

**A META ANALYSIS OF THE WILLINGNESS-TO-ACCEPT
AND WILLINGNESS-TO-PAY DISPARITY**

by

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2002/89/MKT/TM
(Revised Version of 2001/71/MKT/TM)

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A Meta Analysis of the Willingness - to - Accept and Willingness - to - Pay Disparity

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August 2002

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ABSTRACT

Previous research reports a wide range of differences between the consumers' willingness-to-accept (WTA) and willingness-to-pay (WTP) measures of valuation. We examine the variables that affect the magnitude of this asymmetry by conducting a meta analysis of the WTA–WTP disparity figures reported in literature. The variables we consider include not only the ones previously identified in the literature but also some that are not explicitly examined before. Our theoretical framework rests on a recent body of research that suggests that there is no single value of a good. Instead, value depends on context - for example WTA and WTP refer to loss and gain, respectively. Similarly, there is no single difference between WTA and WTP, but this difference depends on certain context variables. Our findings suggest that context affects the WTA-WTP disparity in two ways: it affects the extent of strategic misrepresentation of the valuations, and it changes the valuations themselves.

A divergence between the amount one is willing to pay (WTP) to obtain a good and the amount she is willing to accept (WTA) to relinquish the same good has been frequently reported in previous research. For instance, Kahneman, Knetsch, and Thaler (1990) report that students were willing to pay \$2.75 on average for college mugs, but they asked for \$5.25 to sell their mugs. WTA and WTP figures reported in previous research often differ in order of magnitude, and the issue is still an avenue of interest today (e.g., Carmon and Ariely 2000; Anderson, Vajjala, and Uhlin 2000).

For researchers who would like to elicit the monetary value of a good to consumers, the disparity between WTA and WTP measures of valuation is both intriguing and challenging. Is the disparity an empirical design / measurement artifact? If not, which one is the “actual” value of the good, WTA or WTP? A growing body of research argues that consumers do not have a single value for a good, but have different values depending on the context (e.g., Kahneman, Ritov, and Schkade 1999). For instance, the value will be different if the good is to be *gained* or *given away*. Following this argument, the discrepancy between the WTA and WTP valuations would also be context-dependent. In this paper, we attempt to distinguish various context variables that affect the magnitude of the WTA-WTP disparity. Because the number of context variables is more than a handful, a meta analysis of previous findings seems to be a suitable approach, rather than an additional study. Meta analysis is a statistical analysis of a collection of results from individual studies (Glass 1976). We note that our goal here is not only to integrate the prior findings and therefore to generalize from individual studies, but also to investigate the effects of some factors which are not explicitly examined before.

Measuring consumer valuation and understanding how this valuation changes by context have significant implications on marketing strategies and market transactions. Buyers’ WTP relative to the sellers’ WTA determines key economic variables such as utility, demand and

price. If valuation depends on context, researchers should use appropriate valuation measures in different contexts. For example, it may be more appropriate to use the WTP measure for a new product (e.g. what is the maximum you would pay for a new laptop computer?) and to use the WTA measure for pricing the stripped down version of an existing product (e.g., in order to give up certain features in cable TV service, how much reduction will you ask for in your cable bill?).¹ As a second example, consider a college bookstore which starts trading used textbooks. Clearly, there will be a distribution of WTA and WTP valuations and these buying / selling prices will determine the number of transactions. If, for example, the WTA-WTP disparity is higher when consumers do not have experience in the process, the number of transactions will be lower in the beginning, so the bookstore should design a pricing scheme accordingly.

The paper proceeds as follows. In the next section we briefly review previous research on WTA-WTP valuation and discuss the main issues regarding the discrepancy. Theoretical framework and presentation of hypotheses will follow. Then we will introduce our methodology and provide the results of the analysis. The paper ends with a summary and some suggestions for further research.

WTA-WTP DISPARITY

Various research streams that are related to valuation of goods have contributed to the WTA-WTP disparity literature. Early theoretical investigation of the WTA-WTP disparity can be traced back in the economics literature. Henderson (1941) examined alternative specifications of consumer's surplus and compensating variation, which are closely related to the WTP and WTA measures. To the best of our knowledge, the first empirical study that reports both WTA and WTP values is Coombs, Bezembinder, and Goode (1967). In a

¹ We thank an anonymous reviewer for suggesting this example.

comparative study on alternative expectation models in the context of decision-making under uncertainty, they elicited the buying and selling prices for different lottery tickets in a hypothetical setting. On average, the selling price was found to be more than twice the buying price. Another body of empirical research that is associated with hypothetical valuation is the contingent valuation method (CVM) studies. CVM assumes that the value of any good -- be it public or environmental -- can be stated in monetary terms and can be measured through surveys or interviews. Early CVM studies in the 1960s used only the WTP measure of valuation; Hammack and Brown's (1974) study about goose hunting permits was one of the first studies which used both the WTA and WTP measures of valuation. One common characteristic of the WTA-WTP studies across disciplines was the hypothetical nature of the proposed transaction. Knetsch and Sinden (1984) was the first study that adopted a real exchange mechanism; they reported a WTA / WTP ratio of 4 for lottery tickets in a real exchange setting.

Prior research raises three related issues regarding the discrepancy. *First, to what extent do these values differ from each other?* Standard economic theory claims that in most cases, WTA and WTP values should be approximately the same (Henderson 1941; Willig 1976). According to the economic theory, the WTA-WTP disparity is due to the income effect, and it should diminish when the price of the good is very small. However, empirical studies report significant disparities even for items like mugs or pens which are not unique goods and which do not create a strong income effect (e.g., Kahneman, Knetsch, and Thaler 1990).

Second, given the empirical evidence for the WTA-WTP disparity, which one is the "correct" measure of valuation? Most environmental economics and public policy researchers argue that WTP may be a "better" measure of valuation than WTA (see Garrod and Willis 1999 for a discussion). The argument for this is that the validity of WTA valuations is questionable since individuals show resistance to giving up something they

already have, especially for public goods (Mitchell and Carson 1989); whereas WTP is constrained by the consumer's budget, and therefore it is more realistic (Brookshire, Coursey, and Schulze 1990). On the other hand, WTA may be more appropriate if the proposed transaction will result in a loss of the good, or deterioration in the current situation (Fisher, McClelland, and Schulze 1988, p. 130). As discussed above, our view is more in line with the recent body of behavioral decision research which argues that there is no "correct" valuation; both WTA and WTP may be appropriate depending on the context (e.g., Kahneman, Ritov, and Schkade 1999; Knetsch and Gregory 2002).

Third, how can we explain the empirical evidence for the WTA-WTP disparity? This question constitutes the focus of this paper and will be discussed in more detail below. Previous research by and large focused on specific reasons for the WTA-WTP asymmetry. Extensive examination of factors that contribute to the disparity is rather sparse. In one of these studies, Hoffman and Spitzer (1993) put together a number of explanations for the WTA-WTP disparity: income effect, psychological reasons (Prospect Theory and endowment effect, the need to "close" transactions, preference uncertainty, and regret avoidance), misrepresentation, and incorrect framing of questions. In a recent survey of previous empirical research, Brown and Gregory (1999) group the possible reasons into two main categories: economic factors (income effects and substitution, transaction costs, implied value of the good, profit motives) and psychological factors (endowment effect, legitimacy, ambiguity and moral responsibility). Using a meta analysis framework, Horowitz and McConnell (2000) show that the WTA-WTP disparity is a robust effect, independent from response mode manipulations. Their main finding is that as the good in question moved away from an "ordinary private good", this disparity increases. They also report some counterintuitive

findings such as incentive compatible designs leading to higher WTA-WTP disparities.²

Our goal in this paper is to go one step further by integrating the explanations or variables that affect WTA-WTP disparity --- not only previously identified variables, but also variables that are not studied explicitly before. We categorize the context variables that affect the WTA-WTP disparity into two types: variables that affect individuals' *actual* valuations, and variables that affect the *reporting* of these valuations (which may be suitably called strategic misrepresentation). This structure helps us to see the extent of strategic misrepresentation as compared to the changes in actual valuations. We do not intend to examine the underlying psychological mechanisms. However, we can make inferences about these processes to some extent. It should be noted that since we adopt a meta analysis framework, our interest is limited to factors that are observable (or identifiable) from prior studies. For example, even though transaction costs are expected to contribute to the WTA-WTP disparity (Brown and Gregory 1999), empirical studies are designed in a way that transaction cost is not an issue. Hence, in this study we do not have a hypothesis regarding transaction costs.

THEORETICAL FRAMEWORK

A recent stream of research argues that particulars of the context affect the valuation of goods (e.g. Kahneman, Ritov, and Schkade 1999; Knetsch and Gregory 2002). These context variables make different characteristics of the good or the proposed transaction more salient, thereby affecting individuals' valuations. We argue that context variables can lead to both strategic misrepresentation of the valuation (e.g. intentionally overstating a higher WTA value for a hypothetical transaction than for a real exchange) and / or a change in the valuation itself (a higher ratio of WTA/WTP valuations for a good without readily available substitutes,

² Horowitz and McConnell (2000) make inferences based on average of WTA-WTP disparity values, for example, for ordinary vs. public goods (univariate analysis), and use multivariate analysis on a subset of variables. In this paper, we use a multivariate analysis which takes into account all the variables we identify.

compared to a substitutable good).

Economists tend to argue that WTA - WTP disparity is due to strategic misrepresentation associated with experimental design and elicitation techniques (see Brookshire, Coursey, and Radosevich 1988 for a discussion). The idea is that once the incentives for truthful revelation of valuations are provided, the disparity should disappear. However, the empirical evidence regarding this issue is mixed: Employing similar real exchange mechanisms for college coffee mugs, Shogren et al (1994) report a very small disparity, whereas Kahneman et al. (1990) report that the disparity persists. In this paper, we attempt to investigate whether the disparity still exists once we account for the variables that lead to strategic misrepresentation.

In terms of the variables that affect the valuation itself, there are two possible ways this can happen: One possibility is, in the spirit of Plott's (1996) "discovered preference hypothesis", individuals may "discover" their valuations for unfamiliar items or exchanges during the process of elicitation. This assumes that the underlying preferences are stable but the discovery of these preferences may be influenced by different context variables. Another perspective is that there is no single underlying valuation but valuations are constructed depending on the context (e.g. Knetsch and Gregory 2002). Nevertheless, we cannot differentiate between these two hypotheses in this paper. Rather, our goal in this study is to identify the specific context variables that affect the valuation process. We discuss these variables in the following subsections.

Strategic Misrepresentation of Valuations

One explanation for the WTA-WTP disparity is individuals' strategic motives. Rather than revealing their true valuations, they may overstate the selling price and understate the buying price because of bargaining habits or profit motives (Knez, Smith, and Williams 1985).

Factors that would affect the extent of strategic motives and misrepresentation essentially pertain to the study design.

Preference Revealing and Real Exchange Mechanisms. Researchers occasionally try to align the incentives of the respondents in a way that it is for their own interests to reveal “true” valuations. For instance, in a Vickrey auction (where the highest bidder wins but pays the second highest bid), bidding the “true” valuation is the optimal strategy (Vickrey 1961) -- see Harless (1989) for an example. An alternative mechanism is market clearance. Kahneman et al. (1990) employed such a mechanism in an experimental setting where the WTA and WTP prices determine the demand and supply in the simulated market.

In this study, we distinguish between the preference revealing and realization of exchange characteristics of incentive-compatible designs. A preference revealing mechanism is presumed to induce the revelation of true valuations. Realization of the exchange means that the transaction actually takes place between a buyer and a seller. It is possible to employ a preference revealing mechanism, such as a Vickrey auction, but not to carry out the exchange. Realization of the exchange, on the other hand, is employed as a preference revealing mechanism.³ A widely used approach in experimental economics is to actually carry out the transaction for a subset of respondents in order to elicit true preferences.

One empirical study that looks at the effect of such design issues is by Neill et al. (1994). They compared the WTP values from three different designs: a CVM, a hypothetical Vickrey auction, and a real exchange Vickrey auction. They found that the average WTP values from CVM and hypothetical Vickrey auction are similar and they are both significantly higher than the WTP of the real exchange auction group. In other words, there is evidence that what matters is the realization of the exchange, not the mechanism itself. It is not clear whether this

argument will hold for the WTA-WTP disparity. We expect both dimensions of incentive-compatibility to decrease the WTA-WTP disparity.

Iterative Bidding. Another factor that would mitigate strategic misrepresentation is the use of iterative bidding in the survey design. Consumers' valuations could be obtained through open-ended questions like "how much are you willing to pay?" or alternatively by using multichotomous answer formats or payment cards where respondents make a choice from a list of figures. Some studies involve asking the respondents whether they would pay (accept) a revised amount, which is higher (lower) than the initial responses. The purpose is to elicit the "maximum" WTP and the "minimum" WTA. Therefore, we expect iterated questions to yield a lower WTA-WTP disparity.⁴

Within vs. Between-Subjects Designs. One way to obtain the WTA and WTP figures is to ask both measures to the same group of respondents -- a within-subjects design. Alternatively one may employ a between-subjects design and ask a group of respondents their WTA values and another group their WTP values. When an individual provides multiple measures in a study, it is possible that she may try to be consistent (Camerer 1995). Therefore, in a within-subjects design respondents may provide less disparate WTA and WTP values. A within-subjects measurement would probably prime respondents to provide selling prices larger than buying prices but these prices should not be markedly different. Therefore, we expect the WTA-WTP disparity to be smaller if a within-subjects design is used as opposed to a between-subject one.

³ Realization of the exchange in a mechanism which is not preference revealing (e.g. first-price auction) is a possibility; to our knowledge there is no application in the WTA-WTP research.

⁴ The effect of using a multichotomous format as opposed to an open-ended question is not clear. Cameron and James (1987) argue that open-ended questions yield more strategic responses from respondents and the questions requiring yes / no answers are the most similar ones to the actual market experience. In order to obtain average valuations from a single yes / no question, researchers vary the amount stated across respondents, and estimate the value based on certain assumptions. As will be discussed later, we do not include valuations based on yes / no questions in our empirical analysis.

Variables that Affect Valuation

Variables that affect the valuation itself relate to both the elicitation mechanism, and the characteristics of the good in hand. For instance, individuals may state different WTP values when the payment is framed as a tax increase versus an out-of-pocket payment (an elicitation design issue). WTA-WTP disparity can also be related to certain characteristics of the good (e.g. availability of substitutes). We interpret these characteristics as “context” variables because they can be manipulated experimentally (even though experimental manipulation of some may require creativity).

Availability of Substitutes. Standard utility theory claims that buyers’ and sellers’ asymmetric valuation can be explained by the income effect. Income effect refers to the fact that obtaining a good versus giving it away would take consumers to different final wealth points. Willig (1976) and Randall and Stoll (1980) derived upper and lower bounds for the WTA-WTP discrepancy as a function of price elasticities, consumer surplus, and income levels. Hanemann (1991) analytically shows that the income effect is more pronounced when substitutes are not available, and the WTA and WTP values should converge if the good at hand has a very close substitute.

Adamowicz, Bhardwaj, and Macnab (1993) report two experiments, one of which supports Hanemann’s substitution effect. In their first experiment they found that for a one-time only movie feature, which is also available on tape, VCR ownership (means to the substitute) had no effect on the WTA-WTP difference. In their second experiment, the difference between WTA and WTP for a hockey game ticket was 30% smaller in the substitute condition (the game would also be broadcast live), compared to the no-substitute condition (no broadcast). We expect the WTA-WTP disparity to be higher for goods without readily available substitutes.

Market Availability. Another factor that may affect the WTA-WTP disparity is whether the good is readily available or traded in the market.⁵ Consumers have some degree of price (specified market value) awareness for *market goods*. Non-market goods, on the other hand, can be characterized by a wider range of consumer valuations, and these valuations may be ambiguous. Kolstad and Guzman (1999) claim that ambiguity about the value of a good and the cost of gathering information cause an individual to overstate her WTA value and understate the WTP value. In addition, when there is a range of possible values for a non-market good, it makes sense for buyers to assign a value towards the lower end of the range, and sellers would assign a value towards the higher end, which will increase the WTA-WTP disparity (Brown and Gregory 1999).

Perceived Illegitimacy. WTA-WTP discrepancy may also increase when there is an emotionally difficult trade-off. We use three measures to examine the effects of emotional concerns; the first one is *perceived illegitimacy*. We understand perceived illegitimacy as a sense of moral and ethical responsibility (i.e. conscience, altruism). If selling or giving up a good is perceived as an illegitimate transaction, WTA-WTP disparity is expected to increase mainly due to higher WTA values. It is generally unacceptable, for instance, to sell a picture of loved ones. Also, when the decision to be made involves a moral dimension or potentially undesirable consequences, individuals typically favor inaction over action (Brown and Gregory 1999). A higher WTA is reflection of the premium they demand to offset this feeling.

Boyce et al. (1992) provide empirical support that the difference between WTA and WTP increases if the transaction involves a sense of moral responsibility. They used small pine trees as the experimental object. For the moral responsibility manipulation, they told the subjects that the trees would be killed if the subject failed to purchase the tree or to sold back to the

⁵ Note that good substitutes exist for most market goods (more detailed discussion in the Analysis section), but, not always. For instance, a regular mug is an imperfect substitute for a college mug.

experimenter. A higher WTA / WTP ratio for the “kill” condition is reported compared to the “no-kill” condition. Their argument is that if one owns the tree, she has the responsibility. If not, the owner has the responsibility. The property rights shift responsibility to the owner so the buying price does not increase as much as the selling price. Irwin (1994) states that a moral responsibility causes higher preference for environmental goods in the selling mode.⁶ Based on these observations, we expect the WTA-WTP disparity will be higher when the exchange is perceived as an illegitimate transaction.

Environmental. Our second measure related to emotional difficulty is whether the good is *environmental* or not. Environmental goods involve a sense of moral responsibility but they are not necessarily non-market goods. For example, pine trees can be bought in the market. Irwin (1994) reports that the relative preference of an environmental good to a market good is higher in the selling mode (WTA) than in the buying mode (WTP). She provides supporting evidence for this claim: WTA for environmental goods is higher than the WTA for market goods, even though the WTP values do not differ that much.

Health Related. Our third measure regarding emotional difficulty is whether the good is *health related* or not. One’s health and safety is presumably the least substitutable “good.” WTA-WTP disparity should increase if the transaction has an effect on health. Unlike other non-substitutable “goods,” health has a direct and pervasive effect on consumer’s life. Brown and Gregory (1999) argue that one’s health and general safety also involves ethical and legitimacy dimensions. Brief examination of the results of Chapman and Johnson (1995) indicates that the WTA-WTP disparity is generally higher for health related items than for commodity items.

Learning / Experience. WTA-WTP disparity is also observed for items like pens or candy

bars (e.g., Knetsch 1989; Kahneman et al. 1990) which are traded in the market -- presumably without any emotional concerns. Coursey, Hovis, and Schulze (1987) argue that experimental designs that do not allow for experience or learning may lead to the WTA-WTP disparity. Individuals are generally not familiar with valuation tasks, especially with the WTA valuation. If they have an opportunity to evaluate the consequences of their valuation decisions over a series of trials, they may “discover” their preferences (see Plott 1996), or learn that revealing true preferences is the dominant strategy (in incentive compatible designs). And so, experience may affect both the valuation itself, and the extent of strategic misrepresentation.

Empirical evidence regarding the effect of learning on the WTA-WTP disparity is mixed. Shogren et al. (1994) obtained almost equal WTA and WTP values after a series of trials. Using a similar mechanism, on the other hand, Kahneman et al. (1990) observed no significant decrease in the disparity due to repetition. Nonetheless, we expect a smaller WTA-WTP disparity if values are elicited after the respondents gain experience.⁷

Explicit Price Information. In some empirical studies respondents are provided with the *price of the good* at hand. We argue that the WTA-WTP disparity will be smaller in such a case. Although respondents may have some idea about the prices of various goods already, explicit price information narrows the ambiguity about the good’s market value. Following the earlier discussion on the uncertainty about the value of a good and the range of others’ valuations, if individuals are uninformed or uncertain about the price, it makes economic sense to report low WTA values and high WTP values. There is also a psychological effect of providing the price of the good. Various experimental studies on anchoring effect have shown

⁶ It is conceivable that this argument may also apply to nonenvironmental goods. For example, one would not want to sell the pictures of her family.

⁷ In this study, we define learning as the experience in the valuation of the same good under the same conditions. Although the number of trials that counts as experience could be subjective, we consider respondents as experienced if data are obtained after four or more trials. This is by and large consistent with the existing literature.

that individuals tend to be biased towards any given value, even when it is arbitrary (see Kahneman, Ritov, and Schkade 1999 for a review on anchoring effects in valuation). An explicitly stated price may have an anchoring or priming effect serving as a signal of fair value. Individuals will consider WTA and WTP values as deviations from this anchor, and hence the disparity will be lower.

Ownership. WTA-WTP disparity implies that sellers have a higher valuation than buyers: *Ownership of a good* increases its value. Behavioral decision theorists explain this phenomenon by the endowment effect, which is a manifestation of the loss aversion property of the Prospect Theory (Kahneman and Tversky 1979; Thaler 1980). According to the Prospect Theory, a loss would yield a larger (in magnitude) discomfort than the value of a commensurate gain. WTA reflects the loss value of the given up good, whereas WTP is a measure of the value obtained through gaining the good (Kahneman et al. 1990). Therefore, when an individual is asked to give up a good she owns, she will demand a high WTA to compensate for the feeling of loss associated.⁸

In some experimental studies, respondents value goods that are actually distributed (e.g., coffee mugs in Kahneman et al. 1990), or goods that they already have or consume (e.g., waterfowl hunting in Hammack and Brown 1974). In other cases they are given the ownership rights but not the physical ownership or experience (e.g., Anderson et al. 2000). Kahneman et al. (1990) note that the physical possession of the good produces a stronger endowment effect than the chance of receiving the good, or a property right to it. We expect both *ownership rights* and *ownership experience* to increase the WTA-WTP disparity as compared to purely

⁸ It is also possible to argue that in real settings owners are more likely to be the ones who value the good more and have more information regarding the good (Casey 1995). However, this argument seems to be less relevant for empirical studies where WTA and WTP questions are asked to randomly drawn respondents.

hypothetical ownership, but we do not have a conjecture regarding the relative effects these two variables.⁹

Framing of Questions. Prospect Theory and mental accounting (Thaler 1985) argue that valuation depends on the format or the framing of the question. WTA is typically elicited by asking consumers the compensation they would seek to give up the good -- assuming that they already possess the good. Similarly, WTP is obtained by asking respondents the amount they would pay to obtain a good or improvement. However, both WTA and WTP values can be *framed as a loss or gain*. For example, one might elicit the WTP in one of the following ways: (i) respondents are told to assume that they do not possess the good, and they are asked how much they are willing to pay to acquire it; (ii) they are told that they possess the good, but they have to pay not to lose it. The former is a gain frame whereas the latter is a loss frame. Similarly the following constitute the gain and loss frames for the WTA measure: (i) respondents are asked how much they would accept not to trade up or have an improvement in the good; (ii) they are asked to state the WTA to give up the good or trade down. Loss aversion property of Prospect Theory suggests that loss framing increases the stated value. Therefore, the WTA-WTP disparity should be lower if selling (WTA) is framed as a gain, and it should be higher if buying (WTP) is framed as a gain (see McClelland and Schulze 1991). We do not have a conjecture regarding the sizes of these two effects.¹⁰

Payment Mechanism. Another implication of mental accounting that may affect the WTA-WTP disparity is the payment mechanism. Thaler (1985) argues that consumers have different

⁹ Note that realization of exchange implies ownership rights, but not vice versa.

¹⁰ Irwin (1994) suggests that WTA – WTP disparity should be greater in the loss-loss frame than in the gain-gain frame; however, her empirical findings do not support this conjecture. Casey (1995) also uses the gain-loss framing concept, and examines whether the WTA-WTP disparity could be explained by different transaction encoding rules for buying and selling. For example, the buyer of a lottery ticket may perceive the money given as a loss and the lottery as a gain. Alternatively, buyers and sellers may use different weight and value functions (corresponding to the subjective probability and utility function in utility theory). Casey provides evidence that buyers and sellers of a lottery have similar weight and value functions, but the individual's role determines the encoding process.

mental accounts for payments depending on where the money comes from and where it goes. So, for example, a windfall earning is spent differently than earned money. Similarly, *out-of-pocket* costs create more disutility than opportunity costs (Thaler 1980). We argue that the payment mechanism affects the WTA-WTP disparity. Consider a case where the payments are reductions (WTA) and increases (WTP) in tax payments. We argue that WTA and WTP will be “integrated” (see Thaler 1985) to the tax (loss) account whereas payments in and out-of-pocket are “segregated”. Because the value function is less convex for losses away from the origin (reference point), a further reduction and increase in the loss (tax) will loom comparable utility changes. On the other hand out-of-pocket costs and in-pocket gains will lead to disparate utility changes. Therefore, we expect the disparity to be higher if the payments are in and out-of-pocket as opposed to tax increases / reductions, or other instruments of payment.

Risky Payoffs. Another factor that can influence the WTA-WTP disparity is risk preferences. Individuals’ valuations may change when the good in hand involves risky payoffs. In a recent study, Sheffrin and Caldwell (2001) focus on the valuation of lotteries. They develop two hypotheses based on a change-of-process framework (Mellers et al. 1992) and analyze a set of binary lotteries in order to test these. In their theoretical framework, WTA and WTP are functions of the individual’s utility from the nonzero outcome, and the subjective weighting of the probability of the outcome. The first hypothesis is that the WTA-WTP disparity should increase as the probability of the nonzero outcome decreases (higher risk). Their second hypothesis is that the disparity should be independent of the absolute value of the nonzero outcome.¹¹ They found support for the first hypothesis and mixed results for the second one. Similarly, Casey’s (1995) findings indicate a small increase in the WTA /

¹¹ We do not include this hypothesis in our study because the value of the non-zero outcome is related to the price of the good and this figure is not always available. We believe that this hypothesis deserves further testing.

WTP ratio as the probability of the nonzero outcome decreases. Hence, we expect the WTA-WTP disparity to be higher for risky goods or payoffs.¹²

ANALYSIS

Data

Meta analysis is a systematic review of previous findings. To that end, we searched several databases, and then we traced the references of the initial set of studies. Eventually we used 145 data points from 34 studies, which report both the WTA and the WTP measures of valuation (or the WTA / WTP ratio which is sufficient for our analysis). Studies that report only the percentages of respondents who value the good above or below a certain monetary amount are not suitable for our purposes. Furthermore, studies that estimate WTA and WTP values from percentages are not included in the analysis (e.g., Knetsch and Sinden 1984).¹³

We present the studies used in the meta analysis in Table A1 in the Appendix (full references are available from the authors). Figure 1 shows the distribution of WTA / WTP ratios for the 145 data points. The WTA / WTP ratio exhibits substantial variation extending from 0.14 to 113. Note that a ratio of 0.14 implies that the selling price is much less than the buying price -- dropping this data point does not affect our findings. There are three other data points with WTA / WTP ratios less than, but close to, 1. The mean of the ratios is 7.6, and the median is 3.2. In addition to the high positive skewness, there are a few data points with substantially high WTA / WTP ratios, going up to 113. In terms of the goods used in the experiments, they range from chocolate bars to elk hunting permits.

Insert Figure 1 about here

¹² In the meta analysis below, we do not account for different degrees of risk involved; we use a binary variable which represents the existence of risk.

¹³ The reason for this exclusion is that these estimations are based on assumptions about the distribution of valuations. Haab and McConnell (1997) show that estimated values depend on the assumed utility function, and even negative WTP estimations can be obtained.

Methodology

The following variables are employed in the subsequent analyses.

Dependent Variable. We use the natural logarithm of the WTA / WTP ratio as the measure of WTA-WTP disparity. We obtain the ratio by dividing the average WTA by the average WTP of the respondents. Note that this is different than the average of (WTA / WTP) which requires within subjects measures of WTA and WTP. One study in our data set reports only the average of respondents' WTA / WTP ratios (Harless 1989). He reports that the average of WTA / WTP ratios is larger than the ratio of average WTA / average WTP, but he does not provide the latter measures. In addition, some studies provide only median values for the WTA and WTP measures.¹⁴ Even though the medians are generally smaller than the means, the ratio of medians is fairly close to the ratio of means.¹⁵

Using $\ln(\text{WTA} / \text{WTP})$ as the dependent variable has two benefits. First, using the absolute difference between the WTA and WTP would be inappropriate because this difference depends on the price level of the good. Second, using the natural logarithm avoids the problem of whether to use the WTA / WTP ratio or the WTP / WTA ratio; explained variation and significances of the variables do not change by taking the logarithm of either ratio.

Explanatory Variables. For the explanatory variables, we start with 17 measures that represent the variables discussed in the previous section. We present these variables in Table 2 together with the expected direction of the effects. All the explanatory variables are binary. Because some of the explanatory variables represent characteristics of the goods,

¹⁴ Chapman and Johnson (1995) chose to report the geometric means of the WTA and WTP figures.

classification of goods (hence, each data point) according to these variables could be subjective. Therefore, two judges independently coded these binary variables for all the data points. Initial agreement between the judges' codings was 95%, and all the remaining disagreements were resolved through discussion.

Insert Table 1 about here

We first look at the simple correlations among the explanatory variables. We present the noteworthy correlations in Table 1; the remaining figures are less than 0.45. We need to distinguish between theoretical and empirical (practical) correlations. For instance, the association between *iterative bidding* and *out-of-pocket payment* is not a theoretical one. However, *availability of substitutes* and being a *market good* are conceptually related. Keeping this in mind, we combined four pairs of variables into four new factors (or constructs). More specifically, (i) *realization of exchange* and *preference revealing* are combined into *incentive compatible designs*; (ii) *availability of substitutes* and *market good* are combined into *normal good*; (iii) *perceived illegitimacy* and *environmental* are combined into *intrinsic values*; and (iv) *ownership right* and *ownership experience* are combined into *ownership*.¹⁶ When we look at the correlations among these newly formed variables and the remaining set of variables, none of the correlations are larger than 0.50 -- except the one between *iterative bidding* and *out-of-pocket payment*, which is still 0.53, as expected.

Using the thirteen explanatory variables and $\ln(\text{WTA} / \text{WTP})$ as the dependent variable, we conducted an OLS regression analysis. The regression results are presented in Table 2. The coefficient of variation R^2 is 0.44 and the adjusted- R^2 is 0.38. Although the primary concern is

¹⁵ We replicated the analysis below with a dummy variable representing whether the measure was a median or average; this variable was insignificant and did not affect the coefficients of the other variables.

the significance of the variables, the resulting explained variation of 0.44 is typical for a meta analysis. Examples of meta analyses in marketing include Peter and Churchill (1986) with an R^2 of 0.25, and Assmus, Farley, and Lehmann (1984) with R^2 of 0.59.

 Insert Table 2 about here

Discussion

Although a few of them are not statistically significant, all the parameter estimates have the expected signs. The overall picture that emerges is that context affects both the reporting of valuations and valuations themselves. In other words, the WTA-WTP disparity is not simply due to empirical designs conducive for misrepresentation. We note here that one should not interpret the relative impact of strategic misrepresentation vis-à-vis other variables by summing the respective parameter estimates, or should not try to estimate the magnitude of the WTA-WTP disparity for certain situations (e.g. when there is iterative bidding and incentive compatibility). The reason is that, for instance, *incentive compatible* designs automatically imply *ownership*, or researchers rarely use *iterative bidding* in *incentive compatible* designs. Be it a theoretical association or merely a coincidence, the end result is that some hypotheses are confounded. For instance, incentive compatibility, vis-à-vis ownership, is neither a “main effect” nor an “interaction” but the two effects are interdependent. This does not create a technical problem, but the reader should interpret it accordingly. We cannot simply set incentive compatibility to 1, and ownership to 0 in order to find the expected WTA-WTP disparity in such a case.

That said, our results indicate that incentive compatible designs, iterative bidding, and to a

¹⁶ We weighted the observations equally (0.5) in combining these pairs of variables. This is consistent with the results of a separate factor analysis where the variables of a given pair have almost equal loadings for the respective factors.

lesser extent within-subjects designs reduce the WTA-WTP disparity. It seems that individuals' strategic motives play a certain role when they provide valuation measures. This reminds us something important about individuals: people are not inclined to reveal their true valuations or preferences unless there are incentives to do so. Hence, behavioral researchers' attention to incentive compatibility is well grounded. Considering the fact that revealing true preferences in incentive compatible settings is a learned behavior, and learning is a significant factor in our analysis, researchers should also provide sufficient learning mechanisms in empirical settings.

In terms of context variables affecting the actual valuations, we provide evidence that the WTA-WTP disparity is smaller for normal goods and larger for goods with intrinsic values and for goods that are health-related. Our findings also suggest that learning decreases the disparity. In addition, the disparity is larger when individuals actually own the good as compared to hypothetical ownership. Carmon and Ariely (2000) report that WTA-WTP disparity does not depend on whether the respondents actually own NCAA basketball tickets or they are told to assume that they own them. It may be interesting to examine the conditions under which hypothetical ownership does not make a difference. For instance, tickets may be considered as means to some other good, and both the actual and hypothetical owners may be valuing the expected utility from the basketball game. Other significant variables are the gain-loss framing for buying and selling transactions. More specifically, when selling is framed as a gain rather than a loss, consumers demand a lower WTA, and the disparity is smaller. On the other hand when buying is framed as a gain, the disparity is higher because individuals are willing to pay less. The underlying reason for this change in the WTA-WTP disparity is that framing changes the actual valuation of the good. Relative sizes of these effects imply that the disparity will be higher for the loss-loss condition than the gain-gain framing; this is consistent with Fisher et al. (1988) where the WTA / WTP ratio for the loss-loss condition is

twice that of the gain-gain case.

The effect of the payment mechanism on the WTA–WTP discrepancy is marginally significant. More specifically, if the payments are into or out-of-pocket, rather than through tax reductions and other indirect payments, we observe a slightly larger WTA–WTP disparity. We did not find sufficient evidence for the effect of explicitly stating the price of the good to the respondents. We note that in all the cases where the price is given, except for one case, the respondents are students and the goods are items such as coffee mugs and chocolate bars. One exception is a Smith auction for the density of park trees for which the critical cost (value) is provided to the individuals. In this case, the respondents already have some price knowledge, and stating a figure may not have an additional effect. It is conceivable that what matters is not the statement of the price, but price knowledge. Price knowledge is an unobservable measure but it is partly captured by the normal good variable. Similarly, we did not find evidence for the effect of risky goods or payoffs. The risky goods in our data set are either lotteries or health related items -- we have a variable for the latter. One possible explanation for lotteries is that increasing risk may aggravate the WTA–WTP disparity, but goods like lotteries may have a lower disparity in the first place (see Camerer [1995], p. 668). Therefore what we are observing may be the result of two opposite effects. One limitation of the current study is that we do not address varying degrees of risk.

Technical Issues

Anscombe's test does not suggest a heteroskedasticity problem in our OLS regression model. However, the tolerance figures for incentive compatibility and ownership are less than desired; both are around 0.32 (equivalently, variance inflation factors are 3.0). This implies some degree of multicollinearity regarding these two variables. As a further step, we

combined incentive compatibility and ownership into a new variable -- which may suitably be called *real exchanges*. When we use this variable in the OLS regression and leave incentive compatibility and ownership out, all tolerance figures are higher than 0.50, and significance levels of the coefficient estimates do not change -- except, out-of-pocket payment, which was marginally significant, becomes insignificant.

There are some issues one needs to consider regarding the meta analysis tool. The first is the (in)dependence of data points. There are two ways that the data points may not be independent: (i) obtaining valuations from the same set of respondents for different goods (multiple treatment studies); and (ii) reporting results from different sets of respondents --- same or different goods --- in the same paper. As a diagnosis for the possible effects of dependence among some data points, we checked the sensitivity of the parameter estimates to the deletion of observations. We deleted each observation in turn, and obtained a different set of coefficients. We replicated this sensitivity analysis by deleting 5 and 10 observations randomly (with replacement) a large number of times. It turns out that in each of these cases the variances from this jackknife distribution are pretty small, and none or a few coefficient estimates change sign in a small percentage of the time. It seems that the direction of the effects are pretty robust against the dependence of data points. The second issue is the accommodation of different degrees of significance of the valuations in the extant literature. Significance of each data point is related to the sample size used in the corresponding study. This can be addressed by employing a weighted least squares estimation where weights are the sample sizes.¹⁷ Results of the WLS regression are similar to the OLS findings, except for a few variables. We should note that samples sizes in our data set range from 8 to 2116. Hence, a few studies with large sample sizes tend to drive the results of this exercise. The third issue

is the possibility of a “file drawer” or publication bias. Due to the nature of this area, previous studies report similar WTA and WTP values, as well as disparate ones. The histogram of the WTA/WTP ratios in Figure 1 above shows that ratios cover a wide range, and there is no indication of a bias against ratios above or below a certain threshold. Hence, we believe that publication bias is not a serious issue in our case.

SUMMARY AND FURTHER SUGGESTIONS

In this study, we examined the factors contributing to the WTA-WTP disparity by conducting a meta analysis of the previous findings. Our main contribution is that the WTA-WTP disparity is not simply a result of misrepresented valuations but also the valuations themselves are affected by the context variables. Secondly, our study also involves some variables that were not examined explicitly by prior research; namely, we examined iterative bidding, explicit statement of the price, in and out-of-pocket payments, and the within / between-subjects nature of the design.

The present analysis is not without limitations. First, variables that capture the goods’ characteristics are binary variables. It is conceivable, for example, that substitutability is a continuous variable. Even the definition of “environmental” has shades of gray. Are ecologically produced eggs environmental as much as air quality? However, we believe that assigning continuous values for these variables would amplify the subjective nature of the coding process. Secondly, we employed a linear model without any interactions. Since we have quite a number of explanatory variables, introduction of interactions in the analysis should be based on reasoning or theory.

¹⁷ More specifically, weights should be inversely proportional to the error variance of the dependent variable. Since we use $\ln(\text{WTA} / \text{WTP})$ as the dependent variable, deriving the weights is not straightforward. We employed a simulation and found that sample size is proportional to the inverse of the error variance.

In terms of future directions in this area, we believe that there is a wide array of issues that still need to be explored. Based on prior research and the current analysis, the WTA-WTP disparity seems to be, to some extent, good specific. It is challenging to explain why pens yield a WTA / WTP ratio of 5, whereas mugs yield a ratio of 2, under similar experimental conditions. One possible explanation, other than random variation, is the degree of ambiguity about the price or the value of the good. This conjecture could be tested by examining the relationship between individual level price uncertainty and the WTA-WTP disparity for a given good. Alternatively one can ask individuals for their price estimates for various goods, and relate the (between subjects) price variation to the WTA-WTP disparity.¹⁸ Our analysis did not find a significant effect of the explicit statement of the price; yet, we believe that more research will be insightful. Alternatively, future research can examine how WTA-WTP disparity varies for different types of goods, for example, search goods, experience goods, and credence goods (Nelson 1970; Darby and Karni 1974), or durables versus consumables.

Another issue is whether the context variables have more impact on WTA or WTP, given that they affect not only the disparity but the valuation process itself. Because WTA and WTP are good specific, to infer the effects of context variables on these two values, one needs to compare them to a benchmark value measure, such as price (say, for instance, WTA decreases relative to price when the design is incentive compatible whereas WTP remains relatively constant). Price is not available for most of the goods used in our data set -- the concept of price may not be applicable for some goods anyway. A more suitable approach than a meta analysis seems to be empirically examining the impact of a subset of the variables on WTA and WTP for a given good. Nevertheless, our opinion is that different variables would affect WTA or WTP to different extents. For instance, iterative bidding probably affects both the WTA and WTP, but intrinsic values probably have more impact on WTA.

WTA-WTP disparity may also depend on the respondents' characteristics. Adamowicz, Bhardwaj, Macnab (1993) report a higher disparity for males than for females. On the other hand, Loewenstein (1996) found evidence that females exhibit a stronger endowment effect. It may be interesting to examine gender differences for valuation, and underlying characteristics of genders in that regard. Future research can also explore other aspects of ownership. Strahilevitz and Loewenstein (1998) examine the effect of ownership duration on the valuation of objects. It would be interesting to study such an effect of duration on the WTA-WTP disparity. Another related question is what constitutes ownership? For example, owning a ticket for an event may not be the same thing as owning a painting. The ticket is a means to some other good; therefore, actual ownership of the ticket may induce similar valuations as a hypothetical ownership. One can also examine the relationship between the way a good is received (or earned) and the WTA-WTP values.

As noted above, a within- or between-subjects design can be used to gather WTA-WTP data. Comparison of the WTA / WTP ratios from both designs for the same good could provide some insight to respondents' valuation process and behavior. Along the same line, the effect of the order of WTA and WTP questions in a within-subject design is worth exploring. Carmon and Ariely (2000) report no effect of question order for valuation of basketball game tickets; nevertheless, replication of this finding would be insightful.

Finally, there seems to be a need to understand the interactions between explanatory factors we discussed in the present study. For example, is the effect of learning or experience different for environmental goods? It would be interesting to examine how respondents' experiences affect their WTA and WTP valuations for environmental but market traded goods, such as air pollution certificates.

¹⁸ We thank the Area Editor for suggesting this alternative approach.

The main contribution of this meta analysis study is to show that the WTA-WTP disparity depends on a number of context variables. These context variables affect not only the elicitation of the WTA and WTP values but also the valuation process itself. By identifying some of these explanatory variables and discussing a set of open-ended questions, we intend to shed some light in the ongoing debate over WTA-WTP disparity. We hope more future research will follow to improve our understanding of how individuals value goods and the impact of the elicitation method on the valuation process.

APPENDIX

TABLE A1
STUDIES USED IN THE META ANALYSIS

Author(s)	Year	Good	Number of Data Points
Adamowicz, Bhardwaj, and Macnab	1993	tickets for Cannes commercials show	1
Anderson, Vadjal, and Uhlin	2000	eggs, ecological eggs	2
Banford, Knetsch, and Mauser	1979	ocean pier, postal service	2
Bishop, Heberlein, and Kealy	1983	goose hunting permits	1
Borges and Knetsch	1998	scratch-win lottery tickets	1
Bowker and MacDonald	1993	odor free air	1
Boyce et al.	1992	Norfolk island pine	2
Brookshire and Coursey	1987	density of park trees	8
Brookshire, Coursey and Radosevich	1988	raspberry juice	5
Brookshire, Coursey, and Schulze	1990	tasting sucrose octa-acetate	10
Brookshire, Randall, and Stoll	1980	elk hunting permits	3
Carmon and Ariely	2000	NCAA basketball tickets	1
Casey	1995	lottery	2
Chapman and Johnson	1995	20 various items	20
Coombs, Bezembinder, and Goode	1967	lottery	2
Dubourg, Jones-Lee, and Loomes	1994	vehicle safety feature	6
Eisenberger and Weber	1995	lottery	8
Franciosi et al.	1996	mugs	1
Garbacz and Thayer	1983	senior companion program services	2
Hammack and Brown	1974	waterfowl hunting	1
Harless	1989	lottery	2
Hartman, Doane, and Woo	1990	electric service reliability	9
Hogarth and Kunreuther	1989	insurance	4
Kachelmeier and Shehata	1992	lottery	1
Kahneman, Knetsch, and Thaler	1990	mugs, pens, binoculars, chocolate bars	11
Knetsch	1989	candy bars	1
Mellers et al.	1992	lottery	2
Morrison	1997	chocolate bar, mugs	4
Ortona and Scacciati	1992	labor / leisure trade off, faster/slower train	4
Rowe, d'Arge, and Brookshire	1980	atmospheric visibility	4
Schulze et al.	1986	closure of landfill, presence of landfill	2
Shefrin and Caldwell	2001	precious / toxic metal in a land	4
Shogren et al.	1994	candy bars, coffee mugs, health risk from food pathogens	17
Tanrivermis	1998	environmental quality	1

TOTAL: 145

NOTE.— Chapman and Johnson (1995) report 56 data points (plus some data points from “filler items”) from the same set of respondents under the same experimental conditions. We included 20 items that they used in both the first and the second experiments.

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FIGURE 1

HISTOGRAM OF WTA / WTP RATIOS

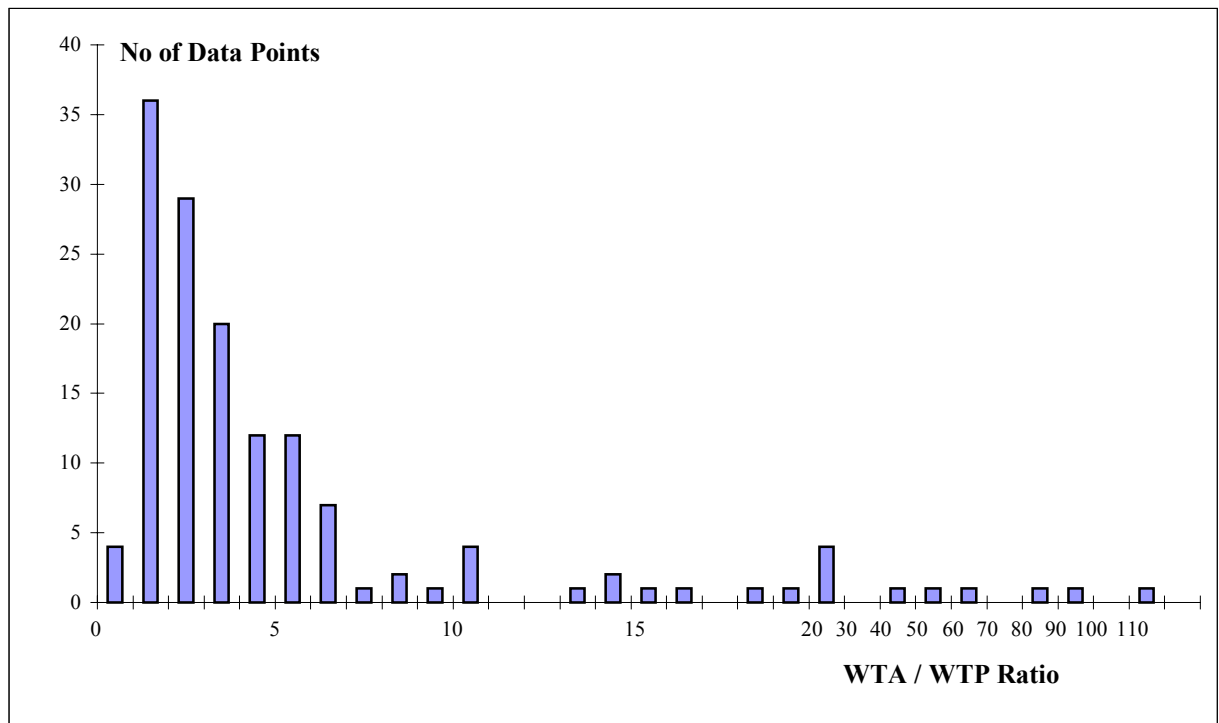


TABLE 1

SIMPLE CORRELATIONS

Variables			Simple Correlation
Preference revealing mech.	–	Realization of exchange	0.86
Preference revealing mech.	–	Ownership right	0.53
Realization of exchange	–	Ownership right	0.60
Iterative bidding	–	Out-of-pocket payment	–0.53
Within-subjects design	–	Ownership experience	–0.61
Availability of substitutes	–	Market good	0.79
Perceived illegitimacy	–	Environmental	0.65
Ownership right	–	Ownership experience	0.64

TABLE 2

REGRESSION ANALYSIS RESULTS

Dependent variable: $\ln(\text{WTA} / \text{WTP})$			
Explanatory variable		Expected direction of the effect	Parameter estimate
Intercept	.....	?	0.85**
Preference revealing mech.	} Incentive compatible	—	−0.71***
Realization of exchange			
Iterative bidding	.....	—	−0.69***
Within-subjects design	.....	—	−0.28*
Availability of substitutes	} Normal good	—	−0.58***
Market good			
Perceived illegitimacy	} Intrinsic values	+	1.00***
Environmental			
Health related	.....	+	0.41**
Learning	.....	—	−0.61***
Price stated	.....	—	−0.26
Ownership right	} Ownership	+	0.45**
Ownership experience			
WTA framed as gain	.....	—	−1.11***
WTP framed as gain	.....	+	0.41**
Out-of-pocket payment	.....	+	0.46*
Risky payoffs	.....	+	0.24
Adjusted $R^2 = 0.38$			

NOTE.—All tests are one-sided, except for the intercept.

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$