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WTA-WTP disparity for vegan food products

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Abstract

There has been an enormous amount of research on the disparity between the willingness-to-accept (WTA) and the willingness-to-pay (WTP), however if you look at the changing world in terms of sustainability and vegan foods the body of literature is still lacking. Therefore, the main point of research was to investigate whether the WTA and WTP differ for some chosen vegan foods. With the use of data from a survey with 124 valid responses, mostly under students, an answer to this was given with the use of OLS regressions. The research also looked at the role of independent variables often used in WTA-WTP research in the case of vegan foods. These variables are loss aversion, valuation uncertainty, familiarity, opinion about vegan foods, gender, age and income. The analysis points out that for vegan foods on average the WTA is significantly higher than the WTP. In terms of other results, lower valuation uncertainty turned out to increase the gap which opposes some available literature. For gender, males showed a higher gap than women also opposing some research. Most other variables showed insignificant results. With the expected growth of vegan foods, this research can function as a starting point for future research.

Table of contents

1	Introduction	5
2	Theoretical framework	7
2.1	<i>WTA-WTP gap</i>	7
2.2	<i>WTA-WTP gap for loss aversion</i>	9
2.3	<i>WTA-WTP gap for opinions about vegan foods</i>	10
2.4	<i>WTA-WTP gap under uncertainty</i>	10
2.5	<i>WTA-WTP gap with familiarity</i>	11
2.6	<i>WTA-WTP gap for age</i>	11
2.7	<i>WTA-WTP gap for income</i>	12
2.8	<i>WTA-WTP gap for gender</i>	12
3	Methodology	14
3.1	<i>Survey</i>	14
3.1.1	<i>Survey set-up</i>	15
3.2	<i>Methodological approach</i>	19
3.2.1	<i>Dependent variable</i>	19
3.2.2	<i>Independent variables</i>	20
3.2.3	<i>Analysis</i>	21
3.2.4	<i>Regressions</i>	21
4	Results	23
4.1	<i>Descriptive statistics</i>	23
4.1.1	<i>Dependent variable</i>	23
4.1.2	<i>Independent variables</i>	25
4.2	<i>T-tests gaps</i>	27
4.3	<i>OLS regression analysis</i>	29
4.3.1	<i>Assumptions</i>	29
4.3.2	<i>Regression results</i>	30
4.3.3	<i>Multiple regression</i>	32
4.3.4	<i>Bivariate regressions</i>	34
4.3.5	<i>Gaps for individual products</i>	34
4.3.6	<i>Individual WTA and WTP regressions</i>	36
4.3.7	<i>Robustness check(s)</i>	37
4.3.8	<i>Summary of the main findings</i>	40
4.3.9	<i>Hypotheses</i>	41
5	Conclusion & Discussion	42
5.1	<i>Conclusion</i>	42
5.2	<i>Discussion</i>	44
6	Bibliography	45
7	Appendix	49
7.1	<i>Other regression results</i>	49

7.2 *Qualtrics survey*52

1 Introduction

The difference between the willingness-to-accept (WTA) and the willingness-to-pay (WTP) is one of the most researched disparities in the field of behavioural economics. Where on the one hand the willingness-to-accept of a person can be derived by endowing them with a product/object, after which they are asked for what amount they would be willing to give up the product/object. On the other hand, the willingness-to-pay can be derived by asking them the amount they would be willing to pay for a product/object when they don't own it. So, essentially the difference between the two is about how much the person is willing to pay (WTP) to obtain the product and for what amount he/she would sell the product (WTA). With all the research that has been done on this subject you would believe there would have been a consensus about the existence of the disparity. However, after reading numerous studies and the review of Horowitz & McConnell (2002) you still see differences in the outcomes concerning the WTA-WTP disparity. For instance, research done by Georgantzís & Navarro-Martínez (2010) shows a WTA/WTP ratio of 1.47 which they say is somewhat lower than the average of 2 found in previous research. But it's in line with other studies that also come to a ratio of about 1.5 (Loewenstein & Adler, 1995; Lerner et al., 2004). Another study finds a median WTA-WTP ratio of 2.5 amongst 14 real cash experiments (Brown & Gregory, 1999). Some other studies come to results where the difference between the WTA and WTP is not statistically significant (Shavit et al., 2006). Which shows that not all research done on the WTA-WTP disparity led to the same results/conclusions. There is also a strand of researchers who say that the WTA-WTP disparity and even other exchange asymmetries are mainly due to the inexperience and mistakes of the tested subjects (Knez et al., 1985; List, 2003; Shogren et al., 1994). This is just a small glimpse of all research done which shows that differences in the broader picture of WTA-WTP research can also be expected. Highlighting the necessity to keep accumulating new results on this subject.

Given the increased role of sustainability and the rising popularity of vegan foods, investigating the WTA-WTP disparity in context to these products seems as an interesting option. These products have been gaining significant interest in people's daily life which makes it worthwhile investigating whether the disparity also exists for these products. In relation to this, examining whether the gap differs for different demographics and independent variables such as loss aversion and familiarity

could be of interest. The role of valuation uncertainty could also be of relevance to the WTA-WTP gap. In most research it has been found that a higher level of uncertainty leads to a higher gap. Contrary to this, the role of vegan foods and its link to the environment and sustainability may lead to a different outcome. Cause in that light people may be more willing to pay a higher price when their uncertain, just to ‘prove’ their role in behaving sustainable. While a higher level of certainty may lead to a lower price in the sense that you don’t want to be the ‘fool’ to overpay.

The growth of interest in the vegan food market can be seen when looking at the research done by Fortune Business Insights (2022) and Expert Market Research (2022) where they look further into the size and the growth rate of the global vegan food market. They forecast a growth rate of 12.95% and 10.1% respectively in the period between 2023-2028. Comparing this to a growth rate of 6.21% (2023-2027) expected for the whole food industry in the research by Statista (2023), a considerable difference is observed. This difference is a good indicator of the relevance of vegan products in the coming years, which makes them interesting for research. The results of this research can be relevant by ‘simply’ gaining an insight in whether there is a difference between the willingness to accept and the willingness to pay. But maybe even a more interesting fact can be what companies and policy makers can do with it. For both companies and policy makers it can be valuable to look whether there are certain things they can do to with the information gained from this research.

The findings of this research can provide more insight in the domain of WTA-WTP disparities and also in relation to vegan food. With the growing relevance of these products in past years and the expected growth of the market size of this industry it’s important to investigate. Mainly to gain more insights for this ‘newer’ product group. Also, to keep contributing to the existing literature concerning the WTA-WTP gap, due to there still being lots of different findings and conclusions. Given this information we can derive the following research question:

What is the size of the WTA-WTP gap for vegan food products?

The structure of this thesis will be as follows: The theoretical framework and the hypotheses to the research question will be discussed in section 2. In section 3 the methodology of this thesis will be

discussed and explained. In the 4th section the empirical results will be discussed. In section 5 the conclusion and the discussion will be discussed.

2 Theoretical framework

2.1 WTA-WTP gap

From the neoclassical view of economics and the homo-economicus concept, it would be expected that all actors behave rationally and have access to complete information. In the light of the WTA-WTP disparity it would then be assumed that individuals assign the same value to the products, regardless of whether they are endowed with the product or not. So, in the essence of the neoclassical view the gap between the WTA and the WTP should not exist based on the principles assumed. But as seen in some studies stated in the introduction this is not always the case (Georgantzís & Navarro-Martínez, 2010; Loewenstein & Adler, 1995; Lerner et al., 2004). These studies provide evidence that people can show differences in their WTA and WTP, in contrast to what is expected by those neoclassical principles.

One interesting theory that could explain the gap between WTA and WTP could be the endowment effect. This effect is mainly about how people assign higher values to products they own, which can be linked to the concept of loss aversion. Loss aversion suggest that losses of the same size are experienced as more painful than gains. Thus, in terms of the loss aversion, we can say that people require more compensation to sell a product (WTA) than they would pay for the product (WTP) (Kahneman & Tversky, 1979). The endowment effect has also been tested by Kahneman et al., (1990). In their experiment they confirmed the endowment effect, because the participants that were endowed with the products assigned higher values to them. Other studies like Knetch & Sinden (1984) and Boyce et al., (1992) further support the claims for the endowment effect.

Another explanation for the WTA-WTP disparity is the substitution effect. Which implies that people will expect or at least desire a larger compensation for the product when there are fewer substitutes/alternatives compared to what they're willing to pay for the product (Hanemann, 1991). Research by Adamowicz et al., (1993) suggests that the gap between the WTA and the WTP is reduced when there is a substitute for the product and the results for the two measures are both significant.

With the existence of a lot of studies concerning the WTA-WTP disparity there are also diverging conclusions amongst those studies. On the one hand there are studies that show empirical evidence of the gap between the WTA and the WTP. For instance, the studies by Georgantzís & Navarro-Martínez (2010), Loewenstein & Adler (1995); Lerner et al. (2004) all come to a WTA-WTP ratio of around 1.5. On the other hand, there are other studies that have found evidence of the gap/ratio not existing under certain circumstances. Research done by List (2003) suggests that the gap can be eliminated with market experience. When experience with the market and products increases, the difference between the WTA and WTP diminishes. Additionally, some studies argue that the gap is merely a consequence of participants' misunderstandings in the experiments (Plott & Zeiler, 2005). The study by Isoni et al., (2011) replicates this study and finds similar results in one of the experiments, but differing results in the other experiment, once again showing the variability in research about the disparity.

In the review of papers by Horowitz & McConnel (2002), it was found that the WTA-WTP gap is larger for public goods than for private goods. Food can be seen as a private good as the definition of a private good states that the ownership of a private good is restricted to the one who purchased the good. Private goods can also be traded, which is also the case for foods and in this thesis' case vegan foods. Linking the WTA-WTP gap to vegan food products its best to look at other studies concerning these products. One of those is the study done by Vermeir & Verbeke (2006), where it is found that due to the low perceived availability of sustainable food products, the actual amount of buying of these products is also low. So, due to the limited availability of these products they will be bought less which can contribute to a gap between the WTA and the WTP for people. For example, when one person has access to the products while another person may not have access, the prices he/she will require or pay can differ drastically from the prices the other person is requiring or wanting to pay. Factors such as ethical considerations and product familiarity may also influence the WTA-WTP gap for vegan products. With ethical considerations, people may value the consumption of vegan foods differently. One can attach a lot of value to it and see it as very important, while the other may not. Therefore, some people are willing to pay more for the products than others. People also attach values to what others think about them when they consume vegan foods or not (Ruby & Heine, 2011). This shows that there is also a more social/public side to these 'private' goods, where other people's opinions may alter their own decisions.

With the given literature it is visible that there is still a lot of unknown for the WTA-WTP gap for vegan products. Also, the conclusions in other research about the WTA-WTP generally lead to different outcomes and don't all agree with each other. But with the things we know from the given literature we can come up with a hypothesis for the research question of this thesis. The hypothesis is as follows:

H1: The willingness to accept (WTA) will be higher than the willingness to pay (WTP) for vegan food products.

This mainly follows from the fact that most of the studies that investigate the gap for products arrive at this conclusion and those who come to other conclusions are mainly due to errors in the experiment or things like experience in the markets.

2.2 WTA-WTP gap for loss aversion

Losses loom larger than gains, this is probably one of the most important 'claims' of the loss aversion principle. This means that consumers are more sensitive to losses than to gains (Kahneman & Tversky, 1979). This concept has been researched a lot and many supported the main findings. However, there is also research that doesn't confirm the findings of loss aversion, meaning loss aversion may be more nuanced than originally thought (Mukherjee, 2019). This was softly concluded by the author after looking at several papers that provided evidence against loss aversion. Gal & Rucker (2018) show in their review of the current evidence in favour of loss aversion, it is not supported that losses have more impact than gains. To link loss aversion to the WTA-WTP disparity, Brown (2005) states that the primary reason for the disparity is the unwillingness of subjects to suffer a net loss from transactions. Which can be seen as a sort of loss aversion, but in his eyes not the same kind of loss aversion as with the endowment effect. Not every consumer behaves the same as we can see with our own eyes every day and therefore people can and will make different decisions based on their own preferences and the type of product. Sayman & Onculer (2005) suggest that loss aversion can also depend on the moral pleasure of behaving in a responsible way when looking at environmental products. With this we come to the following hypothesis:

H2: The gap between WTA and WTP for vegan foods will be larger for people that show a higher degree of loss aversion.

2.3 WTA-WTP gap for opinions about vegan foods

The opinions people have about vegan foods can possibly also be of relevance for the difference between the WTA and WTP. Lerner et al. (2004) and Lin et al. (2006) show that the WTA-WTP disparity can be eliminated when the participants of an experiment are induced with negative emotions. Negative emotions about the product can cancel out the initial feelings of the participants when they're endowed with the good (WTA). Peters et al. (2003) show that when people have positive feelings about owning a ticket, they were willing to pay more for the ticket (WTP). On the other side when sellers had more negative feelings of not owning the ticket, they would require a higher amount to sell the ticket (WTA). So, from this you can see that the opinion of people towards the products can make for differences in their WTA and WTP. The following hypothesis follows from this:

H3: The gap between WTA and WTP for vegan foods will be larger when people have a more negative opinion about the products.

2.4 WTA-WTP gap under uncertainty

The level of uncertainty regarding the value of a product may have an interesting influence on the gap between the WTA and WTP. In a paper by Okada (2010) she comes to the conclusion that with a higher level of uncertainty on the value of the product, the difference between the WTA and WTP increases. Reilly & Davis (2012) correct an analysis given by Isik (2004), which stated that WTA increases and WTP decreases with the same amount when there is uncertainty about environmental quality improvements. However, Reilly & Davis (2012) say that this is incorrect and they state that WTA and WTP both drop when the uncertainty about environmental quality improvements increases, which can change the disparity in both directions. With increased uncertainty about the actual value an object represents the WTA-WTP disparity increases (Mueser & Dow, 1998). With this information we can derive the following hypothesis:

H4: The gap between WTA and WTP for vegan foods will be larger when people have higher valuation uncertainty.

2.5 WTA-WTP gap with familiarity

One could argue that familiarity has some connections with uncertainty, because when you are more familiar with a product or good, you'll most likely also be more certain about the actual value of the product. When we thus look back at the findings of Mueser & Dow (1998) you would expect to see that when a person is familiar with a product the WTA-WTP disparity will be smaller. This because familiarity lowers the uncertainty about the value. Research on stocks also supports this. When a stock receives a lot of publicity, the degree of familiarity also increases (Cao et al. 2007) lowering the uncertainty about the stock's value. With higher familiarity the actual value of the product should be less uncertain, lowering the disparity following the research used in the uncertainty part. This leads to the following hypothesis:

H5: The gap between WTA and WTP for vegan foods will be larger when people are less familiar with the products.

2.6 WTA-WTP gap for age

The effect of age on the WTA-WTP gap can also be an interesting factor to consider in research. Previous studies provide different results and perspectives on how age influences the disparity. In the review by Horowitz & McConnell (2002) it was found that students tend to have a lower ratio than the general public. Martín-Fernández et al., (2021) came with a different view as they found that people over the age of 65 in their study showed a lower gap between the WTA and WTP. Additionally, Rotteveel et al., (2020) show that the highest and lowest age groups have a higher disparity than the age groups between the two. So, we see some very differing conclusions about the role of different ages on the WTA-WTP disparity. From this we derive the following hypothesis:

H6: The gap between WTA and WTP for vegan foods will be larger when people are of a higher age.

2.7 WTA-WTP gap for income

A study done by Martín-Fernández et al., (2021) on the WTA-WTP gap concerning health care services for the Dutch population showed that a third of the participants had a higher WTA than their WTP. This gap increased even further for those with lower income. The income effect also affects the disparity, because this is about the change in demand for goods with an increase in income. However, Brown & Gregory (1999) argue that the income effect is unlikely to play a large role in the gap for goods like vegan food products. Because these goods are relatively cheap and there tend to be a lot of substitutes. Which links back to the substitute effect previously discussed. For higher income people you would expect that they would have a lower WTA, since they can rely more on their income level. This same reasoning can be used for their WTP, resulting it to also be higher because they most likely have a larger budget due to their higher income. Rotteveel et al., (2020) also show in their study that the disparity is larger for people with a low income than people with a high income. This leads to the following hypothesis:

H7: The gap between WTA and WTP for vegan foods will be larger for people with a lower income.

2.8 WTA-WTP gap for gender

The effect gender may have on the WTA-WTP disparity is also of interest in this paper. Because people can have other preferences which can lead to different preferences between genders. Adamowicz et al. (1993) show in their study that the males have a higher WTA-WTP disparity than females. Differing from this are the findings of Loewenstein (1996), where females were shown to exhibit a stronger endowment effect. With the link between the endowment effect and the WTA-WTP disparity this can also be a valuable insight. Another component of differences in gender is risk taking, as there has been lots of research that shows that males tend to behave riskier than females (Byrnes et al., 1999). This is confirmed by for instance the research of Charness & Gneezy (2012). With the WTP having a connection with the risk taking of a person we can expect that the WTP would be higher for males as the evidence shows that they are more risk seeking than females. This will potentially lead to a higher WTP for males. For the WTA we can go back to the link with the endowment effect where we saw earlier that Loewenstein (1996) reported that females

were shown to have a stronger endowment effect. This could lead to a higher WTA for females. From this we derive the following hypothesis:

H8: The gap between WTA and WTP for vegan foods will be larger for females than for males.

3 Methodology

In this section the methodology and the data used for this thesis will be discussed. Firstly, the survey, so things as the design, setup and software will be explained and this is followed with a more in-depth explanation for the used methods.

3.1 Survey

For answering the research question of this thesis, a combination of the existing literature and data on the WTA and WTP for vegan food products is needed. Since these types of products have been gaining most of their popularity in the past years there is almost no data available online. Even if there may be some data about this specific topic online, it could be hard to gather due to various reasons. Therefore, a survey was conducted to collect the data. The program used for the survey is Qualtrics. One of the reasons for this is that the data gathered from the questions in Qualtrics can be easily translated to a program like Stata or R for the analysis. The survey was mostly distributed to fellow economics students of the Radboud University and people near me, so friends, family, colleagues from work and other people I know. Other ways of distributing the survey such as the use of platforms like SurveySwap and SurveyCircle were also used. This was mainly done to increase the number of respondents and also attempt to increase the external validity in the sense of reaching a broader spectrum of answers to demographics and independent variables. If only students where to participate in the survey most of their answers will most likely fall in the same direction which could hurt the relevance of some independent variables.

Research done via an online survey can sometimes be argued to be less reliable since people may not perceive the question/situations as real which could cause them to act differently from when the situations would be real. But as can be seen in the review of various WTA-WTP studies by Horowitz & McConnell (2002), no significant differences in terms of results on the WTA-WTP disparity were found when comparing real and hypothetical (online) surveys. To make sure most of the respondents of the survey will answer the questions with their full attention and also complete all the questions of the survey, it can't take them too much time. Therefore, the survey included only a limited number of vegan food products. Also, the questions concerning the independent variables were not too extensive, while still giving enough information for the analysis.

3.1.1 Survey set-up

In this part an in-depth explanation on how the survey is made is given. The full survey can be found in the [appendix](#). The participants were first given a brief introduction to tell them what will be asked of them. After this the first block/part of the survey started in which they were asked questions about their demographics, so their age, income and gender. This was necessary to control for those independent variables later in the analysis and test hypotheses [6](#), [7](#) and [8](#). This is just a small block of three questions and will therefore take little time of the participants.

For the second part of the thesis, four questions concerning the willingness to pay (WTP) for four different vegan food products were asked. These questions all follow a general form where a brief introduction about the particular product is given. After which the participants are asked to suppose that they want to buy this certain product and give the maximum price they would be willing to pay for it. For answering they were given five options out of which they could choose one. The price options given are based on the real market price or the price of comparable products. If we have a look at the first question in this part for plant-based milk in figure 1 below, you can see the different options. In all of the questions the second option was the market price and from there I took steps of $\frac{1}{6} * \text{market price}$. So, for this question each step up or down was €0,40. The magnitude of the differences between the price options is the same for all the products even though the prices may differ. This is done to make it easier to draw conclusions on the WTA-WTP gap for all products combined.

Q13 *

With the rise of plant-based foods, also plant-based alternatives for milk are becoming more standard in people's daily life. Examples of these types of alternatives are oat milk, soy milk and some more. Suppose you want to buy one of these plant-based alternatives for milk, what would be the maximum price you would be willing to pay?

- €2
- €2,40
- €2,80
- €3,20
- €3,60 or more

FIGURE 1: QUESTION 1 OF PART 2 OF THE SURVEY

After the four questions concerning the WTP for the products, a question about the valuation certainty of the answers the participants had given was asked. This was necessary to test hypothesis 4. The question that was asked can be seen in table 1. The question was asked after both the WTP questions and the WTA questions, which will follow later. For the analysis when the certainty is higher (more to the right of the Likert scale) it would indicate more certainty about the value and thus a lower level of valuation uncertainty.

TABLE 1: QUESTION FOR VALUATION UNCERTAINTY

	Strongly uncertain	Somewhat uncertain	Neither certain nor uncertain	Somewhat certain	Strongly certain
How certain are you about the prices you answered in the previous questions?	1	2	3	4	5

The third part of the survey consisted of some questions concerning the familiarity with vegan foods, opinion about vegan foods and an elicitation for loss aversion. These questions are to test for hypotheses 5,3 and 2. Starting with familiarity for which the questions can be seen in table 2. Same as with the question about for valuation uncertainty a Likert-scale was used by which the respondents could indicate their familiarity with both the products from the questions in part two (question 1) and familiarity with vegan food products in general (question 2).

TABLE 2: QUESTIONS FOR FAMILIARITY WITH VEGAN FOODS

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am familiar with the vegan food products from the previous questions	1	2	3	4	5
I am familiar with vegan food products in general	1	2	3	4	5

For the opinion about vegan foods a comparable measure was used. One question about the opinion about the vegan foods in the question and one for the opinion about vegan foods in general. Both can be seen in table 3.

TABLE 3: QUESTIONS FOR OPINION ABOUT VEGAN FOODS

	Extremely negative	Somewhat negative	Neither negative nor positive	Somewhat positive	Strongly positive
What is your feeling about the vegan food products listed in the previous questions?	1	2	3	4	5
What is your feeling towards vegan food products in general?	1	2	3	4	5

These questions were followed with the loss aversion elicitation. Because loss aversion along with the WTA-WTP disparity has been researched a lot, there were lots of different elicitations to choose from. The BRET (Bomb Risk Elicitation Test) could be used to find the participants degree of loss aversion, but since this relies on monetary payments to effectively work this doesn't fit for this survey (Crosetto & Filippin, 2013). Therefore, the loss aversion measure used by Gächter et al., (2022) seemed as a fitting one. The participants where asked the question given in table 4.

TABLE 4: LOSS AVERSION ELICITATION

<p>In the following table you find a list of coin tosses with different payoffs. The payoffs differ in how much you lose if the coin turns up heads. For each row you need to indicate whether you want to toss the coin or not. To determine your payoff, one of the six rows will be randomly selected by rolling a six-sided die. If you have indicated that for the randomly selected row you want to toss the coin, then the coin will be tossed, and you will be paid accordingly.</p>		
	I don't want to toss the coin	I want to toss the coin
1. If the coin turns up heads, then you lose €2 ; if the coin turns up tails, you win €6 .	<input type="radio"/>	<input type="radio"/>
2. If the coin turns up heads, then you lose €3 ; if the coin turns up tails, you win €6 .	<input type="radio"/>	<input type="radio"/>
3. If the coin turns up heads, then you lose €4 ; if the coin turns up tails, you win €6 .	<input type="radio"/>	<input type="radio"/>
4. If the coin turns up heads, then you lose €5 ; if the coin turns up tails, you win €6 .	<input type="radio"/>	<input type="radio"/>
5. If the coin turns up heads, then you lose €6 ; if the coin turns up tails, you win €6 .	<input type="radio"/>	<input type="radio"/>
6. If the coin turns up heads, then you lose €7 ; if the coin turns up tails, you win €6 .	<input type="radio"/>	<input type="radio"/>

In the table you can see that the participant has to answer multiple questions about whether they would be willing to toss a coin given the different outcomes. For the first 4 options the participants should want to toss the coin, since the expected value of these options is positive. So, according to the theory all participants should accept these options. When they don't, you can say that they have a certain degree of loss aversion which can be calculated according to the methods used in Gächter et al., (2022). In this paper they state how the degree of loss aversion can be calculated and they

also perform the calculations and show the corresponding answers in a table. Therefore, I will use the answers they have gotten from their calculations and these can be seen below in table 5.

TABLE 5: DEGREE OF LOSS AVERSION

	Lottery choices	Number of respondents	Degree of loss aversion
7)	Reject all	8	>3.00
6)	Accept 1, reject 2 to 6	15	2.40
5)	Accept 1&2, reject 3 to 6	53	1.71
4)	Accept 1 to 3, reject 4 to 6	16	1.33
3)	Accept 1 to 4, reject 5&6	20	1.09
2)	Accept 1 to 5, reject 6	9	0.92
1)	Accept all	3	≤0.86

Then we come to the fourth and final part of the survey in which the questions concerning the willingness to accept (WTA) were asked. The questions in this part follow the same exact set-up as used for the WTP questions from part 2. The only changes that are made to test for the WTA are the fact that the participants now had to suppose that they own the product and that someone wants to buy it from them. Then they are asked for what minimum price they would be willing to sell the product to that person. The answer options are the same as for the WTP questions and the way the options are derived are also exactly the same, because this makes it easier to derive the gap between the WTA and the WTP for the analysis. Same as in the second part, the question for the valuation uncertainty is asked after the four WTA questions to test for hypothesis [4](#).

Let's now briefly talk about which products were chosen to be the vegan food products for the WTA and WTP questions. As said before there is not a lot of data available on these types of products for the WTA-WTP gap and therefore it was most important to look at the general WTA-WTP gap for the products combined. Thus, I have chosen four vegan foods which are quite known/popular nowadays. First of plant-based milks, which are increasing in popularity now and probably also in the future. This is shown by research of Gibson et al. (2022), in which they model the historic UK dairy consumption and update it to scenarios of dairy reduction and the adaptation of plant-based milks. This model projects that dairy will fall below plant-based alternatives around 2030. This shows how relevant plant-based products are in this changing world and how this thesis can contribute to this changing world. For the other products a vegan pokebowl and a vegan burger

were used, as these are also featuring more and more in supermarkets and restaurants. For the last product the choice fell on a bottle of vegan wine, because this product is a bit different from the other products just discussed. Research by Stanco, Lerro & Marotta (2020) shows that for regular wine drinkers innovative attributes such as vegan wines are seen as less important. This may lead to different answers for the vegan wine than for the other products. But as this previous study was conducted under regular wine consumers and my audience is not selected on this feature it may not be that relevant.

3.2 Methodological approach

In this section, the dependent and the independent variables will be discussed. Additionally, the types of regressions that are done in the analysis are given and discussed.

3.2.1 Dependent variable

The main dependent variable of this research is the normalized difference (gap) between the WTA and the WTP for the different products. This difference can be calculated from the answers to the questions of the survey for each product. The normalized WTA-WTP gap for a product is calculated with the following formula:

$$\text{Normalized WTA} - \text{WTP gap} = \left(2 * \frac{(WTA - WTP)}{(WTA + WTP)} \right).$$

The normalized gap is chosen to be better able to compare the gaps for the four different products. Because there are some big differences in the prices and therefore also relatively large differences in the normal WTA-WTP gap. With the normalized gaps it was easier to get a representative average for the overall gap. So, then we have our main dependent variable which is used for the regressions. Apart from the regression with the normalized gap, also regressions on the WTA and WTP separately for the different products are performed. This is done to see whether the independent variables may increase the WTA while decreasing the WTP for example. It helps with visualizing why the gaps increase or decrease due to specific factors. Next to these regressions, regressions for the normalized gap for the four different products are also done. Next to all the regressions with the normalized gap, for robustness some regressions are also done with the WTA-WTP gap and the WTA/WTP ratio.

3.2.2 Independent variables

The independent variables are age, income, gender, loss aversion, familiarity, opinion about vegan food and possibly valuation uncertainty of the participants. Age, gender and income are asked as demographics and therefore will be included as dummies in the analysis.

Loss aversion could be of influence to the WTA-WTP gap due to both being linkable to the endowment effect. Brown (2005) found that the two can be linked due to the fact that one of the primary reasons for the gap is the fact that subjects are unwilling to suffer a net loss in transactions. Attachment can be seen as another factor that influences the endowment effect. Masters, Mishra & Mishra (2017) suggested that attachment together with loss aversion may have an influence on the gap. These are just two papers suggesting a link between loss aversion and the disparity. Many other papers also suggest this relation, which signals the importance of this factor for this research.

The opinion of the participants towards vegan foods can also matter in the gap between the WTA and WTP. When the opinion about the product is more negative, the difference between the two can be cancelled out (Lin et al., 2006; Lerner et al., 2004). Those negative feelings can lower the WTA and therefore potentially also lower the gap. This shows how interesting the role of opinion can be towards the WTA-WTP disparity.

The familiarity with vegan foods can be of influence to the WTA-WTP gap, because when people are more familiar with the products they know more about their actual value. They could use this knowledge as sort of reference points, which can be compared to prices and other peoples' valuations.

Lastly cognitive (valuation) uncertainty could also be something that has an effect on the WTA-WTP gap. It can be interesting to include in the experiment to see if the WTA-WTP gap is larger for people with lower valuation uncertainty or maybe even the other way round. Therefore, after the questions about the vegan products (WTA and WTP), they're asked how certain they are about their answers. Research done by Enke & Graeber (2019) is about this cognitive uncertainty. In this research they ask a similar question for a lottery task, so they ask how certain the participant is about the lottery paying off the same as a certain amount of money. They found evidence that

cognitive uncertainty plays a role in choice making. This makes it interesting to also test it in this research to see to what degree it matters in this setup.

The variables age, income and gender are included in this research because papers in the past found that they influenced the WTA-WTP gap. Examples and also hypotheses are given in the theoretical framework.

3.2.3 Analysis

For the analysis of the results, firstly a regular OLS regression with the all variables stated above is performed. With the outcome of this the signs, relationships and the significance for the different independent variables can be seen. Together with this regular OLS regression, simple bivariate regressions between the dependent variable and all the independent variables on their own are done to see potential changes the signs or significance. Adding to this, regressions for the WTA and WTP separately for all products are done. Different robustness checks will also be performed to strengthen the results of the analysis. Looking at the WTA-WTP gap and WTA/WTP ratio instead of the normalized gap and seeing whether this changes or strengthens the results. Another robustness check is to run the first regression but then only for the separate products and not for all products. Lastly another robustness check for the variables familiarity and opinion is done. Where instead of using the familiarity and opinion on the specific products, the general familiarity and opinion with vegan foods is used.

3.2.4 Regressions

Main regression:

$$\begin{aligned} & \textbf{Normalized (WTA - WTP)gap} \\ = & \beta_0 + \beta_1 * \text{Confidence} + \beta_2 * \text{Familiarity} + \beta_3 * \text{Opinion} + \beta_4 * \text{Loss aversion} + \beta_5 * \text{Age}_{25-34} + \beta_6 \\ & * \text{Income}_{1500-2999} + \beta_7 * \text{Income}_{3000-4499} + \beta_8 * \text{Income}_{>6000} + \beta_9 * \text{Male} + \varepsilon \end{aligned}$$

In this regression familiarity and opinion are about the products asked in the questions.

Bivariate regression(s):

$$\textbf{Normalized(WTA - WTP)gap} = \beta_0 + \beta_1 * \text{Confidence} + \varepsilon$$

This is just the example for the bivariate regression of WTA-WTP gap and confidence, but for all the listed variables this regression is done.

Regressions WTA and WTP separately:

$$\begin{aligned} & \mathbf{WTA_{vegan\ milk}} \\ = & \beta_0 + \beta_1 * \text{Confidence} + \beta_2 * \text{Familiarity} + \beta_3 * \text{Opinion} + \beta_4 * \text{Loss aversion} + \beta_5 * \text{Age}_{25-34} + \beta_6 \\ & * \text{Income}_{1500-2999} + \beta_7 * \text{Income}_{3000-4499} + \beta_8 * \text{Income}_{>6000} + \beta_9 * \text{Male} + \varepsilon \end{aligned}$$

This regression is performed for all the WTA and WTP of the products, so in total 8 regressions.

Regression individual product(s):

$$\begin{aligned} & \mathbf{Normalized(WTA - WTP)gap_{vegan\ milk}} \\ = & \beta_0 + \beta_1 * \text{Confidence} + \beta_2 * \text{Familiarity} + \beta_3 * \text{Opinion} + \beta_4 * \text{Loss aversion} + \beta_5 * \text{Age}_{25-34} + \beta_6 \\ & * \text{Income}_{1500-2999} + \beta_7 * \text{Income}_{3000-4499} + \beta_8 * \text{Income}_{>6000} + \beta_9 * \text{Male} + \varepsilon \end{aligned}$$

This is also just an example for the regression of the WTA-WTP gap for vegan milk. The regressions for the other 3 products are the same, just the products that differ.

Robustness checks:

$$\begin{aligned} & \mathbf{\left(\frac{WTA}{WTP}\right) \text{ratio}} \\ = & \beta_0 + \beta_1 * \text{Confidence} + \beta_2 * \text{Familiarity} + \beta_3 * \text{Opinion} + \beta_4 * \text{Loss aversion} + \beta_5 * \text{Age}_{25-34} + \beta_6 \\ & * \text{Income}_{1500-2999} + \beta_7 * \text{Income}_{3000-4499} + \beta_8 * \text{Income}_{>6000} + \beta_9 * \text{Male} + \varepsilon \end{aligned}$$

For the first robustness check it's the same as the main regression, only the dependent variable has changed to the WTA/WTP ratio instead of the normalized gap.

$$\begin{aligned} & \mathbf{(WTA - WTP)gap} \\ = & \beta_0 + \beta_1 * \text{Confidence} + \beta_2 * \text{Familiarity}_{gen} + \beta_3 * \text{Opinion}_{gen} + \beta_4 * \text{Loss aversion} + \beta_5 * \text{Age}_{25-34} + \beta_6 \\ & * \text{Income}_{1500-2999} + \beta_7 * \text{Income}_{3000-4499} + \beta_8 * \text{Income}_{>6000} + \beta_9 * \text{Male} + \varepsilon \end{aligned}$$

In this regression the familiarity and opinion are about vegan foods in general.

4 Results

In this part the results and the analysis of the data will be discussed and explained. The descriptive statistics of both the dependent and the independent variables will be shown first. Then the standard tests for running a regression are done and explained. After this, the main regression analysis is done and followed by some robustness checks to strengthen the results.

4.1 Descriptive statistics

4.1.1 Dependent variable

TABLE 6: DESCRIPTIVE STATISTICS NORMALIZED WTA-WTP GAP

Variable	N	Mean	Std. dev.	Min	Pctl. 25	Median	Pctl. 75	Max
Gap _{normalized}	124	0.041	0.174	-0.371	-0.063	0.000	0.122	0.56
Gapmilk _{normalized}	124	0.047	0.194	-0.400	0.000	0.000	0.182	0.571
Gappb _{normalized}	124	0.016	0.175	-0.333	-0.154	0.000	0.154	0.571
Gapburger _{normalized}	124	0.040	0.212	-0.571	0.000	0.000	0.154	0.571
Gapwine _{normalized}	124	0.063	0.255	-0.636	0.000	0.000	0.182	0.636

Table 6 shows the descriptive statistics for the normalized WTA-WTP gap. As explained in the methodology the normalized gap is the main dependent variable because it makes the comparison between products easier to grasp. In the table the normalized gap for the four different products can be seen and also the average of the four products (gap_{normalized}). All gaps shown in the table are positive and together with the descriptive stats for the regular WTA-WTP gap and ratio, which can be seen in table 7, shows that the WTA is higher than the WTP. This is further investigated later on with the help of t-tests. The average normalized WTA-WTP gap is 0.041.

TABLE 7: STATISTICS WTA-WTP GAP AND WTA/WTP RATIO

Variable	N	Mean	Std. dev.	Min	Pctl. 25	Median	Pctl. 75	Max
Gap _{average}	124	0.324	1.574	-2.95	-0.556	0.000	0.775	5.55
Gap _{milk}	124	0.126	0.521	-1.2	0	0.000	0.4	1.6
Gap _{pokebowl}	124	0.387	3.356	-6	-3	0.000	3	12
Gap _{burger}	124	0.125	0.717	-2	0	0.000	0.5	2
Gap _{wine}	124	0.657	2.734	-7	0	0.000	1.5	7
Ratio _{average}	124	1.068	0.204	0.695	0.953	1.0042	1.142	1.783
Ratio _{milk}	124	1.07	0.222	0.667	1	1.000	1.2	1.8
Ratio _{pokebowl}	124	1.033	0.194	0.714	0.857	1.000	1.167	1.8
Ratio _{burger}	124	1.066	0.239	0.556	1	1.000	1.167	1.8
Ratio _{wine}	124	1.104	0.306	0.517	1	1.000	1.2	1.933

To give a bit of information about the table and also come back to the explanation for the choice of the normalized gap. The gaps for the vegan milk and burger are close to each other while for the vegan pokebowl and wine the gaps are a lot bigger. This is mainly due to the fact that the prices for these products are higher and therefore the gaps between the answers are bigger. An overall gap of 32 eurocents is found. The standard deviation concerning the gaps for the vegan pokebowl and wine are a lot higher in comparison with the other two. This again has to do with the higher prices of the pokebowl and the wine. Just to visualise this, for the vegan pokebowl they could choose between €15, €18, €21, €24 and €27 or more while for the vegan milk the options were €2, €2.40, €2.80, €3.20 and €3.60 or more. Meaning the gap can be larger in total numbers and therefore leading to a higher standard deviation. It is difficult to compare the results of the gap to the existing literature, since I look at the gap (in euro's) and most others look at the ratio between the two.

That's why the WTA/WTP ratio is also included in table 7. The average ratio is 1.068, which in comparison with results given by Horowitz & McConnell (2002) is very small. Adding to this other studies report findings of the ratio being 1.5 or close to 1.5 (Georgantzís & Navarro-Martínez, 2010; Loewenstein & Adler, 1995; Lerner et al., 2004). Which makes these results quite interesting as they're quite far from most of the mentioned literature.

4.1.2 Independent variables

TABLE 8: DESCRIPTIVE STATISTICS INDEPENDENT VARIABLES

Variable	N	Mean	Std. dev.	Min	Pctl. 25	Median	Pctl. 75	Max
Age (in years)	124	2.339	0.697	<18	18-24	18-24	25-34	45-54
Gender	124	1.597	0.525	Male	Male	Female	Female	Third-gender
Income	124	2.266	1.499	<1500	<1500	1500-2999	3000-4499	Prefer not to say
Familiarity _{foods(questions)}	124	4.089	0.963	1	4	4	5	5
Familiarity _{general}	124	3.96	1.07	1	4	4	5	5
Opinion _{foods(questions)}	124	3.79	0.895	1	3	4	4	5
Opinion _{general}	124	3.75	1.001	1	3	4	4	5
Loss aversion	124	1.65	0.554	0.86	1.09	1.71	1.71	3
Confidence	124	3.722	0.959	1	3	4	4.5	5

Table 8 shows relevant information concerning the independent variables used for the regressions. The most relevant information for the first three variables is the median, as these variables will be used as dummies and the median shows the largest category. In the regression the categories shown by the median will be used as the reference categories. Some other categories/dummies are not included in the analysis, due to their very small size. Those that are included can be seen in the regressions in the methodology or in the analysis later on.

For familiarity there are two variables, one concerning the familiarity with the vegan foods in the questions and the other about the familiarity with vegan foods in general. With both means being close to 4, familiarity with vegan foods seems to be quite high for this sample. Familiarity with the vegan foods in the questions was higher than for vegan foods in general, which is logical because there are lots of vegan foods that may be unknown to the public.

The opinion about vegan foods questions followed the same structure as familiarity, therefore there are also two variables for opinion in the table. Again, one for the opinion about the foods in the questions and the other for the opinion on vegan foods as a whole. With means of 3.79 and 3.75 the opinions about vegan foods seem to be positive. Same as with familiarity the opinion about the foods in the questions was a bit higher, which could potentially also be attributed to this higher familiarity.

Loss aversion was measured with the elicitation of Gächter et al., (2022) and in their paper they also included the calculations and answers for the degree of loss aversion. The mean degree of loss aversion is 1.65 for this sample, meaning that on average they're influenced by a degree of loss aversion. This sample shows results similar to those of Gächter et al., (2022) in terms of percentage of people showing loss aversion in a riskless choice. This is when they rejected gamble 4 (50% chance to win €6 and 50% chance to lose €5). In this paper 74.19% of respondents showed this loss aversion compared to the 71% of Gächter et al., (2022). Due to some unexpected answers for the loss aversion questions, some responses were deleted. An example of one of these strange responses was that they would accept one of the latter coin tosses but not the first one. From which no degree of loss aversion could be calculated.

Valuation uncertainty is given by the confidence about the values given. Where a higher level of confidence corresponds to a lower valuation uncertainty. The variable confidence is derived by taking the average of the WTP confidence and WTA confidence questions. The mean is 3.722, which means that this sample on average is quite certain about the values they answered. Thus, on average a lower level of valuation uncertainty.

4.2 T-tests gaps

To see whether the WTA and WTP for the different products significantly differ paired t-tests are performed. Also, one-way ANOVA tests are done for some variables to see whether different categories in this variable account for differences in the WTA-WTP gaps. These differences are further checked with the Tukey HSD tests. The results for these tests can be seen in table 9 below.

TABLE 9: PAIRED T-TESTS AND TUKEY HSD RESULTS

	<i>T-test</i>	<i>Tukey HSD</i>		
		Low group – High group		
	Mean diff.	Familiarity	Confidence	Opinion
WTA-WTP gap _{averaged}	0.324*	-0.3154	-0.7551	0.3934
WTA-WTP milk	0.126*			
WTA-WTP PB	0.387			
WTA-WTP burger	0.125			
WTA-WTP wine	0.657*			

*($p < 0.05$)

The mean difference between the WTA and WTP is significantly positive for two of the four individual products, vegan milk and wine. For the other two, pokebowl and burger, the difference is positive but insignificant. Thus, from these tests alone it cannot be said with confidence that the gap is there for these products. For the averaged WTA-WTP gap, the mean difference is positive and significant telling us that for the average vegan food product the WTA is higher than the WTP in this sample. This helps with answering the first and main hypothesis.

The one-way ANOVA tests were done to check for differences in the WTA-WTP gap between groups of low, medium and high for the three independent variables. Some p-values for these ANOVA tests came out significant, meaning that there were some significant differences between the groups in terms of the WTA-WTP gap. However, Tukey HSD tests pointed out that most of those differences were between the medium and low/high groups and not between low and high

groups of the independent variables. In table 9 these results can be seen. Those with a high familiarity turned out to have a higher gap than those with lower familiarity, opposing the hypothesis. For confidence the same result was found, consequently also opposing the hypothesis. The group with a more negative opinion (low) turned out to have a higher gap than those with a more positive opinion (high), which is in line with the hypothesis. Due to all these results being insignificant ($p > 0.05$), they don't provide evidence for those corresponding hypotheses.

4.3 OLS regression analysis

In this paragraph I will lead you through all the steps of the OLS regression analysis. First, we start with checking some assumptions in order to run a good regression. After which the main results to the regressions are shown which will be followed by some robustness checks. Some other tests are performed and will be mentioned briefly as they can be seen in the appendix.

4.3.1 Assumptions

Firstly, the correlation between the variables is checked to rule out possible highly correlated variables. In table 10 you can see the correlations between the different variables. Overall, most variables show low correlation with each other (correlation statistic below 0.3). The correlation between familiarity and opinion about vegan foods is the only one that can be considered to be moderately strong with a correlation of 0.399. With the information given by the matrix it can be said that there is no multicollinearity in the data. To test this even further a VIF test is performed. Results of which can also be seen in table 10 and with all the values in this test being below 10, which is the general rule of thumb for problems, multicollinearity should indeed not form an issue in the regression analysis.

TABLE 10: CORRELATION MATRIX & VIF RESULTS

<i>Variables</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	<i>VIF</i>
(1) Gap	1.000								
(2) Opinion	-0.042	1.000							1.219
(3) Familiarity	-0.004	0.399	1.000						1.238
(4) Loss aversion	-0.181	-0.020	-0.014	1.000					1.089
(5) Confidence	0.282	0.116	0.168	-0.153	1.000				1.109
(6) Age	0.027	0.102	0.137	-0.106	0.051	1.000			1.038
(7) Gender	-0.194	0.130	0.007	0.183	0.171	0.021	1.000		1.106
(8) Income	-0.158	-0.013	-0.072	0.042	-0.112	0.045	-0.059	1.000	1.024

Another assumption that is tested is whether the residuals are normally distributed. This can normally be tested with a Shapiro Wilk test but since the sample is greater than 100, the Kolmogorov Smirnov (KS) test is used. In this test the null hypothesis says that the residuals follow a normal distribution. With the p-value of this test being greater than 0.05, the null hypothesis can't be rejected. Thus, the residuals follow a normal distribution which is also confirmed by various plots of the residuals.

Lastly a test that must be performed is the test for homoscedasticity of the residuals of the regression. Which comes down to the variance of the residuals of the regression being constant. It is tested with the use of a Breusch-Pagan test. With the p-value being higher than the 0.05 threshold it can be concluded that there is no sign of heteroscedasticity. Thus, the variance of the residuals is constant and there is homoscedasticity in the regression.

4.3.2 Regression results

In this section the results of the regressions named in the methodology will be observed. So, the initial regression with some independent variables as dummies, the bivariate regressions of the individual independent variables on the dependent variable and individual regressions for the products and for WTA and WTP individually.

TABLE 11: MULTIPLE AND BIVARIATE REGRESSIONS NORMALIZED GAP

	Normalized WTA-WTP gap (average)	
	Multiple regression	Bivariate regressions
Confidence	0.0604**** (0.0004)	0.0517*** (0.0013)
Familiarity	-0.0100 (0.5551)	-0.0081 (0.6210)
Opinion	-0.0172 (0.3462)	-0.0161 (0.3610)
Loss aversion	-0.0175 (0.5291)	-0.0532* (0.0599)
Age (25-34)	0.0032 (0.9309)	0.0357 (0.3415)
Income (1500-2999)	0.0308 (0.4092)	0.0647* (0.0728)
Income (3000-4499)	0.0201 (0.6707)	0.0440 (0.3467)
Income (>6000)	-0.0958* (0.0693)	-0.0907* (0.0861)
Male	0.0797** (0.0120)	0.0661** (0.0362)
Observations	124	124
Multiple R-squared	0.1987	
Adj. R-squared	0.1354	

(P-value): ****(p=0) *** (p<0.01) ** (p<0.05) *(p<0.1)

4.3.3 Multiple regression

Table 11 shows the regression results of the averaged normalized WTA-WTP gap in relation to all relevant independent variables. The coefficients are rather small but that is due to the use of the normalized gap. The results of this regression are strengthened by the results of the WTA-WTP gap which can be seen in the table 16 of the [appendix](#).

The first and also a highly significant result that can be seen is the role of confidence on the normalized gap. The positive coefficient tells us that the higher the confidence, the bigger the normalized gap will be. With a high level of confidence corresponding to low valuation uncertainty, this makes for an interesting result. Previous literature has almost always found the opposite relation, higher valuation uncertainty leads to a higher gap. A possible explanation can be given for this opposite finding in the context of vegan foods/sustainability. With a higher degree of uncertainty (lower confidence), it can lead to people being willing to pay a higher price for the vegan foods. This has all to do with the link between vegan foods and sustainability, they want to signal that they care about the environment and are therefore willing to pay a higher price. Which would ultimately lead to a lower WTA-WTP gap. A different example of the same principle is that when people have a high valuation of a product in a second price-auction, they're often found to overbid (Fang & Cooper, 2008). Coming back to uncertainty, when the valuation uncertainty is lower (higher confidence) it could be the case that people want to pay less. This is mostly due to the fact that they have higher confidence/knowledge about the price and don't want to be the 'fool' to overpay for the products (Chapman et al., 2017). So, this would mean that higher confidence would increase the gap. Which is exactly the result that is shown in this experiment. But since this is still a very new point of view on this topic, it still lacks some more background/support in terms of previous literature. Reilly & Davis (2012) give a possible explanation where due to the higher or lower uncertainty, both the WTA and WTP can drop which lowers or increases the gap. This would suggest that the size of the gap can increase or decrease when there is either high or low valuation uncertainty. Therefore, also saying that different results can be found.

The next two independent variables are familiarity with- and the opinion about vegan food products. They both have insignificant negative coefficients, meaning that both these variables lead to a decrease in the normalized gap when they themselves increase. This is consistent with the

predictions in the hypothesis but since the results are not significant, no definitive conclusions can be made. The coefficient for loss aversion is also negative and insignificant. Meaning that with an increase in loss aversion, the normalized the gap between the WTA and WTP decreases. This is very much contradicting the previous literature and thus also the hypothesis, since they suggested that with an increase in the degree of loss aversion the gap would also increase. Brown (2005) stated that people don't want to suffer a net loss in a transaction and that this type of loss aversion differs from the loss aversion arising in the endowment effect. So, maybe there could be an explanation somewhere in there to these findings. But since the p-value of this result is very high and nowhere near significant there is not enough statistical evidence for this finding.

For age we see that the dummy for age group 25-34 gives a higher normalized gap when compared to the reference dummy of 18-24 years. Which is in line with the hypothesis but due to the lack of significance it doesn't have any statistical power.

As with age, dummies were also used for income. The reference category was low-income (<1500) and from the regression it can be seen that higher income (>6000) leads to a significantly lower normalized WTA-WTP gap. This means that the gap is lower for the high-income group compared to the low-income group, which is in line with the hypothesis and previous literature such as the findings of Rotteveel et al., (2020). The other dummies used in the analysis signal the opposite result, but due to their insignificance these insights can't be seen as valuable.

For the last result reported in the table for the multiple regression we look at the male dummy for the gender variable. The reference category is the female dummy, since this was the biggest group. The third-gender group was not included in the regression due to its very low size. The normalized WTA-WTP gap for males was significantly positive compared to the gap for women. This opposes some previous literature and the hypothesis, because these expected a higher gap for females compared to males. But there is also literature that reports the same findings (Adamowicz et al., 1993). So, we can reject this hypothesis but the results don't stand on their own since the same relation has been found before.

4.3.4 Bivariate regressions

Now, we will briefly look at the results of the bivariate regressions to check for potential changes. In terms of coefficients there are only changes in the magnitude for all the different variables but not in terms of changes of sign (positive to negative or vice versa). All variables that were significant in the multiple regression remain significant in the bivariate regressions. But there are two variables that are significant on the $p < 0.05$ in the bivariate regressions which are not significant in the multiple regression. We're talking about loss aversion and income (1500-2999). But since these two variables are not expected to be a good estimator of the gap between WTA and WTP we can't really use these values. They lose all their significance in the multiple regression which means that there are other variables included that explain the gap better than these two.

4.3.5 Gaps for individual products

The results to the four individual regressions can be seen in table 12 on the next page. If we look at the results, we can see that for most variables the sign and the significance remain the same. Overall, when we compare the results of table 11 with the results of table 12, we see no real discrepancies. Or at least no significant differences. For instance, the effect of loss aversion on the normalized WTA-WTP gap for vegan wine is slightly positive in comparison with the negative effect in the original regression. But due to a really high p-value it doesn't give any usable information. The results of the WTA-WTP regressions for the individual products are given in table 17 in the [appendix](#) and are in line with the results of table 12.

TABLE 12: INDIVIDUAL GAP REGRESSIONS

	Normalized WTA-WTP gap			
	Vegan milk	Vegan Pokebowl	Vegan burger	Vegan wine
Confidence	0.0534*** (0.0060)	0.0476*** (0.0051)	0.0714**** (0.0007)	0.0692*** (0.0082)
Familiarity	-0.0200 (0.3058)	0.0044 (0.7948)	-0.0085 (0.6856)	-0.0162 (0.5385)
Opinion	-0.0304 (0.1470)	-0.0262 (0.1518)	-0.0351 (0.1183)	0.0230 (0.4142)
Loss aversion	-0.0178 (0.5768)	-0.0311 (0.2659)	-0.0258 (0.4508)	0.0045 (0.9156)
Age (25-34)	-0.0263 (0.5349)	0.0530 (0.1544)	-0.0177 (0.6964)	0.0039 (0.9457)
Income (1500-2999)	0.0141 (0.7402)	0.0449 (0.2299)	0.0121 (0.7910)	0.0519 (0.3670)
Income (3000-4499)	0.0286 (0.5980)	-0.0168 (0.7237)	0.0258 (0.6567)	0.0428 (0.5579)
Income (>6000)	-0.1145* (0.0580)	-0.0874* (0.0974)	-0.0811 (0.2089)	-0.1001 (0.2170)
Male	0.0727** (0.0444)	0.0771** (0.0152)	0.1040*** (0.0078)	0.0651 (0.1798)
Observations	124	124	124	124
Multiple R-squared	0.1556	0.2106	0.1846	0.1117
Adj. R-squared	0.0889	0.1483	0.1202	0.0415

(P-value): *****(p<0.001) *** (p<0.01) ** (p<0.05) *(p<0.1)

TABLE 13: WTA AND WTP REGRESSION

Regressions WTA and WTP for individual products								
	Vegan milk		Vegan pokebowl		Vegan burger		Vegan wine	
	WTA	WTP	WTA	WTP	WTA	WTP	WTA	WTP
Confidence	0.0716 (0.1257)	-0.0669* (0.0848)	0.4031 (0.1949)	-0.4881** (0.0390)	0.1031 (0.1150)	-0.1382** (0.0342)	-0.2098 (0.4343)	-0.9377**** (0.0003)
Familiarity	0.0372 (0.4335)	0.0920** (0.0205)	-0.0037 (0.9907)	-0.0811 (0.7340)	0.0738 (0.2670)	0.0967 (0.1440)	0.1214 (0.6565)	0.2922 (0.2553)
Opinion	0.0052 (0.9181)	0.0830* (0.0501)	0.0936 (0.7817)	0.5528** (0.0321)	-0.0067 (0.9240)	0.1116 (0.1152)	0.5060* (0.0852)	0.2411 (0.3799)
Loss aversion	-0.1947** (0.0131)	-0.1219* (0.0596)	-1.4404**** (0.0061)	-0.8553** (0.0300)	-0.0993 (0.3600)	-0.0182 (0.8661)	-0.5381 (0.2293)	-0.5571 (0.1851)
Age (25-34)	-0.1310 (0.2048)	-0.0600 (0.4820)	0.0057 (0.9934)	-1.0661** (0.0416)	-0.0662 (0.6460)	0.0076 (0.9576)	-0.6561 (0.2699)	-0.7462 (0.1818)
Income (1500-2999)	0.1441 (0.1661)	0.0782 (0.3630)	1.2311* (0.0765)	0.2409 (0.6445)	0.1340 (0.3560)	0.0862 (0.5500)	1.2500** (0.0380)	0.5820 (0.3000)
Income (3000-4499)	0.1200 (0.3635)	0.0366 (0.7375)	0.5088 (0.5626)	0.7330 (0.2708)	0.0740 (0.6880)	0.0109 (0.9524)	1.6186** (0.0348)	1.1857* (0.0982)
Income (>6000)	0.0036 (0.9802)	0.3051** (0.0127)	-0.0878 (0.9279)	1.6324** (0.0278)	-0.0095 (0.9630)	0.2889 (0.1557)	1.9140** (0.0242)	2.8907**** (0.0004)
Male	0.01181 (0.8923)	-0.1791** (0.0145)	1.2002** (0.0407)	-0.2341 (0.5943)	-0.0293 (0.8100)	-0.3768*** (0.0023)	0.6218 (0.2174)	-0.0433 (0.9269)
Observations	124	124	124	124	124	124	124	124
Multiple R-squared	0.1428	0.223	0.1831	0.1665	0.0732	0.1608	0.1545	0.2146
Adj. R-squared	0.0752	0.1617	0.1186	0.1007	-2.247e-05	0.0946	0.0878	0.1526

(P-value): ****(p<0.001) *** (p<0.01) **(p<0.05) *(p<0.1)

4.3.6 Individual WTA and WTP regressions

In table 13 regressions with just the WTA and WTP for the different products can be seen. The main result of higher confidence leading to a higher gap is supported by the results in this table. The WTA is higher (or less negative) for all four products and therefore it is shown that the gap between the WTA and WTP becomes larger when confidence is higher. However, the coefficients for confidence on the WTA for the products is not significant and therefore no real conclusions can be made from this information. It helps with visualizing the possible explanation given earlier, which said that higher confidence (low uncertainty) leads to a lower WTP. For the other variables it also helps with seeing the different reactions to the WTA and WTP. Table 18 in the [appendix](#) shows regressions for the average WTA and average WTP of the four products.

4.3.7 Robustness check(s)

In this section the results will be checked with the use of some robustness checks. Firstly, it is checked whether the results differ when you look at the WTA/WTP ratio instead of the (normalized) gap. After that familiarity and opinion about vegan foods in general are used instead of using it for the foods asked in the questions. So, in this regression the familiarity and opinion are about vegan foods in general and not just the four examples in the questions.

In table 14 below, the results for the regression(s) with the WTA/WTP ratio instead of the gap are shown. The results are similar to the results of the original regression in table 11 and in terms of signs/relations and significance almost nothing. So, in the case of this robustness check it strengthens the found results in the main regression.

As said before for familiarity with and the opinion about vegan food products two questions were asked. Instead of using the answers to the questions concerning the vegan food products used in the questions, the answers to the 'general' familiarity and opinion questions are used in the next regression. These results can be seen in table 15 and are best compared to the results of table 16 in the appendix. Overall, the results of this regression are the same as the original one in terms of significance and signs. Looking at familiarity and opinion and the effects these two have on the gap, we see that the coefficient for both is a bit higher. But they still lack significance and therefore are unable to help with giving a clear answer to the corresponding hypothesis.

TABLE 14: REGRESSION RESULTS WTA/WTP RATIO

WTA-WTP ratio (average)		
	Multiple regression	Bivariate regressions
Confidence	0.0659*** (0.0010)	0.0599*** (0.0015)
Familiarity	-0.00762 (0.7030)	-0.0044 (0.8200)
Opinion	-0.0168 (0.4230)	-0.0134 (0.5150)
Loss aversion	-0.0295 (0.3677)	-0.0708** (0.0322)
Age (25-34)	0.0110 (0.8008)	0.0495 (0.2600)
Income (1500-2999)	0.0458 (0.2955)	0.0831** (0.0489)
Income (3000-4499)	0.0339 (0.5422)	0.0617 (0.2600)
Income (>6000)	-0.1108* (0.0735)	-0.1115* (0.0716)
Male	0.0847** (0.0227)	0.0727** (0.0497)
Observations	124	124
Multiple R-squared	0.1956	
Adj. R-squared	0.1321	

(P-value): *** (p<0.01) ** (p<0.05) * (p<0.1)

TABLE 15: REGRESSION FOR GENERAL FAMILIARITY AND OPINION

WTA-WTP gap (average)		
	Multiple regression	Bivariate regressions
Confidence	0.4993*** (0.0012)	
Familiarity	-0.0836 (0.5797)	-0.0775 (0.5610)
Opinion	-0.1258 (0.4355)	-0.1257 (0.3780)
Loss aversion	-0.1878 (0.4556)	
Age (25-34)	0.2490 (0.4514)	
Income (1500-2999)	0.4799 (0.1550)	
Income (3000-4499)	0.1402 (0.7438)	
Income (>6000)	-0.8441* (0.0788)	
Male	0.6308** (0.0269)	
Observations	124	124
Multiple R-squared	0.2056	
Adj. R-squared	0.1429	

(P-value): *** (p<0.01) ** (p<0.05) * (p<0.1)

4.3.8 Summary of the main findings

The main objective of this research paper was to examine whether the WTA-WTP disparity is present for vegan food products. With the use of paired t-tests, it is found that for vegan milk alternatives and vegan wine there is a significant difference in WTA and WTP. For the other two products, vegan burger and vegan pokebowl, no significant difference was observed. However, if you consider the average difference between WTA and WTP for all products, a significant difference is found. Given the objective of this paper was to look at the difference for vegan foods as a whole, these results support the first and main hypothesis.

If the focus is switched to the regressions that were performed in this study, some interesting results were found. To start with the most surprising result, the fact that valuation uncertainty showed the opposite effect of what was expected based on most previous literature. The higher the confidence, which equals a lower level of valuation uncertainty, the bigger the gap between the WTA and WTP. Which is best explained by the fact that people with higher uncertainty are willing to overpay (WTP higher) to signal that they want to do good for the environment, in terms of buying vegan foods. Leading to a lower disparity between their WTA and WTP. Adding to this that people with lower uncertainty don't want to overpay for the product (WTP lower), which increases the gap. A possible explanation for this intriguing result is given, but since this is not really backed up by existing literature yet it needs more research.

For loss aversion the results of the regression were also quite surprising, as it suggests that a higher degree of loss aversion leads to a lower WTA-WTP gap. However, due to its limited significance, this result doesn't contribute much to our overall understanding of this subject. The same can be said for familiarity with and opinion about vegan foods. While the results are in line with previous papers that they both have a negative effect on the disparity, due to their insignificance they add little value to this research.

For gender, the findings show that males exhibit a significantly larger WTA-WTP gap than women. Opposing some previous literature and the hypothesis, but there is also literature supporting the found result (Adamowicz et al., 1993). In terms of age, insignificant results that for a higher age the gap is also higher are found. Limiting its relevance to this research. Lastly for income, the two

dummies close to the reference category of low income lack significance in showing that the gap is higher for a higher income. Contrary to this the dummy for high income shows that the gap is significantly ($p < 0.1$) smaller compared to low income. Resulting in a relevant contribution to this paper as it is in line with the hypothesis, but careful conclusions must be taken due to it only being significant on the $p < 0.1$ level.

4.3.9 Hypotheses

With the information gained from the experiment, we can now say whether the previously stated hypotheses are to be accepted or rejected.

The main hypothesis was that the WTA would be higher than the WTP for vegan food products. The results of the paired t-test say that for the averaged WTA and WTP, this is the case but not for all the individual products. Meaning that this hypothesis is **partially accepted**.

The hypothesis for loss aversion, stating that the gap is larger when the degree of loss aversion is higher, is **rejected** due to insignificant opposite results.

The hypothesis for opinion about vegan foods, stating that the gap is larger when the opinion is more negative, is also **rejected** due to the lack of significant results.

The hypothesis for valuation uncertainty, stating that the gap is larger when the valuation uncertainty was higher (confidence lower), is **rejected** due to the finding of the opposite relation. So, when the valuation uncertainty is lower the gap also increases for vegan foods.

The hypothesis for familiarity, stating that the gap is larger when people are less familiar with vegan foods, can also be **rejected** due to insignificant results.

The hypothesis for age, stating that the gap is larger when the age is higher, can also be **rejected**. But this is due to the insignificant results found.

The hypothesis for income, stating that the gap is larger when income is lower, can be **partially accepted** due to slightly significant ($p < 0.1$) result.

The hypothesis for gender, stating that the gap is larger for females compared to males, can be **rejected** due to a significant positive gap for men compared to women.

5 Conclusion & Discussion

5.1 Conclusion

In this research paper, the ‘possible’ gap between the willingness-to-accept (WTA) and willingness-to-pay (WTP) for vegan food products was investigated. With the constantly growing literature on the phenomenon of the WTA-WTP gap or ratio, a definitive answer is yet to be found. Considering the constantly changing world and the demand of people, the gap in relation to vegan foods is something that can contribute to the current literature by gaining new insights. To find out whether this gap existed for vegan foods and what the actual size of this gap was, a survey was conducted. The survey gathered a total of around 150 responses, but due to various factors and some incomplete answers only 124 observations were used in the regressions.

Paired t-tests for looking at whether the WTA and WTP significantly differed from each other, found that only for the vegan milk and vegan wine the difference was significant. Also, for the average vegan food products as a whole there was a significant difference between the two. But for the other two individual products, vegan burger and pokebowl, the tests showed that there is no significant difference between the WTA and WTP. The average gap for the vegan foods was found to be 0.324. This is a euro amount, so the average gap was around 32 eurocents. Which was mainly influenced by the higher prices for the vegan pokebowl and wine. For these two products the gap was found to be higher than for the other two.

The results of the regressions point out that a few variables have a significant effect on the gap. Valuation uncertainty turned out to have the most significant effect, but surprisingly it was found that a lower level of valuation uncertainty (confidence higher) increased the gap. This opposes the hypothesis and the previous literature that was conducted on this topic. The other significant result was for gender. Dummies were used for the analysis and in the regression, it was found that for males the gap is significantly higher than for females. Same as with valuation uncertainty this opposes most previous findings, but it doesn’t stand on its own as this result has been found before. For income a slightly ($p < 0.1$) significant result was found that a higher income leads to a lower gap. This is in line with the stated hypothesis but due to it only being slightly significant some precaution must be taken. The other variables turned out to have no significant effect on the WTA-

WTP gap. This includes the following variables; loss aversion, familiarity with vegan foods, opinion about vegan foods and age. For loss aversion a significant negative effect was found in a bivariate regression, but due to its extremely low r-squared this doesn't give us relevant information.

Overall, the main results of this paper diverge a bit from the 'general' findings in research about the WTA-WTP disparity. What the exact reasons for this are remain unknown at this point, because the relation of the gap with vegan foods is still in an early stage. Not a lot of research has been done concerning this relationship because vegan foods are only just really getting the interest of a larger group of people. Nevertheless, these findings add another bit of literature to the ever-existing debate over the existence of the WTA-WTP disparity. With some interesting and sometimes opposing results this thesis can help improve the overall debate, thus giving this research its' academic value in that sense. On the other side with the growth of interest in the world of vegan foods due to various reasons, this thesis can serve as a sort of starting point for future research. More studies and papers about the WTA-WTP gap for vegan foods, can increase society's understanding of the topic. Which may not only be interesting from a researcher's point of view, but also for consumers to really think about. It still amazes me how and why it comes that people add value to products they own in comparison to when other people own that same exact product.

5.2 Discussion

In terms of limitations or things other researchers could change when doing research of this kind, it is mostly in the scope of the research. With the relation between vegan foods and the WTA-WTP gap being quite new and thus not researched a lot, I tried implementing a lot of different characteristics that have been used in previous WTA-WTP research. Think of all variables such as age, income etc. Instead of using all these characteristics in one research, maybe focussing on one or two of these could lead to more interesting and maybe better overall results. When the focus is on one or two, more in-depth questions can be asked in a survey to obtain a better estimation of this independent variable. Which than hopefully gives a better explanation of the WTA-WTP gap. One of these independent variables could be valuation uncertainty, as the results of this paper were the opposite of previous literature. So, by focusing on this variable and its relation with the disparity it can probably be found whether the findings of this thesis are wrong or if there is some truth in it. Also, the fact that an online survey was used as the source of the data collection can also be seen as a bit of a limitation. Because all the respondents just read the questions and answer them from a virtual and hypothetical situation, they might not fully commit to understanding and answering the questions. It would most definitely be better when they would be put into a situation of actually buying or selling the products, but realizing this would be very expensive and hard. Thus, this may be interesting to do on a smaller group of people. Another limitation of this research is the distribution of the survey since this was mainly done through mailing other students and using survey distribution platforms. With this almost all of the respondents where students and therefore they mostly displayed the same answers in terms of age and income. Leading to less generalizable results and therefore also limiting the power of this research.

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7 Appendix

7.1 Other regression results

TABLE 16: WTA-WTP REGRESSION

	WTA-WTP gap (average)	
	Multiple regression	Bivariate regressions
Confidence	0.4997*** (0.0013)	0.4623*** (0.0015)
Familiarity	-0.0428 (0.7814)	-0.0069 (0.9629)
Opinion	-0.0976 (0.5543)	-0.0747 (0.6400)
Loss aversion	-0.1800 (0.4754)	-0.5142** (0.0441)
Age (25-34)	0.2543 (0.4484)	0.4986 (0.1410)
Income (1500-2999)	0.4430 (0.1904)	0.7306** (0.0246)
Income (3000-4499)	0.0888 (0.8360)	0.3297 (0.4364)
Income (>6000)	-0.8242* (0.0842)	-0.8567* (0.0730)
Male	0.6594** (0.0216)	0.5610** (0.0497)
Observations	124	124
Multiple R-squared	0.1966	
Adj. R-squared	0.1332	

(P-value): *** (p<0.01) ** (p<0.05) * (p<0.1)

TABLE 17: WTA-WTP REGRESSIONS INDIVIDUAL PRODUCTS

	WTA-WTP gap			
	Vegan milk	Vegan Pokebowl	Vegan burger	Vegan wine
Confidence	0.1384*** (0.0077)	0.8913*** (0.0060)	0.2413**** (0.0007)	0.7279*** (0.0094)
Familiarity	-0.0548 (0.2938)	0.0774 (0.8118)	-0.0229 (0.7470)	-0.1707 (0.5440)
Opinion	-0.0777 (0.1650)	-0.4592 (0.1885)	-0.1184 (0.1210)	0.2649 (0.3795)
Loss aversion	-0.0729 (0.3931)	-0.5851 (0.2722)	-0.0812 (0.4845)	0.0191 (0.9669)
Age (25-34)	-0.0710 (0.5310)	1.0718 (0.1312)	-0.0738 (0.6323)	0.0901 (0.8828)
Income (1500-2999)	0.0659 (0.5635)	0.9902 (0.1654)	0.0478 (0.7581)	0.6680 (0.2787)
Income (3000-4499)	0.0834 (0.5654)	-0.2242 (0.8043)	0.0631 (0.7494)	0.4329 (0.5804)
Income (>6000)	-0.3144* (0.0620)	-1.7202* (0.0875)	-0.2985 (0.1733)	-0.9767 (0.2603)
Male	0.1909** (0.0485)	1.4343** (0.0179)	0.3475*** (0.0088)	0.6651 (0.2005)
Observations	124	124	124	124
Multiple R-squared	0.1622	0.2139	0.1803	0.1137
Adj. R-squared	0.0960	0.1519	0.1156	0.0437

(P-value): **** (p=0) *** (p<0.01) ** (p<0.05) * (p<0.1)

TABLE 18: AVERAGE WTA AND WTP REGRESSIONS

Regressions average of 4 products		
	WTA	WTP
Confidence	0.0920 (0.5212)	-0.4077***** (0.0001)
Familiarity	0.0572 (0.6954)	0.0999 (0.3383)
Opinion	0.1495 (0.3394)	0.2471** (0.0282)
Loss aversion	-0.5681** (0.0187)	-0.3881** (0.0242)
Age (25-34)	-0.2119 (0.5045)	-0.4662** (0.0413)
Income (1500-2999)	0.6898** (0.0324)	0.2468 (0.2798)
Income (3000-4499)	0.5803 (0.1548)	0.4916* (0.0919)
Income (>6000)	0.4551 (0.3120)	1.2793***** (0.0001)
Male	0.4511* (0.0952)	-0.2083 (0.2785)
Observations	124	124
Multiple R-squared	0.1707	0.2854
Adj. R-squared	0.1052	0.2289

(P-value): ***** (p=0) *** (p<0.01) ** (p<0.05) * (p<0.1)

7.2 Qualtrics survey

Start of Block: Start of the survey

Welcome!

Thanks for taking the time to fill in this survey, it will greatly help me upon finishing my master's thesis. In this survey you will be asked questions concerning your demographics, your opinion and familiarity about vegan food products and specific questions about some vegan products. This survey will take approximately 5 minutes. If you have any questions about the survey feel free to contact me: seb.sanders@ru.nl

Please read the questions carefully!

P.S.: This survey contains a completion code for SurveySwap.io and Surveycircle.com

End of Block: Start of the survey

Start of Block: Demographic questions

How old are you?

- Under 18 (1)
 - 18-24 years old (2)
 - 25-34 years old (3)
 - 35-44 years old (4)
 - 45-54 years old (5)
 - 55-64 years old (6)
 - 65+ years old (7)
-

How do you describe yourself?

- Male (1)
 - Female (2)
 - Non-binary / third gender (3)
 - Prefer to self-describe (4) _____
 - Prefer not to say (5)
-

What is your household income per month?

- <1500 (1)
- 1500-2999 (2)
- 3000-4499 (3)
- 4500-5999 (4)
- >6000 (5)
- Prefer not to say (6)

End of Block: Demographic questions

Start of Block: WTP questions

With the rise of plant-based foods, also plant-based alternatives for milk are becoming more standard in people's daily life. Examples of these types of alternatives are oat milk, soy milk and some more. Suppose you want to buy one of these plant-based alternatives for milk, what would be the maximum price you would be willing to pay?

- €2 (1)
 - €2,40 (2)
 - €2,80 (3)
 - €3,20 (4)
 - €3,60 or more (5)
-

When you go out for dinner and you have a look at the menu, there can also be some vegan options on there nowadays. A vegan pokebowl can be an example of one of these options. What would be the maximum price you would be willing to pay for this product?

- €15 (1)
 - €18 (2)
 - €21 (3)
 - €24 (4)
 - €27 or more (5)
-

On top of all the vegan foods, there is nowadays also more demand for drinks to be vegan. Manufacturers of products like wine and beer are therefore also developing 'new' products to comply with this demand. Suppose you want to buy a vegan bottle of wine, what would be the maximum price you would be willing to pay for it?

- €7,50 (1)
 - €9 (2)
 - €11,50 (3)
 - €13 (4)
 - €14,50 or more (5)
-

Another sort of plant-based foods which are growing in popularity in the past years are vegan burgers. These are alternatives for 'regular' meat burgers and can be made from different plant-based products. Let's say you are interested in buying this burger, what would be the maximum price you would be willing to pay?

- €2,50 (1)
 - €3 (2)
 - €3,50 (3)
 - €4 (4)
 - €4,50 or more (5)
-

Please answer the following question

	Strongly uncertain (1)	Somewhat uncertain (2)	Neither certain nor uncertain (3)	Somewhat certain (4)	Strongly certain (5)
How certain are you about the prices you answered in the previous questions? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: WTP questions

Start of Block: Familiarity/opinion questions

Indicate how much you agree with the following statements

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I am familiar with the vegan food products from the previous questions (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am familiar with vegan food products in general (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please answer the following questions

	Extremely negative (1)	Somewhat negative (2)	Neither positive nor negative (3)	Somewhat positive (4)	Extremely positive (5)
What is your feeling about the vegan food products listed in the previous questions? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
What is your feeling towards vegan food products in general? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Familiarity/opinion questions

Start of Block: Loss aversion/uncertainty questions

Indicate whether you would accept or reject the following bets/coin toss

	Accept (1)	Reject (2)
1. If the coin turns up heads, then you lose €2; if the coin turns up tails, you win €6 (1)	<input type="radio"/>	<input type="radio"/>
2. If the coin turns up heads, then you lose €3; if the coin turns up tails, you win €6 (2)	<input type="radio"/>	<input type="radio"/>
3. If the coin turns up heads, then you lose €4; if the coin turns up tails, you win €6 (3)	<input type="radio"/>	<input type="radio"/>
4. If the coin turns up heads, then you lose €5; if the coin turns up tails, you win €6 (4)	<input type="radio"/>	<input type="radio"/>
5. If the coin turns up heads, then you lose €6; if the coin turns up tails, you win €6 (5)	<input type="radio"/>	<input type="radio"/>
6. If the coin turns up heads, then you lose €7; if the coin turns up tails, you win €6 (6)	<input type="radio"/>	<input type="radio"/>

End of Block: Loss aversion/uncertainty questions

Start of Block: WTA questions

Vegan pokebowls and other vegan foods are gaining popularity nowadays. Now suppose you own/have a vegan pokebowl and someone wants to buy it from you. What would be the minimum price for you to sell it to them?

- €15 (1)
- €18 (2)
- €21 (3)
- €24 (4)
- €27 or more (5)

Suppose you own some plant-based milk, and there is someone that wants to buy this from you. What is the minimum price that you're willing to sell it for?

- €2 (1)
 - €2,40 (2)
 - €2,80 (3)
 - €3,20 (4)
 - €3,60 or more (5)
-

Suppose you have/own a vegan burger, and there is someone interested in buying it from you. What is the minimum price you are willing to sell the product for?

- €2,50 (1)
 - €3 (2)
 - €3,50 (3)
 - €4 (4)
 - €4,50 or more (5)
-

Vegan drinks are also gaining popularity and demand. Suppose you own a bottle of vegan wine, and there is someone willing to buy it from you. What is the minimum price you would sell it for to _____ that _____ person?

- €7,50 (1)
- €9 (2)
- €11,50 (3)
- €13 (4)
- €14,50 or more (5)

Please answer the following question

	Strongly uncertain (1)	Somewhat uncertain (2)	Neither certain nor uncertain (3)	Somewhat certain (4)	Strongly certain (5)
How certain are you about the prices you answered in the previous questions? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: WTA questions

