used within economics as a loosely defined psychological concept, meaning just that, for some reason, when an individual is endowed with an object he/she automatically values it more monetarily than if he/she is not endowed with it.

However, if we analyse the WTA-WTP disparity in detail from a psychological point of view, it is easy to distinguish two completely different sources for what economists have roughly labelled as loss aversion. The first comes from the fact that endowing subjects with the target good might somehow enhance the value they attach to it and this, in turn, could get reflected in WTA. This source of an increase in WTA has nothing to do with loss aversion, understood as an actual aversion to losing the good. Actually, it does not even require that subjects are faced with the possibility of losing it. This possible source of a gap between WTA and WTP comes from an initial stage, in which subjects are endowed with the good and just own it. We will call this stage *phase of ownership*.

The possibility that a gap is generated in the phase of ownership relates the WTA-WTP disparity to phenomena like the "perceived ownership" (Heider, 1958) and "mere ownership" (Nuttin, 1987) effects. These phenomena have been widely documented in the psychological literature, almost always in the context of non-incentive compatible experiments focused exclusively on the phase of ownership (see, for example, Belk, 1988; Feys, 1991, 1995; Beggan, 1992; Aidman, 1999; Nesselroade et al., 1999). Normally, WTP and WTA are not even elicited in this kind of studies.

The second possible source of a disparity between WTA and WTP comes from the fact that WTA valuations are, by definition, always elicited by facing subjects with the possibility of losing the good they have been endowed with. Specifically, subjects are always asked to state the minimum compensation for which they would be willing to give up the good. So, the possibility of losing it is intrinsic to the elicitation of WTA. Facing this possibility can generate some kind of aversion to loss, which in turn can be reflected on WTA. This second source of the disparity could be regarded as "real loss aversion", from a psychological point of view. Real loss aversion is completely different from the enhancement in value that might appear in the phase of ownership and it corresponds to a posterior stage, which we will call *phase of possible loss*.

This crucial distinction between the phase of ownership and the phase of possible loss in research on the WTA-WTP disparity has been broadly overlooked both in economics and in psychology. The idea behind *H1* is precisely to determine if these two different phases contribute to the WTA-WTP gap. *H1* is a fundamental and general hypothesis that will be tested indirectly through the results for hypotheses *H2.1* to *H5*.

Once these two main phases have been identified, the question turns to which specific psychological processes could be generating a gap in each one of them. This takes us to the next hypotheses tested.

*H2.1.—In phase A, a gap is generated through a general attitude change towards the target good.*

One of the main possibilities for a gap between WTA and WTP treatments to be generated in phase A (the phase of ownership) is that subjects in WTA treatments engage in attitude change. Specifically, the fact of receiving the target good in the experiment and owning it could modify subjects' attitude towards it. Such an attitude change could for example be produced by an association of the good with the self (see Gawronski et al., 2007) or by starting to treat the target good as a social entity (see Beggan, 1992). *H2.1* is concerned with testing if such a change in subjects' attitudes towards the good is actually one of the sources of the WTA-WTP gap. This hypothesis can be tested directly through the second attitude measurement (AM2). If attitude change is one of the sources of the disparity, the scores for AM2 in the WTA treatment should be higher than the scores in the Choice treatment.

As has been indicated before, there is virtually no previous evidence on the contribution of the phase of ownership in the context of WTA-WTP experiments. An interesting exception to this is study 4 in Strahilevitz and Loewenstein (1998), in which the authors elicited attractiveness ratings as well as incentive compatible monetary valuations for mugs. Their results are somewhat unclear. While, in their experiment, attractiveness does not seem to change instantaneously with endowment, it changes with the duration of ownership.<sup>6</sup>

*H2.2.—In phase A, a gap is generated through an attitude change towards the target good produced by cognitive dissonance.*

Closely related to *H2.1* (the general attitude change hypothesis) is the more specific hypothesis that there could be an attitude change in phase A produced by cognitive dissonance (Festinger, 1957).<sup>7</sup> Specifically, dissonance could result from an inconsistency between a negative, or non-positive, pre-existing attitude towards the target good and the act of receiving it and accepting to own it, in principle as something good, in the experiment. That dissonance in turn could lead subjects in the WTA treatment to adjust their attitudes towards the target good to reduce it. A crucial difference between this hypothesis and *H2.1* is that, if cognitive dissonance is producing the attitude change, only subjects with non-positive pre-existing attitudes towards the good would be engaging in it. This would have important consequences for the valuation of different types of goods and for the valuations given by different types of subjects. *H2.2* is concerned with testing this specific cognitive dissonance hypothesis of attitude change. In this case, AM1 can be used to divide subjects according to their initial attitudes towards the target good and then AM2 can be employed to conduct between-subjects tests of attitude change in each one of the groups.

To the best of our knowledge, the only study to date that has tested this cognitive dissonance hypothesis is Watson and Winkelmann (2005), but only in the context of a non-incentive compatible experiment focused exclusively on the phase of ownership, in

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<sup>6</sup> Another interesting reference in this respect, in the different domain of the evaluation of time, is Hoorens et al. (1999). In that study, the authors conclude that the endowment effect in the valuation of time is a joint consequence of mere ownership and what we have called real loss aversion.

<sup>7</sup> See Aronson (1992) for an interesting short account of cognitive dissonance theory. For a more thorough analysis of cognitive dissonance research, see Harmon-Jones and Mills (1999).

which monetary valuations were not even elicited. The authors found some support for the hypothesis.

*H3.—In phase A, a gap is generated through a change in subjects' feelings caused by receiving the target good.*

Another main possibility for a gap to be generated in phase A is that there is a change in subjects' feelings when they receive and get to own the target good. Then in turn the enhanced emotional state can produce higher monetary valuations in the WTA treatment. This could produce a gap without attitude change and without real aversion to loss. *H3* is intended to check for this possibility. The measurement of subjects' feelings (FM) can be used to test this hypothesis.

Several recent studies have shown that affectively or emotionally-driven processes are an essential part of WTA-WTP disparities (see, for example, Peters et al., 2003; Lerner et al., 2004; Lin et al., 2006). In fact, Lerner et al. (2004) and Lin et al. (2006) show that inducing negative emotions in individuals can eliminate the WTA-WTP gap, which is absolutely consistent with the idea that an essential part of it comes from an enhancement in subjects feelings produced by receiving and owning the good. If this enhancement is counteracted with a negative emotion, the gap disappears. However, to the best of our knowledge, it has never been shown if such an enhancement actually occurs and if it is related with the monetary valuations.

*H4.—In phase B, a gap is generated by aversion to loss produced by uncertainty regarding the target good.*

The main hypothesis we will put to the test regarding phase B (the phase of possible loss) is that subjects in the WTA treatment experience aversion to loss in that phase produced by uncertainty regarding the target good. Aversion to losing the good, in turn, makes WTA rise. Uncertainty regarding the target good can come from many different sources, like uncertainty about the market price, the value of the good to others, the feelings that giving up the good might produce, the pleasure derived from using the good, etc.

It is important to understand that participants in both treatments are expected to be subject to similar uncertainties, but those uncertainties are hypothesized to affect differently individuals that have been endowed with the good, producing loss aversion and generating the disparity. Like in the standard loss aversion hypothesis, we recognize that endowment situates subjects in a very different psychological position that can result in aversion to loss and we seek to investigate further the processes through which that aversion is produced.

This uncertainty hypothesis is consistent with several theoretical frameworks. It can follow for example from the notion of regret aversion. More uncertainty about a specific good is likely to be associated with more possible regrets. And it is well known that regret is considerably stronger when associated with action, or movement away from a status quo, than when following inaction, or staying in the status quo (see Kahneman and Tversky, 1982; Landman, 1987). Consequently, aversion to regret is expected to lead to a tendency to keep the good in WTA treatments in comparison to WTP treatments. That effect is expected to be stronger under more uncertainty.

The idea of uncertainty about consumer goods generating loss aversion, which in turn generates phenomena like the WTA-WTP disparity, is also one of the main

foundations of the formal model proposed by Loomes et al. (2009). As will be discussed in section 4, this model provides a useful theoretical framework for dealing with some of our results.

We will test the uncertainty hypothesis mainly through the measurement of subjects' familiarity with the good and subjects' risk attitudes. On the one hand, subjects with more familiarity with the target good should feel less uncertainty regarding it, so if *H4* holds, they should feel less aversion to loss and therefore their WTA should be lower. On the other hand, subjects with higher degrees of risk aversion should be more sensitive to uncertainty regarding the good, which in turn should generate more aversion to loss and therefore a higher WTA. As will be shown in section 3, we will also provide some interesting information about this hypothesis through the measurement of subjects' personalities.

The only evidence we are aware of about uncertainty regarding the good producing loss aversion and increasing WTA comes from Brown (2005). This author employs a verbal protocol technique in the context of a WTA-WTP experiment. Specifically, he asks subjects to verbalize why they are choosing their particular WTP and WTA values and also why there is a disparity between them. Brown finds that one of the most frequently given reasons for the gap is some sort of ambiguity or uncertainty regarding the target good.

*H5.—Different types of individuals are associated with high/low valuations in WTP and WTA treatments.*

Existing evidence (as well as the preceding hypotheses) suggests that different psychological processes are involved in producing valuations in WTP and WTA treatments. For instance, only subjects in WTA treatments may experience loss aversion, attitude changes, changes in their feelings, etc. and these psychological processes would in turn affect their valuations. It seems logical that different types of individuals might react differently to these psychological processes and, as a consequence, different types of subjects might be associated with high/low valuations in WTP and WTA treatments. The idea behind *H5* is to analyse whether this is actually the case and which are the types associated with high/low valuations in each treatment. *H5* will be tested mainly through the measurement of subjects' personalities. Some results on *H5* will come also from the measurement of subjects risk attitudes.

To the best of our knowledge, the only study in which personalities are measured in the context of a WTA-WTP experiment is study 2 in Peters et al. (2003). In that experiment, subjects responded to Saucier's (1994) Big Five personality Mini Markers. Authors found only some evidence of high reactivity to negative events (high Big Five Neuroticism, N) being associated with high WTA values.

### **3. Results**

#### *3.1. Choice prices and WTA*

The first question to address is whether the WTA-WTP disparity (in this case, WTA-Choice disparity) was actually replicated with the basic part of the design. As figure 1 shows, the disparity was clearly replicated. The plot for WTA lies markedly on the right of the plot for Choice, which shows that the first is consistently higher. The

statistical significance of the result is strongly confirmed by a Mann-Whitney test ( $p = 0.000$ ). The mean Choice price is 2.87€ and the mean WTA 4.22€, making a WTA/Choice ratio of 1.47. It might seem that this ratio is lower than in previous studies, where the WTA/WTP ratio is on average found to be over 2. However, removing the difference in wealth position and avoiding the buying and selling framing, as our elicitation mechanism does, certainly eliminates two important aspects that are frequently wrongly attributed to endowment. Previous studies using the same elicitation mechanism have reported similar WTA/Choice ratios (see, for example, Loewenstein and Adler, 1995; Strahilevitz and Loewenstein, 1998; Lerner et al., 2004).

Let us now analyse the rest of the results to see what they can tell us about the psychological foundations for the gap we replicated.

### 3.2. Attitudes

To begin with, the second attitude measurement (AM2) can be used to check if a general attitude change towards the target good takes place in the WTA treatment. Table 5 shows that this is clearly not the case.<sup>8</sup> There is no significant disparity in terms of AM2 scores between the Choice and the WTA treatment in any of the 6 items included in the attitude measurement. In some of the cases the sign of the non-significant gap is even reversed. This result rules out any attitude change account of the WTA-WTP gap associated with a general attitude change towards the target good.

To rule out also the cognitive dissonance hypothesis of attitude change, we need to divide the sample according to initial attitudes towards the target good and check if the resulting subgroups are engaging in attitude change. Table 6 shows that, when the sample is subdivided into subjects with non-positive and positive pre-existing attitudes towards the good, using the different items in AM1, none of the subgroups displays a significant disparity between the Choice and the WTA treatment in terms of AM2 scores. This result holds for any combination of the items in AM1 and AM2, with the casual exception of the scores in item 5 in AM2 of the subgroup with positive initial attitudes according to item 2 in AM1.<sup>9</sup>

In addition to that, table 7 shows that all the subgroups according to initial attitudes display significant positive disparities in terms of monetary valuations, that is comparing WTA against Choice prices, with the apparently casual exception of the valuations of the subgroup with non-positive initial attitudes according to item 4 in AM1. Actually, according to the test statistics, it can even be argued that subjects with positive initial attitudes display somewhat stronger disparities, which is the opposite of what the cognitive dissonance hypothesis predicts.<sup>10</sup>

Overall, the results for the attitude measurements show clearly that attitude change, of any kind, either general or by subgroups according to initial attitudes, is not a necessary condition for a WTA-WTP gap to appear. In other words, subjects did not engage in any kind of attitude change but displayed always significant WTA-Choice

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<sup>8</sup> The main numbers reported in the tables are the test statistics and the numbers in brackets the p-values. Statistical significance at the level of 5% is indicated with bold type.

<sup>9</sup> The result is virtually the same when the sample is subdivided into subjects with negative and non-negative initial attitudes towards the target good, instead of positive and non-positive.

<sup>10</sup> Note that detailed descriptive statistics for all the main measurements in the experiment are provided in appendix A, to complement the results reported here in section 3.

disparities. Thus, attitude change does not seem to be an essential part of WTA-WTP gaps.

### 3.3. *Feelings*

Let us next analyse subjects' feelings about owning the good. Figure 2 shows the scores on the first four items of FM, the items designed to measure positive feelings, for the Choice and the WTA treatment. It is easy to see that the plots for the WTA treatment are consistently on the right of the plots for the Choice treatment. This pattern reveals a clear enhancement in subjects' positive feelings about owning the good in the WTA treatment with respect to the Choice treatment, produced by the only difference between the two treatments. Namely, receiving and owning the good.

As the second column in table 8 shows, the statistical significance of this enhancement in subjects' positive feelings is supported by Mann-Whitney tests. Specifically, the difference between the WTA and the Choice treatment is significant at the level of 5% for items 1 and 4, very close to significant at the same level for item 3 and not significant at the usual levels for item 2. Note, however, that figure 2 shows a quite clear displacement to the right of the plot for the WTA treatment for that item too. Notice also that item 2, "pleased", is probably the least positively-laden adjective of the four.

In addition to that, the last column in table 8 shows that the positive feelings about owning the good are positively correlated with monetary valuations. The correlation is statistically significant for all of the items, but item 2.

These results suggest clearly that an enhancement in subjects' positive feelings for receiving and owning the good makes a significant contribution to the WTA-WTP disparity. This aspect of the disparity is not related at all to aversion to loss or, in general, to the phase of possible loss. It clearly corresponds to the preceding phase of ownership.

With respect to the negative feelings about owning the good, we found very low scores and a very low dispersion in all of the items. Very few subjects reported substantial negative feelings about owning the target good and there was no significant difference in that respect between the Choice and the WTA treatment.

### 3.4. *Familiarity and risk attitudes*

We will now analyse jointly familiarity and risk attitudes. This will shed light on the uncertainty hypothesis (*H4*) explained before.

The first important thing to note is that a very interesting pattern of correlations between these two constructs and the monetary valuations emerges when the Choice and the WTA treatment are considered separately. Specifically, table 9 shows that familiarity and risk aversion are virtually not correlated at all with monetary valuations in the Choice treatment, but both of them are significantly correlated with monetary valuations in the WTA treatment. The correlation is negative in the case of familiarity and positive in the case of risk aversion. These results are strongly consistent with the uncertainty hypothesis. In the Choice treatment, subjects are simply not endowed with the target good, so they are not in the position of experiencing loss aversion at any point. In that case, the uncertainty hypothesis does not predict a significant correlation

between familiarity or risk aversion and monetary valuations. In the WTA treatment, people are endowed with the good and then faced with the possibility of losing it, in the phase of possible loss. In that situation, on the one hand, subjects with lower degrees of familiarity with the good will feel more uncertainty regarding it and, according to the uncertainty hypothesis, that will make them experience more loss aversion. That loss aversion will in turn get reflected in monetary valuations. So, subjects with lower degrees of familiarity with the good will report a significantly higher WTA. On the other hand, when more risk-averse subjects face the possibility of losing the good, they are affected stronger by uncertainty regarding it. According to the uncertainty hypothesis, that will make them experience more loss aversion, which in turn will also get reflected in monetary valuations. So, subjects with higher degrees of risk aversion will also report a significantly higher WTA. This is exactly the pattern found in table 9.

Another way of trying to capture these effects is by dividing the sample into people who score low and high on these two constructs and then testing for WTA-Choice gaps in the resulting subgroups. Table 10 shows the result of proceeding that way. For familiarity, the result is again very clear. Subjects with low degrees of familiarity display a highly significant WTA-Choice gap, whereas subjects with high degrees of familiarity do not display a significant gap at all. The result for risk aversion is this time somewhat less clear. Subjects with high degrees of risk aversion display a more significant gap, like the uncertainty hypothesis predicts, but the disparity fails to be significant in any of the subgroups. It is important to note at this point that we do not have measurements of risk attitudes for all of the subjects in the experiment. As indicated in section 2.1, risk attitudes were measured as a part of previous sessions with the same subjects, but we failed to obtain measurements for a number of subjects who did not attend those preceding sessions. Thus, the lack of significance in this case might be a consequence of subdividing the sample and further reducing the number of observations.

Overall, the results for familiarity and risk attitudes provide strong support for the hypothesis that an essential part of the WTA-WTP gap comes from aversion to loss experienced by subjects in the WTA treatment in the phase of possible loss, produced by uncertainty regarding the target good.

### *3.5. Personality*

Finally, let us present the results concerning subjects' personalities. To begin with, table 11 shows the correlations of the different personality factors with the monetary valuations, separating them by treatment. The first major finding observed in table 11 is that, very clearly, different personality profiles are significantly correlated with monetary valuations in the Choice and in the WTA treatment. This confirms our main hypothesis regarding personality. Namely, not only the monetary valuations themselves and the psychological processes leading to them are different, but also the types of subjects having high/low monetary valuations changes with endowment. This finding points at a whole new dimension of WTA-WTP disparities and even of monetary valuations in general, in which the type of people giving high valuations to a particular object depends on endowment.

The particular personality factors appearing as significantly correlated with monetary valuations are agreeableness in the Choice treatment, with a positive sign, and extraversion and conscientiousness in the WTA treatment, both with a negative sign.

Note that all these factors are far from being significant in the opposite treatment, displaying even a reversed sign in all three cases. We do not want to go too far into the interpretation of the specific factors appearing as significant, mainly because they are likely to depend strongly on the type of good. This is especially the case in the Choice treatment, where subjects are not exposed to processes like feelings enhancement and aversion to loss and just value the good without having a special relationship with it. The result for extraversion, however, is of special significance, because it matches the findings for familiarity and risk attitudes explained before and the uncertainty hypothesis supported by them. Specifically, an important personality facet within extraversion is sensation seeking (see Costa and McCrae, 1992), which is basically a more general form of risk seeking, not centred on the monetary domain. So, the fact that subjects with low degrees of sensation seeking give significantly higher monetary valuations in the WTA treatment but not in the Choice treatment reflects exactly the same pattern we find for monetary risk aversion.

Another way of trying to capture these effects is to subdivide the sample into subjects who score low and high on the different personality factors and test then for WTA-Choice gaps in the resulting subgroups. As table 12 shows, the result of proceeding that way matches quite closely the results obtained for the correlations. Specifically, subjects with high degrees of agreeableness and with high degrees of conscientiousness do not display significant WTA-Choice disparities. According to the correlations reported in table 11, on the one hand, subjects with high degrees of agreeableness give significantly higher Choice prices, which should diminish considerably a potential gap between WTA and Choice prices. On the other hand, subjects with low degrees of conscientiousness report a significantly lower WTA, which should also diminish a potential WTA-Choice gap. According to table 11, the same kind of effect should also apply to extraversion. Table 12 shows that the p-value for subjects with high degrees of extraversion is actually close to the 5% limit, but the gap is still significant. Note that among the correlations appearing as significant in table 11, the one for extraversion is the least significant one.

### *3.6. Regression analysis*

Finally, we performed a regression analysis, by treatments, to complement some of the results reported above. Specifically, the results of two linear regressions, using a robust variance calculation with the bias correction  $n/(n - k)$ , are reported in table 13.<sup>11</sup> These regressions lend additional support to the effects identified in the preceding sections for the variables included in them, which are essentially familiarity and the Big Five personality factors. The first item in the first attitude measurement (AM1), designed to measure general liking for the good, has also been included in the regressions to make the models more complete. No more items of AM1, AM2 or FM have been included to avoid problems of multicollinearity. The results reported above for those variables are anyway very clear. Risk attitudes have not been included in the regressions because of the problem of missing observations explained in section 3.4.

Table 13 shows that the results for familiarity are again clearly in line with the uncertainty hypothesis. Specifically, familiarity has a significant negative coefficient in

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<sup>11</sup> It is important to note that the main numbers in table 13 are not regression coefficients, but test statistics (t-statistics in this case). The numbers in brackets are p-values.



the WTA treatment and a non-significant one in the Choice treatment. Regarding the personality factors, agreeableness has a highly significant positive coefficient in the Choice treatment and a non-significant one in the WTA treatment. Conscientiousness has a non-significant coefficient in the Choice treatment and a significant negative one in the WTA treatment. These are the exact same effects reported in section 3.5. In the case of extraversion, the coefficient is negative in the WTA treatment and positive in the Choice treatment, as in table 11, but this time the coefficient in the WTA treatment fails to be significant. As indicated in section 3.5, note that among the factors appearing as significant in table 11, extraversion is the least significant one.

The coefficient of item 1 in AM1 is not significant in any of the treatments. It is important to note however that the correlation between the attitude measurements and the monetary valuations increases notably if all the items are considered (Spearman correlation with the mean of AM1: 0.174,  $p = 0.085$ ; with the mean of AM2: 0.231,  $p = 0.022$ ).

Overall, the regression analysis supports clearly the results reported in the previous sections for the variables included in it.

### 3.7. Summary of results

To conclude section 3, we will summarize briefly the main results identified in subsections 3.1 to 3.6. On the one hand, we clearly replicated a significant WTA-Choice gap with the basic part of our design. On the other hand, the 5 additional instruments we introduced in the experiment provide several important findings about the psychological foundations of the gap we replicated. The main findings can be summarized in the following 5 points:

- 1) Attitude change, of any kind, either general or by subgroups according to initial attitudes, is not a necessary condition for a WTA-WTP gap to appear and it does not seem to be an important part of WTA-WTP disparities.
- 2) An enhancement in subjects' positive feelings produced by receiving and owning the target good in the experiment accounts for a significant part of the WTA-WTP gap.
- 3) An essential part of the WTA-WTP disparity seems to come from aversion to loss produced by uncertainty regarding the target good, as familiarity and risk aversion measures show. This is the other main foundation for the WTA-WTP gap identified in the present paper.
- 4) Endowment changes the type of individuals giving high/low monetary valuations to the target good, as personality measures show.
- 5) The findings reported above (mainly points 2 and 3) show that the WTA-WTP gap is best understood by dividing it in two different phases, which correspond with different psychological processes: A) a first *phase of ownership* and B) a second *phase of possible loss*.

In terms of the main hypotheses put to the test explained in section 2.2, these results imply that *H1*, *H3*, *H4* and *H5* are clearly supported and *H2.1* and *H2.2* are clearly rejected.

## 4. Discussion

Taken as a whole, our results show a psychological complexity behind WTA-WTP disparities which is rarely taken into account in research on the topic. WTA and WTP are indeed different, but they are also generated by markedly different psychological processes and even adopt high/low values for different types of subjects. Moreover, the discrepancy between the two comes from several sources, which correspond with different stages of the process individuals go through in WTA-WTP situations.

Getting down to the specifics, two main sources of a gap between WTA and WTP have been identified in the present paper: 1) an enhancement in subjects' positive feelings produced by receiving and owning the target good and 2) aversion to loss generated by uncertainty regarding the good.<sup>12</sup> Both of these phenomena increase WTA, generating a discrepancy with WTP. The first one corresponds to a first phase of ownership and the second one to a second phase of possible loss.

These two findings can be efficiently used to explain a number of important results reported and discussed in the WTA-WTP literature. To begin with, let us take the well documented fact that non-market and non-ordinary goods display significantly higher WTA-WTP ratios (see Horowitz and McConnell, 2002). Note that, on the one hand, receiving and getting to own non-market and non-ordinary goods is expected to generate a stronger enhancement in positive feelings than receiving ordinary market goods. On the other hand, most individuals will feel considerably more uncertainty regarding that kind of goods and this will make them feel more aversion to losing them. Both of these factors will be reflected in monetary valuations and consequently make the WTA-WTP gap for this type of goods larger.

Let us consider next the important recent findings about the relationship between emotion- or affect-driven processes and the WTA-WTP disparity. As explained in section 2.2, it has been shown that inducing negative emotions in subjects can eliminate the WTA-WTP disparity (see Lerner et al., 2004; Lin et al., 2006). It is apparent that, if an important part of the gap comes from an enhancement in subjects' positive feelings, as our findings suggest, it will be counteracted by anything that acts against this enhancement. The direct induction of a negative emotion is an obvious example (other examples are discussed below).

Another major issue related to our findings is the effect of repeated market interaction on WTA-WTP disparities. This is considered by many a topic of central relevance to economics. The main argument is that it is that kind of transactions that economics is mostly about (see, for example, Binmore, 1999). The usual finding in market laboratory and field experiments is that repeated experience in the marketplace tends to reduce and sometimes eventually eliminate the WTA-WTP disparity and related exchange asymmetries (see, for example, Knez et al., 1985; Brookshire and Coursey, 1987; Coursey et al., 1987; Shogren et al., 1994; List, 2003, 2004; Loomes et al., 2003).<sup>13</sup> The most common explanation given by economists to this phenomenon is that repeated interaction in a market environment allows individuals to learn how to avoid "mistakes" and progressively discover their "true" preferences.<sup>14</sup> Our results lead

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<sup>12</sup> As our study is not exhaustive, that does obviously not rule out the possibility that other processes might also contribute to or be important to completely understand the gap.

<sup>13</sup> Again, there is evidence that this tendency does not appear as clearly for non-market goods with imperfect substitutes (see Shogren et al., 1994).

<sup>14</sup> This argument is in line with the so called "discovered preference hypothesis" (Plott, 1996). See Cubitt et al. (2001) for a clarifying analysis of this hypothesis.

naturally to an alternative, more psychologically sound, explanation. Namely, the existence of a WTA-WTP disparity relies on a series of complex psychological underpinnings, which can be easily undermined by repeated market experience.

In terms of the two main sources of the disparity identified, on the one hand, if subjects receive, and then give up, the same good in the same situation a series of times, it will obviously get to the point where it starts becoming a routine transaction and they will not experience a significant enhancement in positive feelings for receiving it anymore. In other words, the good will become just something subjects trade. There is indeed evidence that an endowment effect is found for goods that are owned for consumption, but not for goods that are just owned for exchange (see Novemsky and Kahneman, 2005). On the other hand, some important sources of uncertainty regarding the target good will be significantly reduced with repeated market interaction. For instance, uncertainty about the feelings that giving up the good and not owning it anymore might produce, uncertainty about the value of the good to others or uncertainty about its market price. Undermining these essential psychological underpinnings will in turn diminish WTA and consequently reduce WTA-WTP disparities.

Accepting this explanation has two important consequences. First, it is misguided to assume that repeated market interaction leads to more “true” preferences. It rather leads to different preferences, triggered by different psychological processes, which correspond with different situations. Second, the key question turns to be which of these situations, repeated market interaction or single transaction, is more relevant to the cases we are interested in studying. It is apparent that the transactions made by normal people with countless goods resemble more the second situation than the first one. See, for example, clothes, entertainment goods, electrical appliances, furniture, cars, houses, to name just a few.

Finally, let us discuss the effect of exhaustive experimental control in the Plott and Zeiler’s (2005) sense (see also Plott and Zeiler, 2007). A similar explanation to the one just given for repeated market interaction applies here. According to Plott and Zeiler, when exhaustive controls for subjects’ misconceptions are introduced in a WTA-WTP experiment, in the sense of including all the procedures used in previous experiments to control for misconceptions, the WTA-WTP gap is eliminated.<sup>15</sup> On the basis of this evidence, the authors assert the following: “The primary conclusion derived from the data reported here is that observed WTP-WTA gaps do not reflect a fundamental feature of human preferences.” (Plott and Zeiler, 2005, p. 542).

Our results reveal the limitations of this conclusion. The gap is indeed a reflection of psychological processes which correspond to fundamental features of how human beings value goods. The fact that the gap can be eliminated shows just that the necessary psychological underpinnings for it to appear can be undermined through experimental procedures (like, for example, repeated practice rounds that may lead subjects to perceive the good as something they trade). As indicated above, the key question turns to be what kind of situation is more relevant to the cases we are interested in studying. Again, it is far from clear that situations with exhaustive control in the Plott and Zeiler’s sense should be the only interest of economists, let alone that of management scientists, decision researchers or psychologists.

To conclude, it is interesting to note that, in light of our findings, the formal model proposed recently by Loomes et al. (2009) emerges as an especially well suited candidate for modelling consumer decisions. These authors present a model of

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<sup>15</sup> Note again that this result has been strongly challenged by Isoni et al. (Forthcoming).

consumer choice (based on Reference-Dependent Subjective Expected Utility Theory, Sugden, 2003) in which loss aversion in utility is combined with preference uncertainty. In this model, the strength of status quo effects (aversion to moving away from reference points) is an increasing function of the individual's degree of uncertainty about her preferences for the goods involved. So, status quo attitude depends both on the asymmetry between an individual's attitude towards gains and losses of utility and on the degree of uncertainty about preferences. Unlike other models of reference-dependent consumer choice (see Tversky and Kahneman, 1991; Koszegi and Rabin, 2006), the model reduces to standard economic consumer theory, when there is no uncertainty about preferences.

This model fits our main findings especially well. On the one hand, the model's loss aversion parameter ( $\beta$ ) can be used to generate different WTA-WTP disparities, or to make them disappear completely (by setting  $\beta = 1$ ).  $\beta$  can be adjusted according to the type of good, the type of individual or, in line with our findings, according to the enhancement in positive feelings a particular endowment situation produces. On the other hand, the parameter for the degree of uncertainty about the preferences for a specific good ( $\alpha$ ), can also be modified to generate different WTA-WTP gaps, or to make them disappear altogether (when  $\alpha = 0$ ). In terms of our findings,  $\alpha$  can be used to model how differences in the degree of uncertainty regarding the target goods affect aversion to loss and in turn the difference between WTP and WTA. This parameter can be adjusted to different types of goods, different individuals or, more importantly, different degrees of repeated market experience with the target goods.

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## Tables and Figures

**Table 1**

The measurement of risk attitudes

<i>p</i>	<i>x</i>	Decision
1	1.00 €	
0.9	2.20 €	
0.8	3.80 €	
0.7	5.70 €	
0.6	8.30 €	
0.5	12.00 €	
0.4	17.50 €	
0.3	26.70 €	
0.2	45.00 €	
0.1	100.00 €	

**Table 2**

Relative risk aversion coefficients with  $U(x) = x^{1-r}/(1-r)$

<i>p</i>	<i>x</i>	<i>r</i>
1	1.00 €	0.909
0.9	2.20 €	0.818
0.8	3.80 €	0.727
0.7	5.70 €	0.636
0.6	8.30 €	0.545
0.5	12.00 €	0.455
0.4	17.50 €	0.364
0.3	26.70 €	0.273
0.2	45.00 €	0.182
0.1	100.00 €	0.091

**Table 3**

Structure of experimental sessions<sup>a</sup>

	<i>Sequence</i>							
<i>Choice treatment</i>	AM1	-	NEO-FFI	AM2	FM	Choice prices	Random draws	Payment
<i>WTA treatment</i>	AM1	<b>Receiving the good</b>	NEO-FFI	AM2	FM	WTA	Random draws	Payment

<sup>a</sup>The measurement of risk attitudes was done as a part of previous sessions with the same subjects

**Table 4**  
Main hypotheses tested

<b>Hypotheses</b>	<b>Main devices involved in testing them</b>
<i>H1: The gap can be divided in two different phases: A) ownership and B) possible loss.</i>	Indirect test through H2.1 to H5
<i>H2.1: In phase A, a gap is generated through a general attitude change.</i>	AM2
<i>H2.2: In phase A, a gap is generated through an attitude change produced by cognitive dissonance.</i>	AM1 and AM2
<i>H3: In phase A, a gap is produced by a change in subjects' feelings caused by receiving the target good.</i>	FM
<i>H4: In phase B, a gap is generated by aversion to loss produced by uncertainty regarding the target good.</i>	Familiarity and risk attitudes
<i>H5: Different types of individuals are associated with high/low valuations in WTP and WTA treatments.</i>	Personality

**Table 5**  
General attitude change

AM 2 items	WTA vs. Choice (Mann-Whitney)
1	0.991 (0.322)
2	0.189 (0.850)
3	-0.682 (0.495)
4	0.569 (0.569)
5	-1.098 (0.272)
6	0.600 (0.549)



**Table 6**

Test of the cognitive dissonance hypothesis: WTA vs. Choice (Mann-Whitney)

AM2 items	Scores in AM1	Divided according to:				
		AM 1, item1	AM 1, item 2	AM 1, item 3	AM 1, item 4	AM 1, item 5
Item 1	<i>Non-positive</i>	1.677 (0.094)	1.442 (0.149)	1.478 (0.140)	1.570 (0.116)	0.684 (0.494)
	<i>Positive</i>	0.266 (0.790)	-0.058 (0.954)	-0.070 (0.944)	-0.564 (0.573)	0.523 (0.601)
Item 2	<i>Non-positive</i>	0.223 (0.824)	0.199 (0.842)	0.119 (0.905)	0.899 (0.369)	1.612 (0.107)
	<i>Positive</i>	0.026 (0.979)	0.008 (0.994)	-0.535 (0.592)	-1.124 (0.261)	-1.307 (0.191)
Item 3	<i>Non-positive</i>	0.625 (0.532)	0.051 (0.960)	0.296 (0.767)	-0.061 (0.951)	-1.070 (0.284)
	<i>Positive</i>	-0.971 (0.331)	-0.828 (0.408)	-1.234 (0.217)	-1.119 (0.263)	-1.077 (0.282)
Item 4	<i>Non-positive</i>	0.476 (0.634)	0.025 (0.980)	-0.390 (0.697)	1.012 (0.312)	-0.933 (0.351)
	<i>Positive</i>	0.455 (0.649)	0.663 (0.507)	0.167 (0.868)	-0.497 (0.619)	0.365 (0.715)
Item 5	<i>Non-positive</i>	-0.322 (0.748)	0.797 (0.425)	-0.726 (0.468)	-0.711 (0.477)	-0.768 (0.443)
	<i>Positive</i>	-0.949 (0.343)	<b>-2.401</b> <b>(0.016)</b>	-1.399 (0.162)	-1.615 (0.106)	-1.516 (0.130)
Item 6	<i>Non-positive</i>	1.123 (0.261)	1.025 (0.306)	-0.473 (0.636)	0.792 (0.428)	-0.332 (0.740)
	<i>Positive</i>	0.472 (0.637)	-0.223 (0.824)	0.328 (0.743)	-0.161 (0.872)	0.205 (0.838)

**Table 7**

Tests for the monetary valuations: WTA vs. Choice (Mann-Whitney)

Scores in AM1	Divided according to:				
	AM 1, item1	AM 1, item 2	AM 1, item 3	AM 1, item 4	AM 1, item 5
<i>Non-positive</i>	<b>2.021</b> <b>(0.043)</b>	<b>2.510</b> <b>(0.012)</b>	<b>2.092</b> <b>(0.036)</b>	1.886 (0.059)	<b>2.420</b> <b>(0.016)</b>
<i>Positive</i>	<b>3.500</b> <b>(0.001)</b>	<b>2.906</b> <b>(0.004)</b>	<b>3.226</b> <b>(0.001)</b>	<b>3.253</b> <b>(0.001)</b>	<b>3.005</b> <b>(0.003)</b>

**Table 8**

Positive feelings

FM items	WTA vs. Choice (Mann-Whitney)	Correlations with monetary valuations (Spearman)
1	<b>2.656 (0.008)</b>	<b>0.246 (0.015)</b>
2	1.443 (0.149)	0.144 (0.157)
3	1.919 (0.055)	<b>0.307 (0.002)</b>
4	<b>2.328 (0.020)</b>	<b>0.224 (0.026)</b>

**Table 9**

Familiarity and risk aversion: correlations with monetary valuations (Spearman)

	Choice	WTA
Familiarity	0.006 (0.969)	<b>-0.408 (0.004)</b>
Risk aversion	0.113 (0.689)	<b>0.374 (0.038)</b>

**Table 10**

Tests for monetary valuations: WTA vs. Choice (Mann-Whitney)

Categories	Divided according to:	
	<i>Familiarity</i>	<i>Risk aversion</i>
<i>Low</i>	<b>3.920</b> <b>(0.000)</b>	0.426 (0.670)
<i>High</i>	1.320 (0.187)	1.635 (0.102)

**Table 11**

Personality: correlations with monetary valuations (Spearman)

	Choice	WTA
<i>N (neuroticism)</i>	-0.182 (0.205)	-0.042 (0.780)
<i>E (extraversion)</i>	0.180 (0.210)	<b>-0.288 (0.047)</b>
<i>O (openness)</i>	0.235 (0.100)	0.157 (0.286)
<i>A (agreeableness)</i>	<b>0.410 (0.003)</b>	-0.093 (0.529)
<i>C (conscientiousness)</i>	0.101 (0.487)	<b>-0.403 (0.005)</b>

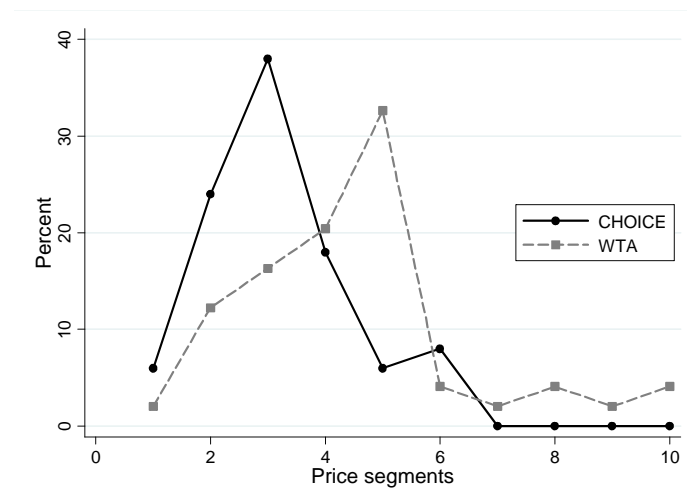
**Table 12**

Tests for monetary valuations: WTA vs. Choice (Mann-Whitney)

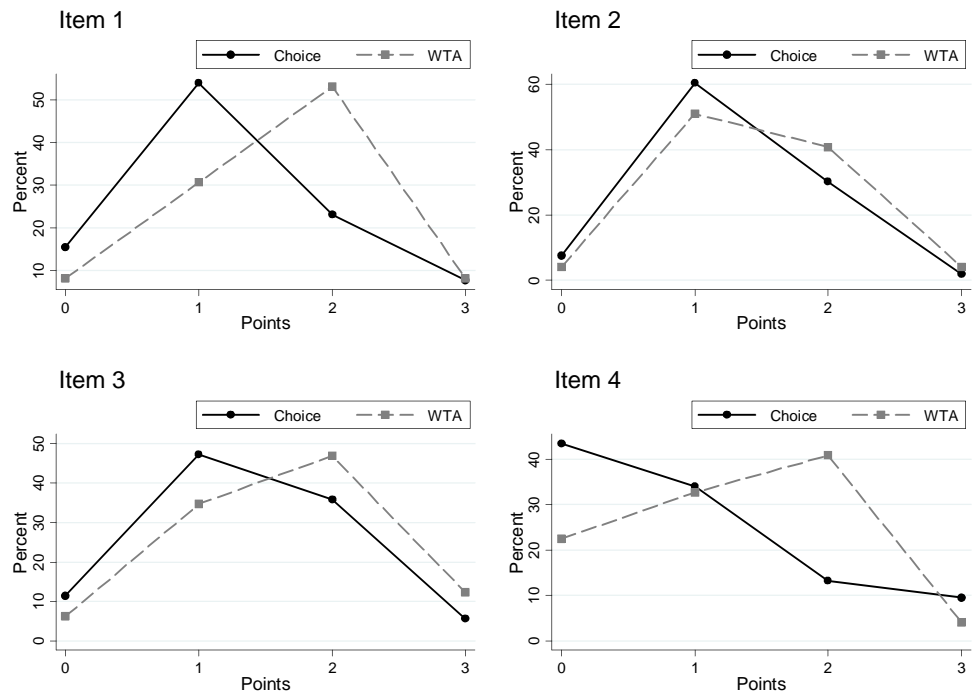
Categories	Divided according to:				
	<i>N</i>	<i>E</i>	<i>O</i>	<i>A</i>	<i>C</i>
<i>Low</i>	<b>2.582</b> <b>(0.010)</b>	<b>3.370</b> <b>(0.001)</b>	<b>2.933</b> <b>(0.003)</b>	<b>3.837</b> <b>(0.000)</b>	<b>3.503</b> <b>(0.001)</b>
<i>High</i>	<b>2.885</b> <b>(0.004)</b>	<b>1.990</b> <b>(0.047)</b>	<b>2.276</b> <b>(0.023)</b>	1.563 (0.118)	1.178 (0.239)

**Table 13**  
Linear regression analysis by treatments

	Choice	WTA
<i>Constant</i>	0.32 (0.751)	<b>2.71 (0.010)</b>
<i>AMI, item 1</i>	0.31 (0.757)	0.39 (0.697)
<i>Familiarity</i>	0.77 (0.444)	<b>-2.32 (0.025)</b>
<i>N</i>	-0.127 (0.211)	-1.58 (0.121)
<i>E</i>	0.89 (0.380)	-0.99 (0.326)
<i>O</i>	1.40 (0.170)	1.86 (0.070)
<i>A</i>	<b>3.40 (0.001)</b>	0.08 (0.936)
<i>C</i>	-1.52 (0.135)	<b>-2.12 (0.041)</b>
	F(7, 42) = 2.66, p = <b>0.023</b> ; R <sup>2</sup> = 0.29	F(7, 40) = 2.58, p = <b>0.027</b> ; R <sup>2</sup> = 0.32



**Fig. 1.** Choice prices and WTA



**Fig. 2.** Positive feelings

## Appendix A: Descriptive statistics

### *Choice treatment*

#### First attitude measurement (AM1) and familiarity measure

	<i>AM1i1</i>	<i>AM1i2</i>	<i>AM1i3</i>	<i>AM1i4</i>	<i>AM1i5</i>	<i>Familiarity</i>
Mean	1.019	0.788	1.075	0.736	1.226	0.509
S.D.	1.337	1.126	1.299	1.288	1.187	0.505
Min.	-3	-2	-3	-3	-2	0
Max.	3	3	3	3	3	1

#### Second attitude measurement (AM2)

	<i>AM2i1</i>	<i>AM2i2</i>	<i>AM2i3</i>	<i>AM2i4</i>	<i>AM2i5</i>	<i>AM2i6</i>
Mean	0.849	0.596	1.132	1.038	0.925	0.811
S.D.	1.150	1.404	1.038	1.160	1.385	1.210
Min.	-2	-3	-1	-2	-3	-2
Max.	3	3	3	3	3	3

#### Feelings measurement (FM)

	<i>FMi1</i>	<i>FMi2</i>	<i>FMi3</i>	<i>FMi4</i>	<i>FMi5</i>	<i>FMi6</i>	<i>FMi7</i>	<i>FMi8</i>
Mean	1.231	1.264	1.358	0.887	0.057	0.075	0.094	0.135
S.D.	0.807	0.625	0.762	0.974	0.233	0.331	0.354	0.486
Min.	0	0	0	0	0	0	0	0
Max.	3	3	3	3	1	2	2	2

#### Personality measures and risk attitude measure

	<i>N</i>	<i>E</i>	<i>O</i>	<i>A</i>	<i>C</i>	<i>Risk attitude (p)</i>
Mean	19.585	34.925	27.792	30.189	30.623	0.373
S.D.	7.809	6.557	7.199	6.385	6.593	0.187
Min.	1	14	10	17	27	0.1
Max.	37	48	44	45	43	0.7

### *WTA treatment*

#### First attitude measurement (AM1) and familiarity measure

	<i>AM1i1</i>	<i>AM1i2</i>	<i>AM1i3</i>	<i>AM1i4</i>	<i>AM1i5</i>	<i>Familiarity</i>
Mean	0.735	0.776	0.816	1.102	1.347	0.551
S.D.	1.335	1.046	1.395	1.246	0.969	0.503
Min.	-3	-3	-3	-3	-2	0
Max.	3	3	3	3	3	1

### Second attitude measurement (AM2)

	<i>AM2i1</i>	<i>AM2i2</i>	<i>AM2i3</i>	<i>AM2i4</i>	<i>AM2i5</i>	<i>AM2i6</i>
Mean	1.020	0.673	0.939	1.163	0.653	0.939
S.D.	0.854	1.281	1.232	1.214	1.234	1.248
Min.	-1	-3	-3	-3	-3	-3
Max.	3	3	3	3	3	3

### Feelings measurement (FM)

	<i>FMi1</i>	<i>FMi2</i>	<i>FMi3</i>	<i>FMi4</i>	<i>FMi5</i>	<i>FMi6</i>	<i>FMi7</i>	<i>FMi8</i>
Mean	1.612	1.449	1.653	1.265	0	0.082	0.061	0.020
S.D.	0.759	0.647	0.779	0.861	0	0.344	0.317	0.143
Min.	0	0	0	0	0	0	0	0
Max.	3	3	3	3	0	2	2	1

### Personality measures and risk attitude measure

	<i>N</i>	<i>E</i>	<i>O</i>	<i>A</i>	<i>C</i>	<i>Risk attitude (p)</i>
Mean	22.021	33.729	27.979	29.917	27.375	0.448
S.D.	6.828	6.642	6.596	4.890	7.204	0.141
Min.	12	18	15	20	15	0.2
Max.	44	46	41	40	47	0.7

## **Appendix B: Written instructions to experimental subjects** (*translated from Spanish*)

### *General instructions*

This experiment consists of several parts, in which you will have to carry out a series of different tasks. The exact characteristics of each one of the parts will be explained to you during the experiment. Some of the tasks will be related to the bottle of wine you have in front of you. You will get 5 € just for participating in the experiment. They will be given to you at the end of the session, together with the rest of the money you win, which will depend on some of your decisions.

You just have to follow the instruction given to you in the different parts of the experiment, until you get to the end of it. Your responses will only be useful if you really understand what you are doing in every one of the parts. Therefore, we beg you to pay attention to the explanation of each one of the tasks. If you have any doubt at any moment, please raise your hand and we will come to answer it.

This is an individual experiment. So, it is very important for its proper functioning that you do not communicate with other participants during the session. Additionally, it is important that you understand that there are no correct or incorrect answers, nor better or worse ones, in any of the tasks you will carry out. All we will ask from you is your personal assessment of the questions presented to you.

### *Instructions for the monetary valuations (WTP)*

In this part of the experiment, you have the opportunity to obtain a bottle of wine like the one which has been shown to you or some money. To choose which of the two alternatives you prefer for different amounts of money, you have to fill in the table below (*a full-length table is displayed in the real instructions*). As you can observe, the table has 41 empty rows, in every one of which you can choose 2 different options: “*I prefer the bottle*” or “*I prefer the money*”. What you have to do is to choose one of the 2 options, marking it with an “*x*”, in every one of the rows. That is, you have to decide, for every one of the amounts of money presented to you, if you would prefer the bottle of wine or the money. When all of you have filled in the table, choosing one of the 2 options in every one of the 41 rows, and we have collected all your response sheets, one of the 41 amounts of money will be selected at random. If for the selected amount you have chosen the option “*I prefer the bottle*”, you will actually get the bottle. If you have chosen the option “*I prefer the money*”, you will actually get the selected amount.

It is important that you understand that the amount of money selected does not depend at all on your decisions. The amount will simply be selected at random from the 41 amounts of money in the table. Therefore, it is in your best interest to just choose in each one of the rows the option you truly prefer for the amount of money specified in that particular row (“*I prefer the bottle*” or “*I prefer the money*”). That way, for any amount chosen, you will get the option you really prefer in that case.

	<b>I prefer the bottle</b>	<b>I prefer the money</b>
Por 0.00 €		
Por 0.25 €		
Por 0.50 €		
⤴ ⋮ ⤵		
Por 9.50 €		
Por 9.75 €		
Por 10.00 €		

*Instructions for the monetary valuations (WTA)*

In this part of the experiment, you have the opportunity to exchange your bottle of wine for some money. To decide if you want to do it and for what amount of money you are willing to do it, you have to fill in the table below (*a full-length table is displayed in the real instructions*). As you can observe, the table has 41 empty rows, in every one of which you can choose 2 different options: “*I keep the bottle*” or “*I exchange the bottle*”. What you have to do is to choose one of the 2 options, marking it with an “x”, in every one of the rows. That is, you have to decide, for every one of the amounts of money presented to you, if you would prefer to keep the bottle of wine or to exchange it for that amount. When all of you have filled in the table, choosing one of the 2 options in every one of the 41 rows, and we have collected all your response sheets, one of the 41 amounts of money will be selected at random. If for the selected amount you have chosen the option “*I keep the bottle*”, you will actually keep the bottle. If you have chosen the option “*I exchange the bottle*”, you will actually give us the bottle and we will give you the selected amount.

It is important that you understand that the amount of money selected does not depend at all on your decisions. The amount will simply be selected at random from the 41 amounts of money in the table. Therefore, it is in your best interest to just choose in each one of the rows the option you truly prefer for the amount of money specified in that particular row (“*I keep the bottle*” or “*I exchange the bottle*”). That way, for any amount chosen, you will get the option you really prefer in that case.

	<b>I keep the bottle</b>	<b>I exchange the bottle</b>
Por 0.00 €		
Por 0.25 €		
Por 0.50 €		
⤴ ⋮ ⤵		
Por 9.50 €		
Por 9.75 €		
Por 10.00 €		



## Appendix C: Questionnaire items (translated from Spanish)

### First attitude measurement (AMI)

#### 1. Do you like this product?

*I'm indifferent to it*

*I don't like it at all*  -3     -2     -1     0     1     2     3 *I like it very much*

#### 2. Would you like to have a bottle of wine like this one?

*I would be indifferent to it*

*I wouldn't like it at all*  -3     -2     -1     0     1     2     3 *I would like it very much*

#### 3. Do you think it is an attractive good?

*Neutral*

*Very unattractive*  -3     -2     -1     0     1     2     3 *Very attractive*

#### 4. Do you think it has a good design?

*Neutral*

*Very bad*  -3     -2     -1     0     1     2     3 *Very good*

#### 5. Do you think it is of a good quality?

*Neutral*

*Very bad*  -3     -2     -1     0     1     2     3 *Very good*

#### 6. Under normal conditions, would you buy a bottle of wine like this one?

Yes     No

*Second attitude measurement (AM2)*

**BOTTLE OF WINE**

*Neutral  
Point*

**Ugly**        **Beautiful**

**Unattractive**        **Attractive**

**Bad**        **Good**

**Unappetizing**        **Appetizing**

**Vulgar**        **Refined**

**I dislike it**        **I like it**

*Feelings measurement (FM)*

<b>1. Happy</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>2. Good</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>3. Pleased</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>4. Excited</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>5. Upset</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>6. Uncomfortable</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>7. Awkward</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>
<b>8. Bad</b>	→	<i>Nothing at all</i> <input type="checkbox"/> <b>0</b>	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> <b>2</b>	<i>Very much</i> <input type="checkbox"/> <b>3</b>