



The willingness to pay–willingness to accept gap revisited: The role of emotions and moral satisfaction

Anders Biel^a, Olof Johansson-Stenman^{b,*}, Andreas Nilsson^a

^a Department of Psychology, University of Gothenburg, Box 500, SE 405 30 Gothenburg, Sweden

^b Department of Economics, School of Business, Economics and Law, University of Gothenburg, Box 640, SE 405 30 Gothenburg, Sweden

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ABSTRACT

While many earlier studies have found that people's maximum willingness to pay for having a good is often substantially lower than their minimum willingness to accept *not* having it, more recent experimental evidence suggests that this discrepancy vanishes for standard consumption goods when an incentive-compatible design without misconceptions is used. This paper hypothesises that there is nevertheless a discrepancy for goods with a perceived moral character, such as contributions to a good cause, and moreover that the reason for this discrepancy can largely be explained by differences in emotions and moral perceptions. The results from a real-money dichotomous-choice experiment, combined with measurements of emotions and morality, are consistent with these hypotheses.

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1. Introduction

The large disparity often observed between people's maximum willingness to pay for a good (WTP) and their minimum willingness to accept not having it (WTA) continues to be puzzling; see e.g. [Bateman, Kahneman, Munro, Starmer, and Sugden \(2005\)](#) and [Plott and Zeiler \(2005, 2007\)](#) for careful experimental contributions that aim to identify why and when such disparities exist, and [Huck, Kirchsteiger, and Oechssler \(2005\)](#) for possible evolutionary arguments behind them. The present paper uses experimental evidence combined with measurements of emotions and morality to shed light on this disparity.

Conventional microeconomic theory implies that an individual is *on the margin* willing to pay just as much for obtaining a good as he or she is willing to accept forsaking it. At the same time it predicts that WTA typically exceeds WTP for discrete (i.e. non-marginal) changes. Of course, survey-based and experimental empirical tests are generally based on discrete changes, and typically finds that WTA exceeds WTP, often by a substantial margin ([Horowitz & McConnell, 2002](#)). Whether the observed discrepancies can be explained within this framework is debated, however. [Randall and Stoll \(1980\)](#) derived

* Corresponding author. Tel.: +46 31 7862538; fax: +46 31 7861043.

E-mail address: Olof.Johansson@economics.gu.se (O. Johansson-Stenman).

bounds that seem to indicate that the WTA–WTP difference, based on standard theory, should generally be quite small. However, Hanemann (1991) derived other conditions that highlight the degree of complementarity between income and the good to be valued. He argued that observed large WTA–WTP discrepancies are consistent with standard theory, given low complementarity between the good and income. Indeed, he showed that when the elasticity of substitution between them goes to zero, the WTA–WTP discrepancy becomes infinite. Amiran and Hagen (2003) provided an important generalisation and showed, both algebraically and graphically, that an infinite WTA–WTP discrepancy may occur even when the elasticity of substitution is not zero, provided that the utility function is asymptotically bounded¹; cf. also Shogren, Shin, Hayes, and Kliebenstein (1994). Sugden (1999), Horowitz and McConnell (2003) and Horowitz, List, and McConnell (2007), on the other hand, argued that the Hanemann argument is not sufficient to explain observed results from contingent valuation (CV) studies, and hence that one must move beyond mainstream theory to understand the data. At present, there is no sign of an approaching consensus on this issue.

Several explanations have been suggested beyond the standard microeconomic theory, the most prominent being loss aversion (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991), i.e. that losses (reflected by WTA) tend to loom larger than gains (reflected by WTP); see e.g. Kahneman, Knetsch, and Thaler (1990) and Knetsch (1989, 2000). However, loss aversion *per se* cannot explain the observed regularity that the WTA–WTP disparity tends to be much larger for public goods, such as environmental goods; see the recent meta-analyses by Horowitz and McConnell (2002) and Sayman and Öncüler (2005). Horowitz and McConnell summarised that ‘the farther a good is from being an “ordinary private good”, the higher the ratio’ (p. 442). Moreover, Plott and Zeiler (2005) found in a recent experimental study that the discrepancy vanishes for standard consumption goods when an incentive-compatible design that controls for misconceptions is used.

A possible explanation for this pattern is that public good choices are perceived to have a more obvious ethical dimension, since the individual choices also affect (or are perceived to affect) others (Johansson-Stenman & Svedsäter, 2008). Kahneman and Knetsch (1992) suggested that the numbers reported in survey-based hypothetical WTP studies may not primarily express respondents’ values of goods, but rather the ‘moral satisfaction’ of behaving in an ethically admirable way, which corresponds to the so-called ‘warm glow’ hypothesis (Andreoni, 1989, 1990).² Others have suggested that the influence of a moral perspective may be particularly strong under WTA (Boyce, Brown, McClelland, Peterson, & Schulze, 1992; Irwin, 1994; Nyborg, 2000; Sayman & Öncüler, 2005). This parallels the distinction between omission and commission, since refraining from contributing is an act of omission while accepting payment is an act of commission. Empirical evidence suggests that acts of omission causing harm are typically perceived as less blameworthy than acts of commission that cause an equal amount of harm (Baron & Ritov, 1994; Spranca, Minsk, & Baron, 1991).³ A similar line of reasoning provided the underpinning of a study of consumers’ judgements of ethical products (Irwin & Naylor, 2009). Like the present study, Irwin and Naylor assumed that ethical considerations are guided by the decision context. When faced with a large product category, consumers tend to form a smaller set of options. This reduction could either take the form of including attractive options or excluding in attractive options. The authors showed that the protection of moral values is stronger in the “exclusion” mode than in the “inclusion” mode, paralleling our hypothesized distinction between WTA and WTP.

If it is correct that the perceived morality, or the moral satisfaction, differs between WTA and WTP settings for goods with a perceived moral character, it appears logical that the associated emotional reactions differ as well. According to Jonathan Cohen (2005, p. 3), a leading brain researcher: ‘Emotions influence our decisions. They do so in just about every walk of our lives, whether we are aware of it and whether we acknowledge it or not.’ However, although already Adam Smith discussed the role of emotions extensively, in particular in his *Theory of Moral Sentiments* (Evensky, 2005; Ashraf, Camerer, & Loewenstein, 2005), economics has traditionally had little to say about them, especially empirically. According to Bosman, Sutter, and van Winden (2005, p. 408), ‘There is hardly any empirical economic research among emotions.’ However, this is about to change.⁴ This is partly due to increasing influences from psychology and partly as a result of the insights from the emerging field of neuroeconomics (see e.g. Camerer, Loewenstein, & Prelec, 2005; Fehr, Fischbacher, & Kosfeld, 2005; Singer & Fehr, 2005).

As an example of the latter, consider the so-called ‘trolley problems’, about which there is a long-established discussion in philosophy (see e.g. Appiah, 2008): In one scenario, a runaway trolley is hurtling down the tracks and is about to run over and kill five people who are unavoidably in its path. The five people can only be saved by hitting a switch that steers the trolley onto a side track where it will kill one person. Should the switch be hit? When polled, a large majority think it should, and most philosophers agree. In a second scenario, the trolley is again hurtling toward the five people. This time, the only

¹ Whereas *non-bounded* utility functions such as Cobb–Douglas have indifference curves that are asymptotic to the good axis, *bounded* utility functions such as the ones used by Amiran and Hagen have indifference curves with asymptotes at a positive level of the good to be valued (see their Fig. 1B). The latter case implies that universal hyper-substitutability does not apply, i.e. one cannot at all levels of a particular good fully compensate an individual for a certain reduction of the good by an increase in another good (such as money). In a more recent paper (Amiran & Hagen, 2010), the authors extend the analysis of such bounded utility functions to another phenomenon often observed in the CV literature, the limited sensitivity to scope. Specifically, they show that one cannot, based on standard consumer theory, rule out arbitrarily small degrees of sensitivity to scope for this class of utility functions.

² However, the warm glow hypothesis is far from uncontroversial, in particular when a referendum format is used. According to Hanemann (1994, p. 33): ‘Warm glow’ is simply a red herring. I have seen no evidence that people get a warm glow from voting to raise their own taxes, whether in real life or in a contingent valuation study.’

³ This also relates to the typically observed non-symmetric effects between carrots and sticks, e.g. in order to induce cooperation between people; c.f. for example Sutter, Haigner, and Kocher (2010).

⁴ See e.g. Hopfensitz and Reuben (2009) for a recent study on the role of emotions such as guilt for the effectiveness of punishment in order to deter uncooperative actions.

way they can be saved is by pushing a nearby 300 lb man, standing on a footbridge over the tracks, off the bridge and down on the tracks. His body mass will stop the trolley, but he will be killed in the process. Should the man be pushed? Most people, including many philosophers, say no. While there is a great deal of philosophical literature trying to justify why it is morally acceptable to sacrifice one life to save five in one scenario but not in the other, psychologist Joshua Greene and coauthors (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001) studied the problem from a purely descriptive point of view. They provided evidence based on functional magnetic resonance imaging (fMRI), suggesting that the different reactions in the two scenarios can largely be explained by different emotional reactions rather than by differences in cognitive reasoning.

Moreover, psychologists Peters, Slovic, and Gregory (2003) suggested that the WTA–WTP disparity could be accounted for by different emotional reactions. In a recent CV study of an ordinary market good (lottery tickets), they found that the disparity between the WTA and the WTP conditions was largest for the tickets that evoked the strongest emotions.

In the present paper we therefore set up a simple and clean real-money dichotomous-choice experiment where the monetary outcomes are exactly the same in the WTA and WTP framings. This is done by adjusting the initial income and the level of a provided good (money given to a WWF project) in the WTA framing. Each subject can choose an alternative where the overall effect is that he/she receives 150 SEK (approximately 20 US dollars) or an alternative where he/she receives 50 SEK and where 100 SEK is donated to a WWF project. If a difference remains, we can unambiguously conclude that the observed behaviour is not consistent with standard theory. In fact, this turns out to be the case. The perceived emotional and moral reactions associated with each choice are then measured for each framing. As hypothesised, not donating to the WWF project causes stronger negative emotions, such as shame, in the WTA condition compared to in the WTP condition. Moreover, when correcting for emotional reactions, no statistically significant effect of the framing remains.

The remainder of the paper is organised as follows: Section 2 first outlines the standard model as well as a modified model that suggests asymmetric emotional reactions in the WTA and WTP treatments, and then goes on to present testable hypotheses. Section 3 provides the experimental set-up followed by the corresponding results in Section 4, and Section 5 concludes the paper.

2. The model and hypotheses

2.1. The conventional model

Consider an individual who is faced with a simultaneous increase in a provided good with a perceived moral character, G (which may or may not have a public good character), and a decrease in his/her own income y . Provided that the individual's behaviour is defined by the maximisation of a strictly quasi-concave and twice continuously differentiable utility function $U = u(y, G)$, the WTP for an increase in G by ΔG , starting from $\{y^0, G^0\}$, is implicitly given by B , such that

$$u(y^0, G^0) = u(y^0 - B, G^0 + \Delta G), \quad (1)$$

which is also illustrated in Fig. 1. Similarly, the WTA for a decrease in G by the amount ΔG , starting from $\{y^0 - B, G^0 + \Delta G\}$, is of course also given by B . Indeed, according to conventional theory we should clearly rank the allocations $\{y^0, G^0\}$ and $\{y^0 - B, G^0 + \Delta G\}$ in the same way whether we start in allocation $\{y^0, G^0\}$ and calculate the associated WTP or start in

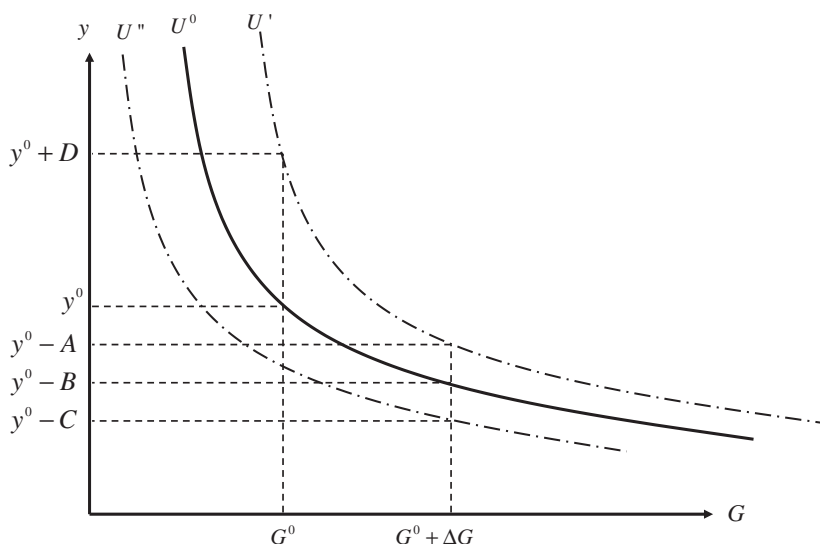


Fig. 1. Indifference curve in the y - G space and WTP/WTA measures for changes in G .

allocation $\{y^0 - B, G^0 + \Delta G\}$ and calculate the associated WTA. Since this is true for each individual, the fraction of people in a population who prefer the allocation $\{y^0 - B, G^0 + \Delta G\}$ over $\{y^0, G^0\}$ should then clearly be the same whether expressed based on a WTA or a WTP framing. This is the theoretical basis for our experiment, which we present in the next section.

Note that we will compare only two different allocations, and that these allocations are the same for the WTP and the WTA framings. This of course means that we do not aim to quantify the discrepancy between WTA and WTP, neither for an individual nor in terms of some average for our sample. Indeed, since we do not know each individual subject's WTP beforehand, we cannot make the appropriate initial monetary adjustments. Suppose that we guessed, incorrectly, that an individual would be willing to pay only A for the G improvement, starting from $\{y^0, G^0\}$. If we then asked the individual about his/her minimum WTA in order to accept a decrease in G by ΔG , starting from $\{y^0 - A, G^0 + \Delta G\}$, this WTA would of course in general not equal B . Indeed, from the indifference curve U' in Fig. 1 we obtain a WTA equal to $A + D$, which in Fig. 1 is considerably larger than B . Yet, depending on how the indifference curve U' is drawn, all WTA values above A are possible (while maintaining quasi-concavity and monotonicity). Similarly, if the initial income compensation in the WTA treatment is C where $C > B$, we instead end up on the lower indifference curve U'' . Then we can again not say whether the WTA associated with a G decrease from $G^0 + \Delta G$ to G^0 , starting from $\{y^0 - C, G^0 + \Delta G\}$, is smaller or larger than B , but only that it is smaller than C .

However, again, we are not concerned with measuring the size of the WTA–WTP discrepancies, but with testing whether the two allocations are ranked differently depending on whether they are presented based on a WTP or a WTA context.⁵

2.2. The extended model

Consider now an alternative model with an asymmetry between the WTA and WTP framings *per se*, i.e. in addition to possible differences due to conventional income and substitution effects. Assume that people derive utility from their experienced emotional state, E , which is assumed to arise from the actions in the moral sphere, in addition to their utility derived from y and G , as follows:

$$U = v(y, G) + E, \quad (2)$$

where v is strictly quasi-concave and twice continuously differentiable, and one may interpret the emotional state E as a reflection of conscience.⁶ If the individual contributes to an increased G , then the emotional state improves such that:

$$E = E^0 + \alpha f(\Delta G), \quad (3)$$

where $\alpha > 0$ and $f'(\Delta G) > 0$. If, on the other hand, the individual contributes to a decreased G , then the emotional state deteriorates as follows:

$$E = E^0 - \beta f(\Delta G), \quad (4)$$

where $\beta > \alpha > 0$. Thus, there is an asymmetry such that the emotional improvement of causing an increased G is smaller than the emotional loss of causing an equally large decrease in G . Consider now again the point of departure $\{y^0, G^0\}$ together with the WTP question of how much the individual would pay for a ΔG increase in G . Denoting this amount CV , we have:

$$v(y^0, G^0) + E^0 = v(y^0 - CV, G^0 + \Delta G) + E^0 + \alpha f(\Delta G). \quad (5)$$

Consider next the WTA that the individual would need in compensation for a ΔG decrease in G , when starting from $\{y^0 - CV, G^0 + \Delta G\}$. Denoting this amount EV it follows that:

$$v(y^0 - CV, G^0 + \Delta G) + E^0 = v(y^0 - CV + EV, G^0) + E^0 - \beta f(\Delta G). \quad (6)$$

Combining (5) and (6) we obtain:

$$v(y^0 - CV + EV, G^0) - v(y^0, G^0) = (\beta - \alpha)f(\Delta G). \quad (7)$$

The right-hand side of (7) is clearly larger than zero if and only if $\beta > \alpha$. Since the sub-utility function v is monotonically increasing in y , we clearly have that $EV > CV$ if and only if $\beta > \alpha$. In other words, given that the initial conditions are modified in the suggested way, the individual would be willing to pay more in the WTA treatment than in the WTP treatment if and only if $\beta > \alpha$, i.e. if and only if the emotional reactions of induced G changes are asymmetric and larger in the WTA treatment.⁷

2.3. Hypotheses

We are now ready to specify a number of hypotheses that are testable with an experimental design where the initial conditions are modified as outlined above. Let us start with the conventional theory, suggesting that the framing should not matter *per se*:

⁵ Note again that, according to conventional theory, this ranking should be the same regardless of whether WTA exceeds WTP without any initial income compensation in the WTA treatment, or for any other income compensation than the one corresponding to the WTP based on the initial allocation.

⁶ See e.g. Brekke, Kverndokk, and Nyborg (2003) and Nyborg and Brekke (2010) for other models of moral motivation.

⁷ Presumably, the consequences for the WWF project resulting from an additional individual donation is small in the present experiment. Indeed, if the subjects take G as given, then clearly everything is driven by the changes in E in the discussed model. Still, the experimental design isolates the effects through E also in the case where the subjects do not take G as given.

Hypothesis 0. People are equally willing to donate to the WWF project in the WTP and in the WTA treatments.

Opposing this hypothesis, we have our alternative theory:

Hypothesis 1. Those in the WTA condition donate to the WWF project to a larger extent than those in the WTP condition.

Provided that the results are consistent with [Hypothesis 1](#), the following explanation is suggested:

Hypothesis 2. Not donating to the WWF project causes stronger negative emotions, such as shame, in the WTA condition than in the WTP condition.

Since the emotional reactions are supposed to arise for moral reasons, we have:

Hypothesis 3. Not donating to the WWF project is perceived to be less moral, or more immoral, in the WTA condition than in the WTP condition.

Since our alternative theory above suggests that the *only* reasons why people would be more willing to donate in the WTA treatment are differences in emotions and moral perception, we have:

Hypothesis 4. When correcting for differences in relevant negative emotions and moral perceptions, there is no remaining statistically significant difference between the conditions with respect to the extent to which people donate to the WWF project.

Thus, if [Hypothesis 4](#) is correct, then emotions and moral perceptions account for all or almost all of the WTA–WTP discrepancy observed. While the empirical results reported in [Section 4](#) turn out to be inconsistent with [Hypothesis 0](#) in terms of reflecting the conventional theory, they are broadly consistent with all other hypotheses.

3. The experiment

Ninety-nine students recruited from a pool of subjects participated in the study. The participants were randomly assigned to two groups of approximately the same size, with 34 females and 17 males in the WTA group and 28 females and 20 males in the WTP group. The study was conducted as a single real-money dichotomous-choice experiment. This procedure was chosen because we wanted to make certain that the monetary choice conditions were identical in both conditions. Following [Plott and Zeiler \(2005\)](#), we also ensured that the experimental design fulfilled the requirements of subject anonymity, of an incentive-compatible elicitation mechanism and of the procedures being simple enough to prevent misunderstandings.

One week before the actual experiment, the participants were contacted by e-mail. Once they had accepted participating in the study, a new e-mail informed the participants about the prerequisites of the respective condition they were randomly assigned to. Participants in the WTP condition were informed that they would receive SEK 150 (approximately 20 US dollars) for their participation. In the WTA group, the participants were instead informed that they would be paid SEK 50 for participating and that an additional SEK 100 would be donated to the World Wide Fund (WWF) for Nature's ongoing project 'Protecting the Swedish otter'. We assumed that most people have a favourable attitude towards the WWF and believe that the organisation contributes to environmental protection. Since the otter project was presently going on in Sweden, the decision situation introduced in the experiment was realistic. Nobody declined participation after having been informed about the compensation.

At the time of the experiment, the participants were reminded about their compensation. At the same time, they were informed that they now had a choice. Those in the WTA condition were told that rather than donating to the WWF, they could keep all money for themselves. The participants in the WTP condition were informed that although they could keep all the money, they could instead donate SEK 100 to the WWF otter project and keep SEK 50 for themselves. It was emphasised that the choice was entirely up to them. Furthermore, we used a double-blind procedure, and the instructions made clear that the choice was perfectly anonymous (see [Appendix A](#)). This procedure was used since there is evidence that the degree of anonymity may strongly affect people's responses in this type of choice situation ([Hoffman, McCabe, Shachat, & Smith, 1994](#); [List, Berrens, Bohara, & Kerkvliet, 2004](#)). The money and, where appropriate, a receipt for the payment to the WWF were sent to the participants within a week after the experiment.

Hence, the participants in both groups chose between keeping all the money for themselves (alternative A) and donating SEK 100 to the WWF and keeping SEK 50 (alternative B). Consequently, the conventional microeconomic theory for the typically observed WTA–WTP discrepancy can clearly not explain any differences here, since the monetary outcomes are identical in both settings.

After they had been instructed about their choice alternatives but before they made their choices, the participants rated *affect* with regard to choosing A and B, respectively. We use self-reported emotions following e.g. [Bosman and van Winden \(2002\)](#) and many studies in psychology.⁸ Following [Peters et al. \(2003\)](#), the posed question was: 'If you choose alternative A/B,

⁸ This is by far the most common method in psychology, and it is generally not considered to be less reliable than physiological measures (e.g. skin conductance or neural responses) or behavioural changes such as facial expressions. According to [Robinson and Clore \(2002, 934\)](#): 'Self-report is the most common and potentially the best (...) way to measure a person's emotional experiences.' [Ben-Shakhar, Bornstein, Hopfensitz, and van Winden \(2007\)](#) found a positive correlation between self-reported and physiologically measured emotions, and argued that this finding supports the use of self-reported emotions. Moreover, 'social emotions' such as shame and guilt are difficult to assess directly through physiological or behavioural measures ([Adolphs, 2002](#); [Tangney & Dearing, 2002](#)).

how will you feel?' The question was followed by sixteen different emotions, and the respondents rated themselves in terms of each emotion on a 0–4 scale: 'not at all' (0), 'a little' (1), 'slightly' (2), 'quite a bit' (3), and 'very intense' (4). Eleven of the emotions represented the negative domain and were sampled from PANAS-X (Watson & Clark, 1994) and Higgins (1987): *Dissatisfied with self*, *Disgusted with self*, *Ashamed*, *Guilty*, *Uncomfortable*, *Annoyed*, *Tense*, *Uneasy*, *Bothered*, *Embarrassed* and *Feeling downcast*. *Regretful* was added to this list. Also included were four emotions, taken from the same sources, measuring positive affect: *Happy*, *Satisfied*, *Calm* and *Confident*. *Immoral* was captured by asking to what extent it was perceived to be morally good or bad to choose alternative A and B, respectively. Responses were given on a 0–6 scale that was anchored by 'morally very bad' (6) and 'morally very good' (0), with a mid-point of 'neither morally good nor bad' (3).

4. Results

Table 1 reveals that the donation choices differ significantly and substantially between the framings; in the WTP setting only 9 out of 48 participants chose to donate while in the WTA group 23 out of 51 did. This finding is consistent with Hypothesis 1.

The reported strength of the negative feelings from not donating to the WWF generally appears to be quite weak. This is not surprising given that a clear majority chose not to donate. Concerning differences between the groups, negative emotions

Table 1
Mean index values of choice (donate or not).

	WTP framing	WTA framing	t-Test for equal means Prob-value (2-tailed)	Wilcoxon-Mann-Whitney test for the same underlying distribution Prob-value
Share donating to WWF	18.7%	45.1%	0.005***	0.005***
<i>Anticipated emotions if choosing A (not donate)</i>				
Annoyed	0.79	1.33	0.008***	0.004***
Embarrassed	0.81	1.16	0.088*	0.099*
Uneasy	0.91	1.10	0.395	0.329
Happy	2.44	2.08	0.138	0.138
Disgusted with self	0.79	1.33	0.012**	0.014**
Regretful	0.79	1.39	0.007***	0.009***
Tense	0.75	0.96	0.230	0.177
Calm	2.46	2.31	0.504	0.796
Feeling downcast	0.46	0.65	0.280	0.525
Bothered	0.73	0.96	0.249	0.132
Guilty	0.83	1.12	0.180	0.091*
Satisfied	2.08	1.78	0.197	0.174
Dissatisfied with self	0.75	1.53	0.000***	0.001***
Uncomfortable	0.90	1.29	0.059*	0.050**
Ashamed	0.62	1.29	0.001***	0.000***
Confident	2.48	2.29	0.461	0.498
<i>Anticipated emotions if choosing B (donate)</i>				
Annoyed	0.71	0.57	0.447	0.218
Embarrassment	0.25	0.24	0.899	0.609
Uneasy	0.62	0.57	0.747	0.918
Happy	2.19	2.51	0.156	0.096*
Disgusted with self	0.79	0.63	0.402	0.637
Regretful	1.15	0.88	0.260	0.251
Tense	0.62	0.49	0.429	0.636
Calm	2.29	2.45	0.466	0.362
Feeling downcast	0.54	0.47	0.661	0.539
Bothered	0.35	0.39	0.786	0.950
Guilty	0.29	0.29	0.987	0.755
Satisfied	2.31	2.45	0.552	0.470
Dissatisfied with self	0.79	0.68	0.601	0.421
Uncomfortable	0.54	0.49	0.773	0.940
Ashamed	0.15	0.14	0.934	0.923
Confident	2.42	2.57	0.531	0.351
Perceived immorality if choosing A (not donate)	3.04	3.76	0.016**	0.022**
Perceived immorality if choosing B (donate)	1.22	1.00	0.298	0.170
n	48	51		

Notes: Emotions are measured on a 0–4 scale, and immorality on a 0–6 scale for the WTP and WTA framings, respectively. Standard deviations are presented in parentheses. Alternative A implies SEK 150 to oneself, whereas alternative B implies SEK 50 to oneself and SEK 100 to the WWF (irrespective of framing). Superscripts *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, or better, respectively.

Table 2
Probit regression, marginal effects, on the choice to donate.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
WTA framing	0.263*** (2.94)	0.204** (2.18)	0.194** (2.05)	0.151 (1.49)	0.143 (1.49)	0.136 (1.41)
Perceived immorality if choosing A (not donate)		0.132*** (3.50)	0.119*** (3.10)	0.043 (0.97)	0.045 (1.10)	0.043 (1.05)
Perceived immorality if choosing B (donate)			−0.077 (1.45)	−0.079 (1.38)	−0.057 (1.07)	−0.048 (0.85)
Negative emotions if choosing A (not donate)				0.301*** (3.39)	0.260*** (3.03)	0.214** (2.22)
Negative emotions if choosing B (donate)					−0.376*** (2.95)	−0.283* (1.79)
Positive emotions if choosing A (not donate)						−0.091 (1.14)
Positive emotions if choosing B (donate)						0.049 (0.63)
Log likelihood	−58.27	−51.57	−50.50	−43.12	−38.69	−38.04
N	99	99	99	99	99	99

Notes: The parameters reflect marginal effects; *t*-values (absolute values) are shown in parentheses. The explanatory variables reflect the WTA framing (0–1 scale), perceived immorality (0–6 scale) and the negative and positive emotion clusters (0–4 scale). Superscripts *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, or better, respectively.

were stronger in the WTA framing, consistent with [Hypothesis 2](#); the largest differences were found for the negative emotions *Annoyed*, *Disgusted with self*, *Regretful*, *Uncomfortable*, *Dissatisfied with self* and *Ashamed*, which follows intuition given the moral character of the issue. We have no clear hypotheses regarding the emotions associated with choosing the altruistic alternative, i.e. donating to the WWF project, and there were no significant differences between the groups, based on a simple equal means *t*-test. Consistent with [Hypothesis 3](#), we found that the perceived degree of immorality for choosing not to donate was higher in the WTA framing.

Before testing [Hypothesis 4](#), we reduced the number of emotions by means of factor analyses. A factor analysis of the ratings of the 16 emotions (varimax rotation and principal extraction method) associated with alternative A (keeping all money for oneself) revealed two factors with eigenvalues >1. One factor embraced all negative emotions, explaining 42% of the variance (Cronbach's Alpha = .94), while the four positive emotions loaded on the second factor contributing 19% ($\alpha = .79$). Extracting two factors in a second factor analysis on emotions associated with alternative B revealed one factor for negative emotions, contributing 33% ($\alpha = .91$) and one for positive emotions contributing 23% ($\alpha = .83$). We computed an emotion index for each of the four factors by taking the mean rating corresponding to the respective factor.

In order to test [Hypothesis 4](#) we ran a hierarchical probit regression, reported in [Table 2](#), where the choice to donate (or not) was the dependent variable. In Model 1, where we do not correct for emotions or perceived immorality, the parameter associated with the WTA framing is positive and highly significant, again consistent with [Hypothesis 1](#). The reported marginal effect of 0.263 means that the probability to donate is 26.3% points larger based on the WTA framing compared to the WTP framing. In Model 2, including the degree of immorality of choosing A, the effect of framing, although reduced, is still positive and significant at the 5% level. The immorality parameter is significant and reflects that the more immoral it is perceived to choose A (not donate), the more likely is the choice to donate, which follows intuition. Adding the perceived immorality of choosing B (donate) in Model 3 does not change this picture. In Model 4 we also include negative emotions associated with choosing A (not donate), and the associated parameter is highly significant, consistent with the described results presented. Moreover, and in line with [Hypothesis 4](#), the effect of framing is no longer significant, and the same applies to the parameters associated with the perceived immoralities. In Model 5 we include negative emotions of choosing B, i.e. of donating. Interestingly, and perhaps somewhat surprising, this effect turned out to be highly significant, while the pattern otherwise is largely unchanged, i.e. in line with [Hypothesis 4](#). Finally, as shown in Model 6 incorporating positive emotions associated with the alternatives does not change the overall picture, although the significance degrees associated with the negative emotion are somewhat reduced. The results thus suggest that affective responses associated with a moral reaction could account for most of the WTA–WTP discrepancy typically observed when valuing public goods.⁹

The results based on likelihood ratio tests are similar. We can reject Model 1 in favour of any of the Models 2–6 individually at the 1% significance level. We can also reject Model 2 in favour of any of the Models 4–6 individually at the 1% level, but we cannot reject Model 2 in favour of Model 3 at the 10% level. Similarly, we can reject Model 3 in favour of any of the

⁹ In an earlier version of this paper (Biel, Johansson-Stenman, & Nilsson 2011) we instead applied the extreme bound analysis suggested by Leamer (1983), Leamer (1985), where we always included an intercept and the framing dummy variable, and then included all possible combinations of potentially important emotions and perception of immorality. A variable was considered to be robust if the associated parameter did not change sign and always had a *t*-statistic of two or higher, implying that the parameter in each of the regressions was significant at the 5% level or better. In our case the variables *Disgusted with self* and *Regretful* turned out to be robust, but no others. We therefore ran the regressions with only these emotions together with and without an immorality variable. Again we found, in line with [Hypothesis 4](#), that the WTA framing parameter was statistically insignificant at conventional levels for both of these specifications.

Models 4–6 individually at the 1% level. Finally, we can reject Model 4 in favour of any of the models 5–6 individually at the 1% level, but we cannot reject Model 5 in favour of Model 6 at the 10% level.

5. Conclusion

This paper has analysed whether differences in emotions and moral perceptions can account for parts or all of the discrepancy found between a WTA and a WTP framing when ranking two allocations involving a good with a perceived moral character. In a simple valuation experiment where the monetary outcomes with respect to money given to the participants themselves and to a WWF project are identical in the two framings, it is shown that after correcting for measured affective influences and moral reactions, there is no significant remaining difference between the WTA and the WTP framings. Since there is no corresponding ethical dimension when valuing standard consumption goods, this finding resembles the result in [Plott and Zeiler \(2005\)](#), who found no significant WTA–WTP discrepancy in the valuation of lotteries and mugs when using a design that is incentive compatible (like ours) and that simultaneously attempts to control for different kinds of misconceptions. Similarly, using luxury chocolates, [Bateman et al. \(2005\)](#) found quite small differences for most comparisons.

We conjecture that emotional experiences, and possibly moral perceptions, may well also explain why the observed WTA–WTP gap is typically larger for public than for private goods. In order to shed light on the extent to which the results here can be generalised, we encourage the use of alternative experimental setups, goods (including standard consumption goods) and follow-up questions, and possibly also an fMRI machine to measure emotions in an alternative way.

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Appendix A. Instructions to participants (translated from Swedish)

A.1. Initial information to the respondents in the WTP treatment

Welcome, and thank you for participating in this study!

In line with earlier information, you will receive SEK 150 as a compensation for your participation.

Now, if you wish, you may instead choose to donate SEK 100 out of the 150 to the World Wide Fund for Nature's (WWF) ongoing project 'Protecting the Swedish Otter'.

A.2. Initial information to the respondents in the WTA treatment

Welcome, and thank you for participating in this study!

In line with earlier information you will receive SEK 50 while SEK 100 will be donated to the World Wide Fund for Nature's (WWF) ongoing project 'Protecting the Swedish Otter'.

Now, if you wish you may choose to keep the SEK 100 that otherwise would have gone to WWF.

[The following part of the instructions was identical for both treatments.]

We have no opinion in the matter and your choice is completely anonymous. You will receive your money and, if applicable, a receipt for the donation to WWF in your mailbox within a week from now.

To guarantee anonymity, the payment will be made as follows: Next to you is an envelope where you write your name and the address to which the money should be sent. After you have done that, place the envelope upside down. When you are through with the questionnaire, please leave it on the table. Our research assistant will check which option you chose and then put the corresponding amount in the envelope *without looking at your address*. Should you choose to donate to WWF, the same assistant will transfer the money and put the receipt in the same envelope. He will then mail it and you will receive the envelope within a week. This procedure is used to guarantee complete anonymity. In the data set that will be analysed by the researchers, no names or any other information that can be used to identify individuals will appear. Nobody except yourself will know which choice you made.

If you have understood the instructions, please turn to the next page.

(New page)

You may choose between two alternatives, A and B.

Alternative A. You will receive SEK 150.

Alternative B. You will receive SEK 50 and the WWF SEK 100.

Before you make your choice, if you choose alternative A, how will you feel? (you receive SEK 150):

	Not at all	A little	Slightly	Quite a bit	Very intense
Annoyed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...
...
Tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(New page)

If you choose alternative B, how will you feel ? (You receive SEK 50 and the WWF SEK 100):

	Not at all	A little	Slightly	Quite a bit	Very intense
Annoyed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...
...
Tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(New page)

Now it is time for you to make your choice. Again, we have no opinion in the matter and your choice is completely anonymous.

Do you choose alternative A or B?

- Alternative A. You will receive SEK 150.
- Alternative B. You will receive SEK 50 and the WWF SEK 100.

(New page)

The choices of consumers or citizens may be affected by many factors. In certain areas, moral aspects can play a role. Consider the choice you just made from a moral perspective.

How morally good or bad do you consider Alternative A (you receive SEK 150) to be?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morally very bad	Morally pretty bad	Morally rather bad	Neither nor	Morally rather good	Morally pretty good	Morally very good

How morally good or bad do you consider Alternative B (you receive SEK 50 and the WWF SEK 100) to be?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morally very bad	Morally pretty bad	Morally rather bad	Neither nor	Morally rather good	Morally pretty good	Morally very good

Thank you for your assistance!

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