

Overestimation of others' willingness to pay – An investigation

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**CONCORDIA UNIVERSITY**  
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This is to certify that the thesis prepared

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Entitled: Overestimation of others' willingness to pay – An investigation

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Complies with the regulation of the University and meets the accepted standards with respect to the originality and quality.

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## **Abstract**

Overestimation of others' willingness to pay – An investigation

Bin Li

This project focuses on consumers' overestimation of others' willingness to pay, a topic of theoretical importance as well as managerial importance. Previous research has found that consumers often overestimate others' willingness to pay, and that this effect can be found in a variety of circumstances. The underlying reasons behind this effect are, however, not well understood. We conducted seven studies to test the leading proposed explanations – namely, perceptions of others' consumer spending self-control capabilities and perceptions of others' affluence – and also considered moderating factors such as product type – hedonic/ utilitarian, and ethical/conventional products. Overall, our research contributes to the pricing literature by adding to the limited number of studies that have so far addressed this issue. Our findings replicate some earlier ones, and also provide insight into the mechanism through which overestimation occurs. Pricing practitioners should also benefit from our findings as they will be able to calibrate themselves better so as to minimize overestimation, and generate sales while charging the optimal price in the conduction of an appropriate marketing strategy.

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## **Introduction**

Estimation of the amount others are willing to pay for a product or service is an important issue, as it underlies many pricing decisions. Both individual sellers putting their goods up for sale on sites such as eBay and corporate pricing departments need to guess at buyers' reservation prices in order to select the optimal price. Surprisingly, though, this issue has seen little research. In a recent article, Frederick (2012) summarizes the extant studies on the topic and shows that subjects reliably overestimate others' willingness-to-pay (hereafter WTP) compared to their own WTP. This effect appears robust to different forms of measurement, and is not attributed to several widely researched theories (i.e. endowment effect and better-than-average effect).

Our objectives were to test promising explanations for this widely observed phenomenon that had not already been considered, such as the perception of others' consumer spending self-control, which in Frederick (2012)'s study is suggested as a possible avenue for future research. Then we conducted a study to investigate the moderating effect of product type, such as products with hedonic/utilitarian attributes. We also conducted a replication of the findings of Matthews, Gheorghiu and Callan (2016), who show that affluence beliefs can also affect overestimation of others' WTP. Based on the applicable explanation – affluence belief (Matthews et al, 2016), we moved to find another moderator: ethical/conventional products. Finally, we extended existing research by assessing the effects of both consumer spending self-control perceptions and affluence beliefs concurrently in order to estimate their interactions and effects concerning WTP.

Study 1 replicates Frederick (2012)'s study to ensure the existence of main effect - overestimation of others' willingness to pay. Study 2 investigates the new explanation - underestimation of others' consumer spending self-control. Study 3 explores the moderating effect of hedonic product. Study 4 replicates Matthews et al (2016)'s study by supporting the explanation - affluence belief. Study 5 sets the causal link between affluence belief and willingness to pay for ethical products. Study 6 found support of moderating effect of ethical products on willingness to pay. Study 7 investigates that two explanations, underestimation of others' self-control and affluence belief are separate and independent.

The remainder of the paper discusses the entire study logic, point out the limitations and future research directions.

## **Theoretical background and hypotheses development**

### **1 Overestimation effect**

An overestimation effect is “a tendency to overestimate how much others will pay for goods” (Frederick, 2012, p.1), which is widespread.

Frederick (2012) found that there is a bias among customers, that they tend to overestimate others’ willingness to pay (hereafter WTP) for commercial goods. The bias is relatively robust, because in Frederick (2012)’s six studies, many procedural changes were made: for instance, offering incentives for precise estimation, asking participants to estimate others’ WTP by proportion, letting people give their maximum WTP and estimate the next participant’s WTP, asking if subjects’ WTP was more or less than a typical person’s offer, estimating the mean of bids in a BDM auction – bid price is generated randomly, which could be selected as accepted or rejected by buyers and sellers (Becker, DeGroot & Marschak, 1964). All these attempts point to the same result, overestimating others’ willingness to pay compared to their own. Hence, this leads to a self-other WTP gap.

Other studies have also observed a similar phenomenon, including from both sellers and buyers’ eyes. Sellers tend to overestimate buyers’ willingness to pay, which is known as the endowment effect – “the tendency to value an object more once one owns it” (van Boven, Dunning & Loewenstein, 2000, p.66). When paying for others, people will generally offer a higher price (Jung, Nelson, Gneezy & Gneezy, 2014). Self-other difference exists in value function, which is that buyers always overestimate other buyers’ purchasing price offer for a same product than they would by over 20% (Kurt & Inman, 2013). In other words, when estimating the price that will be offered by others, people always tend to overestimate the amount.

#### **1.1 Explanations of WTP gap**

Frederick (2012) conducted a coherent work and thereby rejected a series of explanations for the overestimation effect. First, giving subjects the market price (how much a product is offered in market place) of a product does not affect overestimation of others’ willingness to pay for the product. Second, individual differences in perceived liking are not leading to overestimation effect

- whether people like a product or not, they tend to overestimate what others will pay for the product. Third, the “empathy gap” (van Boven et al., 2000) explanation does not account for the overestimation bias, with measures of this gap being uncorrelated with overestimation. Fourth, the better-than-average effect – “people evaluate themselves more positively than they evaluate most other people” (Brown, 2012, p.209) would not explain the effect, offers no explanation since WTP does not seem to be regarded as an undesirable trait. Fifth, the “availability” heuristic suggesting that overexposure to commercials showing others consumption evokes overestimation of others’ WTP does not hold for different kinds of prices. Lastly, different levels of self-construal leading to an abstract perception to different extents of other people (Trope & Liberman, 2003) do not seem to be an explanation because the effect persists whether subjects know the others or not. Therefore, Frederick (2012) named this effect "the X effect."

However, it does appear that there is at least one explanation for this bias. To investigate the reason why people generally overestimate others' willingness to pay, Matthews et al. (2016) found that there is a causal link between income belief and WTP. Hence, they showed that the bias of the overestimation of others' affluence partly contributes to the overestimation of others' willingness to pay. Different people could have different affluence beliefs, leading to different extents of overestimation of others' WTP.

As a suggestion for future research, at the end of Frederick's (2012) study, he mentions that the underestimation of others' ability to exert self-control may be an explanation. This direction is promising yet there have not been any studies which have investigated self-control. This study will focus on investigating this explanation, among others. We discuss self-control next.

## **2 Self-control**

### **2.1 General self-control**

The definition of general self-control is having the ability to control one's behavior, having clear standards, and having the ability to change (Baumeister, 2002; Vohs & Faber 2007). In the five-factor taxonomy of personality traits, self-control has been proved to be an important personality trait that has the capacity to explain a series of individual differences (Baumeister, 2002). There is also a measure of self-control developed by Tangney, Baumeister, and Boone (2004), which tests

the level of resisting temptation, keeping good self-discipline, and breaking habits. A high level of self-control correlates positively with "better adjustment (fewer reports of psychopathology, higher self-esteem), less binge eating and alcohol abuse, better relationships and interpersonal skills, secure attachment, and more optimal emotional responses" (Tangney et al, 2014, p.271); however, a low level of self-control relates to both eating problems and problematic drinking patterns (Tangney et al., 2014, p.296).

## **2.2 Consumer spending self-control**

When considering people's general self-control and their performance when they have to make purchasing decisions, Hoch and Loewenstein (1991) defined consumer self-control as a conflict between desires generated from preference and respect of time.

In an attempt to observe and explain customers' spending self-control, Haws, Bearden, and Nenkov (2012) invented a scale to measure consumer spending self-control (CCSS). They emphasize the importance of the effect of individual traits and also demonstrate how self-control plays an important role in consumers' spending behavior and purchase decision-making process. Moreover, it is consistent with the ideas that traits or attitudes obtain the ability to foresee relevant behaviors. For example, people with low levels of stability (in the five-factor model of personality) show a high tendency of compulsive buying behavior; there is a negative relationship between conscientiousness and compulsive buying and a positive relationship between agreeability and compulsive buying (Mowen & Spears, 1999).

The progressive meaning of consumer spending self-control is that it focuses specifically on consumers' spending self-control and its purchasing decision results. Moreover, previous research has found that people with high self-control levels could fail to control themselves when they spend (Baumeister et al., 2007).

Similar with a previous idea that personality traits could predict human spending results, previous researchers have found that people with high self-control levels could still fail to control themselves when they spent money. This may be attributed to differences in people's allocation of self-resources; in other words, when studying consumption self-control, the difference between domains should be considered (Baumeister et al., 2007). Hence, Haws et al. (2012) argued that

consumer spending self-control is defined as "the ability to monitor and regulate one's spending-related thoughts and decisions in accordance with self-imposed standards" (p.697).

Haws et al. (2012) have proven that customers with low levels of consumer spending self-control are more likely to make purchase decisions. Meanwhile, these consumers tend to pay more for products than those with a high level of consumer spending self-control. Hence, it is predictable that the estimation of a low level of self-control may lead to an overestimation of payment willingness.

Extending previous studies, we propose that the underestimation of others' self-control in spending might also give rise to a self/other difference in WTP. Hence comes the first hypothesis:

**H1:** The underestimation of others' self-control in spending leads to the overestimation of others' willingness to pay (WTP).

### **3 Hedonic consumption and self-control**

According to Babin, Darden, and Griffin (1994), the motivations for shopping hedonic and utilitarian products are very distinct. Hedonic consumption brings benefits such as fantasy, escapism, arousal, sensory attributes, and spiritual delight; meanwhile, utilitarian consumption is more about customers' practical tasks, instrumental needs, and rational work (Hirschman & Holbrook, 1982; Babin et al., 1994). Dhar and Wertenbroch (2000) revealed that from a postmodern marketing perspective, hedonic consumption produces something while consuming. More specifically, hedonic goods were described as containing magical aspects (Arnould, Price & Otnes, 1999), being sacred (Belk, 1988), projecting an extended self (Belk, 1988), and highlighting a participation in sports (Hopkinson & Pujari, 1999).

Hedonic consumption is a sequentially psychological fulfillment process. It first starts with a loss of self and subsequently transforms to control over self, and eventually acts as a move to fulfill self-enhancement (Babin et al, 1994). Hopkinson and Pujari (1999) also argue that it has the function to create one's identity. The fantasy parts in hedonic consumption fulfill the imagination of the consumers (Hirschman & Holbrook, 1982). The imagination of consumers creates the

perception that hedonic consumption is a process of consuming magic and enchantment (Hopkinson & Pujari, 1999).

Hedonic consumption also has more effects on consumers than utilitarian consumption, because consumers value hedonic products and services from a purely hedonic perspective besides their utilitarian function. In other words, hedonic value acts as an extra or bonus value. In addition, because there is a positive link between involvement and positive affect, hedonic consumption itself is actually an activity of involvement, so it works on consumers with strength (Hightower, Brady & Baker 2002).

The lack or failure of self-control is called "impulsiveness", which contains strong incentive hedonic value to tempt people to make the hedonic-oriented decision right away that could be the opposite of a long-term restrained goal (Loewenstein, 1996). More specifically, people are always torn between controlling themselves from consumption and their instant spending for fulfilling hedonic satisfaction, such as candy consumption and beer purchase (Hofmann, Friese & Strack, 2016). In other words, when a hedonic component defeats self-control, that is when an "indulgent" purchase decision is made. People face the self-control dilemma nearly every day.

As stated by Baumeister et al. (2007), consumers' self-control reacts differently to different domains; hence, it is very likely that when contexts are set to be hedonic and utilitarian ones, the self-control level will be observed differently based on their estimations of others' self-control levels. Previously, it was found that consumers use self-control mechanisms to resist the temptation of hedonic products (Wertenbroch, 1998). It was also found that to resist the immediate temptation of a hedonic effect, a high level of self-control is demanded (Giner-Sorolla, 2001). Moreover, Urminsky and Kivetz (2004) argue that the consumption of hedonic goods causes an enhanced use of self-control because the desire for hedonic consumption is stronger than utilitarian goods. In other words, consumers need more effort and put in the resistance to hedonic consumption, so there is a larger possibility to fail.

Furthermore, new research by Lu, Liu, and Fang (2016) states that when consumers decide for others, they are more likely to select hedonic choices over utilitarian ones than if they are making purchase decisions for themselves. This makes it evident that there is a self-other difference in hedonic and utilitarian products.

Hence, hedonic attributes are found to play an important role in influencing people's consumption self-control. It would therefore be logical to expect that there would be a difference between people's estimation of others' willingness to pay for hedonic and utilitarian products. In other words, hedonic and utilitarian product types might work as moderators towards the WTP gap. This attempt is creative and might bring forth salient research findings.

Hereby, the second hypothesis is as shown below:

**H2:** For a hedonic product, people tend to overestimate others' WTP more than they do for a utilitarian product.

#### **4 Affluence belief and ethical products**

After Frederick's work (2012), only Matthews, et al. (2016) revealed that the overestimation of others' affluence explains the overestimation of others' WTP phenomenon. They found a causal link between the overestimation of others' income and wealth status and their WTP. Therefore, I wondered if there could be a moderator between the overestimation of others' affluence and the overestimation of WTP to strengthen the relationship. Finally, we found the ethical product, which is always believed as enjoying a price premium (Hainmueller, Hiscox & Sequeira, 2012; Marian, Chrysochou, Krystallis & Thøgersen, 2014, etc.). If or when it works together with overestimated affluence beliefs, a higher level of overestimation of others' WTP is presumed.

There are four most commonly known ethical product labels: Fair Trade, Rainforest Alliance, Carbon Footprint, and Animal Welfare. Customers' understanding of ethical products is still limited, majorly vis-à-vis the protection of the environment currently. Moreover, the understanding of ethical products is related to life values. Higher social classes are found to use sustainability label products more (Grunert, 2011).

There are four kinds of motivations that drive customers to purchase ethical products: conformity motivations, self-orientation motivations, self-actualization motivations, and hedonism motivations (Karsaklian & Fee, 2015). Conformity motivations drive consumers to behave like other people; therefore, if other people are purchasing ethical products, they would like to do so as well. Self-orientation motivations show consumers' desire to be different from others; in other

words, the point that others are not purchasing ethical products would motivate them to make the purchase decision. Self-actualization motivations are the willingness to help people in need through the purchase of ethical products. Hedonism motivations are the concerns about consumers themselves, such as health, beauty, economic benefits, etc.

Customers approve of the fact that ethical products involve a price premium. It has been found that organic fruits and vegetables are perceived differently from other products; moreover, customers are generally willing to pay more for them (Krystallis & Chryssohoidis, 2005). However, it was also found that there is a percentage limit to this price premium. When the price premium percentage is equal to or lower than 8%, sales remain steady. Nevertheless, when the price premium percentage rises to 9%, sales will dramatically witness a 30% drop (Hainmueller et al., 2012).

The estimation of consumers' WTP for a price premium for the ethical products was previously researched. The reason behind this WTP for higher prices could be explained as consumers' preferring the ethical contributions a product makes. For example, the WTP for fair trade coffee (Basu & Hicks 2008; Carlsson, García & Löfgren. 2010, etc.), fair trade chocolate (Didier & Lucie 2008; Rousu & Corrigan 2008), and sweatshop-free clothing was investigated (Rode et al. 2008; Hustvedt & Bernard 2010). Moreover, there is proof that product information on an ethical product label can lead to more customers' willingness to pay extra (Basu & Hicks 2008; Didier & Lucie 2008; Rousu & Corrigan 2008). Additionally, there is also social context impact on individuals making them more willing to pay (Carlsson et al., 2010).

As customers prove to accept that there is a price premium for ethical products, the general WTPs for them are higher (Krystallis & Chryssohoidis, 2005). However, meanwhile, noticeably, it was also found that a large number of consumers are not really ready to pay more for organic and fair trade products because of their high prices (Didier & Lucie, 2008). This suggests that there is a firm link between ethical products and higher price. Hence, when introducing the affluence beliefs of others, consumers may witness some relatively more expensive products as well as a relatively wealthier group. It is logical to presume that they would consequently believe more that others are willing to pay extra for an ethical product.

Here is the third hypothesis:



**H3:** When the overestimation of WTP is induced by a belief in affluence and it is for an ethical product, people tend to overestimate more than they estimate others' willingness to pay for a conventional product.

## **5 Research Strategies**

This research involved seven studies in total.

There is no great number of overestimation literature on WTP effects. Frederick's study (2012) was the first one to be presented, and after that, the same perspective on buyers' estimations of others' WTP was seen in Matthews' et al. (2016) research. Apart from these two studies, there is some literature holding the view of buyers', but this research was mainly concerned about the endowment effect, such as in Weaver and Frederick (2012) as well as Kurt and Inman (2013). There was great research potential to continue working on the overestimation of the WTP effect, but at the same time, it was necessary to test the main effect again. Thus, our research could be well based and developed in an effective direction.

In study 1, the overestimation of others' willingness to pay was tested again to support the main effect, replicating Frederick (2012)'s methodologies. Then, in study 2, the strategies selected in Matthews et al. (2016) were adopted; however, rather than testing the affluence belief, study 2 investigated if underestimation of others' consumer spending self-control (Haws et al., 2012) explains the phenomenon of overestimation of WTP. A range of consumer products was selected to investigate participants' beliefs about other people's consumer spending self-control and willingness to pay for those products, aiming to find the self-other WTP gap. Next, study 3 tested the overestimation of others' willingness to pay for hedonic and utilitarian attributed products.

In study 4, the explanation of the affluence belief gap between self and others found in Matthews et al. (2016) was examined again to test the robustness of this finding. The methods conducted in both Matthews et al. (2016) and Frederick (2012)'s work were replicated, asking people to estimate self-other affluence and self-other willingness to pay for a series of consumer products. Then, in study 5, a causal link between affluence belief and willingness to pay more for ethical products was tested to show the moderating effect of ethical product. Following this study, in study 6, a list

of ethical consumer products (that are exact alternatives to those in study 4) was used to test consumers' overestimation of others' willingness to pay.

In all the studies of our research, participants were recruited via the online data collection website CrowdFlower.

## **Methodology**

### **Study 1 Main effect test**

#### Participants

Participants were recruited via CrowdFlower. Consequently, people who were under the age of 18 or who could not complete the task were removed from the dataset. As a result, the dataset contains 55 participants (24 male, 31 female), aged 22–62 ( $M=40.4$ ,  $SD=10.9$ ).

#### Design and procedure

Participants first read the instructions. Then they were randomly assigned to one of two groups. In each group, they were shown nine goods. One group was first told, "Please indicate the most you would like to pay for each of nine products. (CAD)". Thus, they gave the price for each product. After this, on the next page, they were shown the nine products again and told, "Please indicate the most the typical person who is taking this survey would like to pay for each of nine products. (CAD)". For the second group, participants were asked first to predict how much the typical person would like to pay for each product and then report their own willingness to pay. Participants were asked to fill their demographic information in at the end of the task.

At the end of the study, demographic information was asked of the participants. This included gender, age, and annual pre-tax household income options: less than \$25000; \$25000–\$45000; \$45000–\$65000; \$65000–\$85000; above \$85000.

#### Results and Discussion

Respondents overestimated the price offered by others by an average of 38% (see Table 1). A paired t-test was conducted here.

A within-subject analysis here (participants stated their own price offer and then estimated others' willingness to pay) reveals that participants considerably overestimated that the typical person taking this survey would like to pay for the same products (seven out of nine products). This result is consistent with previous findings on this WTP bias.

**Table 1** Arithmetic Self and Other mean price offers for nine goods, Study 1

Good	Mean Price offer		
	Self	Other	Sig
LEGO Classic - Creative Bricks	23.38	31.98	0.000*
Music CD of your favorite singer/band	13.23	19.07	0.028*
HP DeskJet 1112 Printer	125.55	191.13	0.019*
2lbs Joe's Tasty Travels Roasted Peanuts	8.99	8.67	0.857
NESTLÉ KITKAT Minis Milk Chocolate Bar (10x12g)	4.37	5.47	0.004*
1 large Cucumber	1.55	1.98	0.005*
Manchester by the sea DVD	19.51	15.56	0.443
500 ml Canada Dry	2.50	3.00	0.001*
A voucher giving a large pizza at Pizza Hut	11.17	13.96	0.000*
Average	23.36	32.31	

\*  $p < 0.05$

## **Study 2 Alternative explanation: Consumer Spending Self-control**

### Participants

Participants took part online and were recruited via CrowdFlower. Therefore, participants who were under the age of 18 or could not complete the task were removed from the data pool. The dataset eventually contained 50 participants (17 male, 33 female), aged 18-81 ( $M=43.5$ ,  $SD=13.1$ ).

### Design and procedure

After reading the initial instructions, participants chose to agree or not to agree to the rules of the study. Hence, only participants reading and agreeing with the instructions would be guided to the following content.

The following web page presented a list of nine goods (same as used in Study 1). For every product, participants were asked to offer their maximum price offer for each product and then their estimation of the "typical person's" willingness to pay for same product list.

After answering these price offer questions, participants were guided to a new page, where they read the definition of consumption self-control: "Consumer spending self-control is the ability to spend carefully, in line with a budget, without being too impulsive or over-spending". This was simplified based on a definition of "the ability to monitor and regulate one's spending related thoughts and decisions in accordance with self-imposed standards" (Haws et al., 2012). Then they were asked to indicate "the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)".

After answering all the questions, on the next page, the demographic information was gathered, including gender, age, and annual pre-tax household income range.

## Results and Discussion

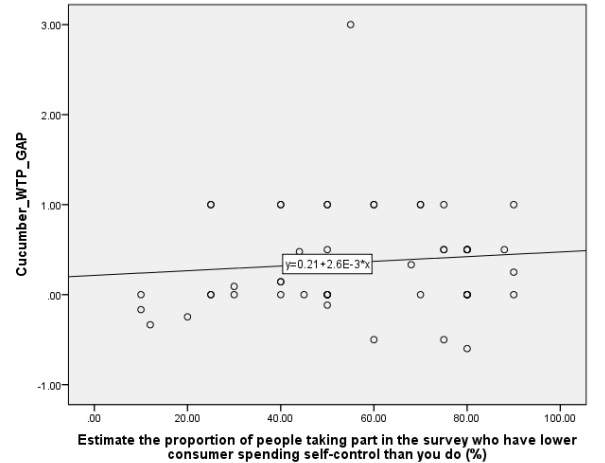
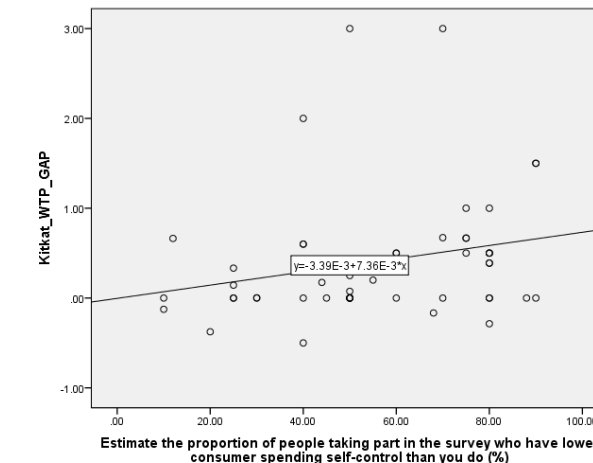
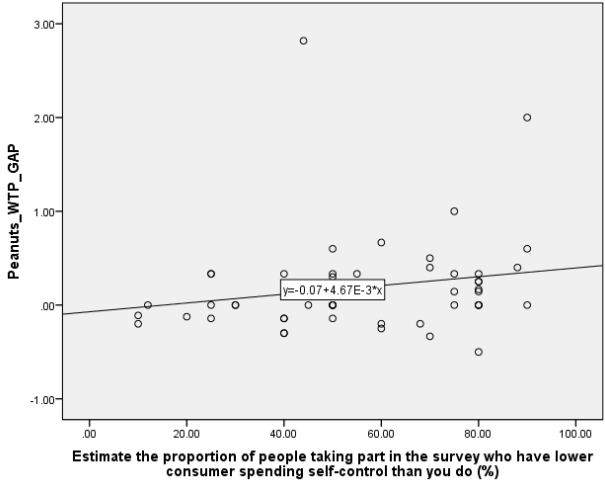
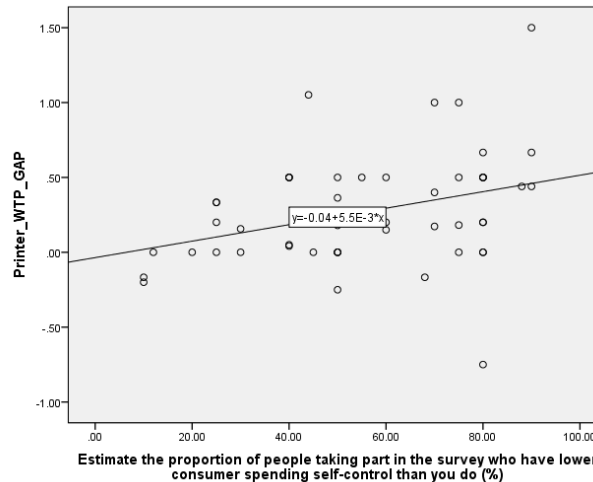
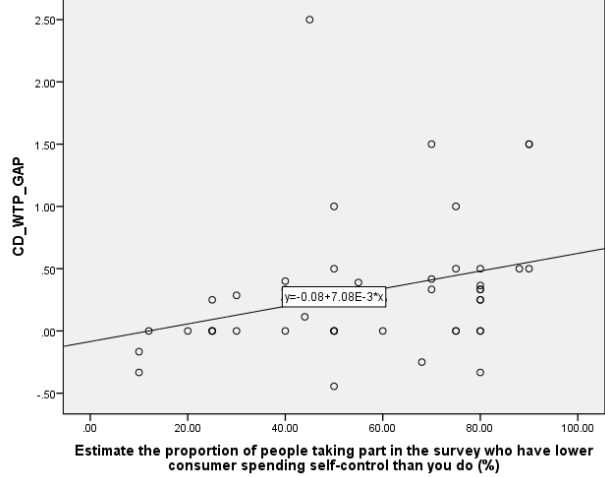
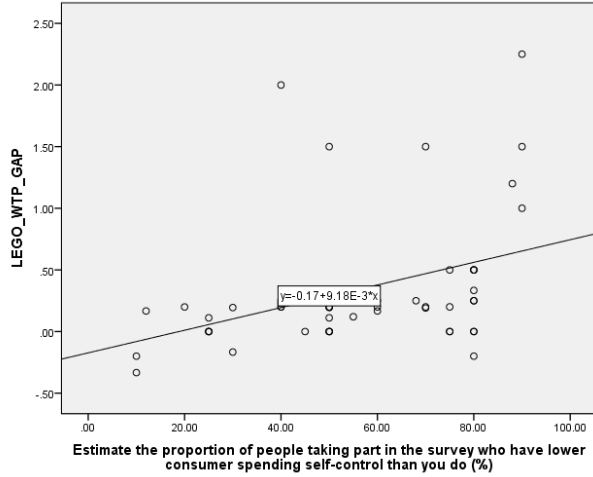
**Table 2** Arithmetic mean of price offer for self and other, study 2

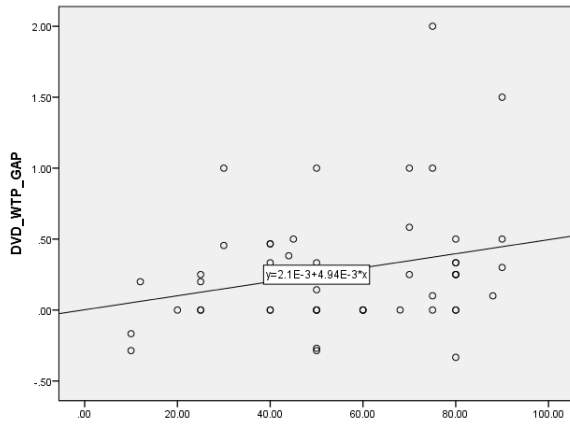
Good	Mean Price offer		
	Self	Other	Sig
LEGO Classic - Creative Bricks	28.54	36.36	0.000*
Music CD of your favorite singer/band	16.29	19.66	0.000*
HP DeskJet 1112 Printer	165.06	200.58	0.000*
2lbs Joe's Tasty Travels Roasted Peanuts	7.67	9.55	0.148
NESTLÉ KITKAT Minis Milk Chocolate Bar (10x12g)	4.38	5.75	0.001*
1 large Cucumber	2.58	3.39	0.070*
Manchester by the sea DVD	16.28	19.48	0.000*
500 ml Canada Dry	2.09	2.53	0.002*
A voucher giving a large pizza at Pizza Hut	13.84	17.85	0.000*
Average	28.53	35.02	

\*  $p < 0.05$ .

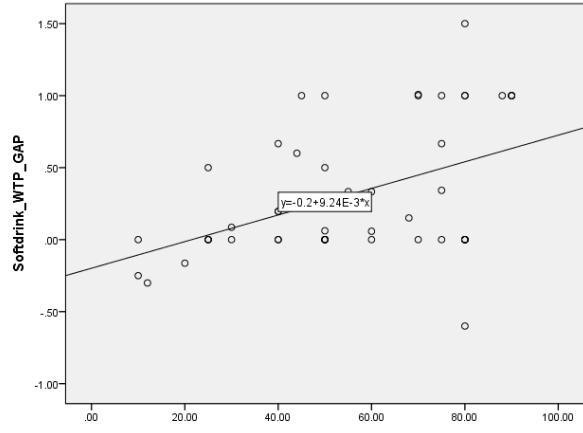
**Figure 1:** Results of Study 2. The plot shows participants' WTP gap of nine products as well as average WTP gap against underestimation proportion of others consumer spending self-control

\*Note: The WTP gap for each product equaled to the participant's price estimation of others' divided by their own price offer, which then minus 1. The average WTP gap was the mean of WTP gap of nine products. The calculation method is similar as in Study 1.

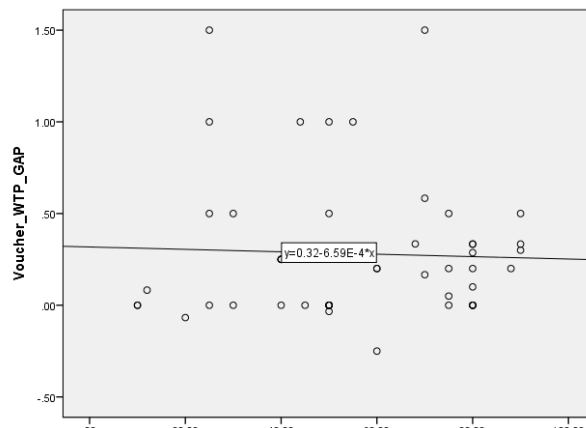




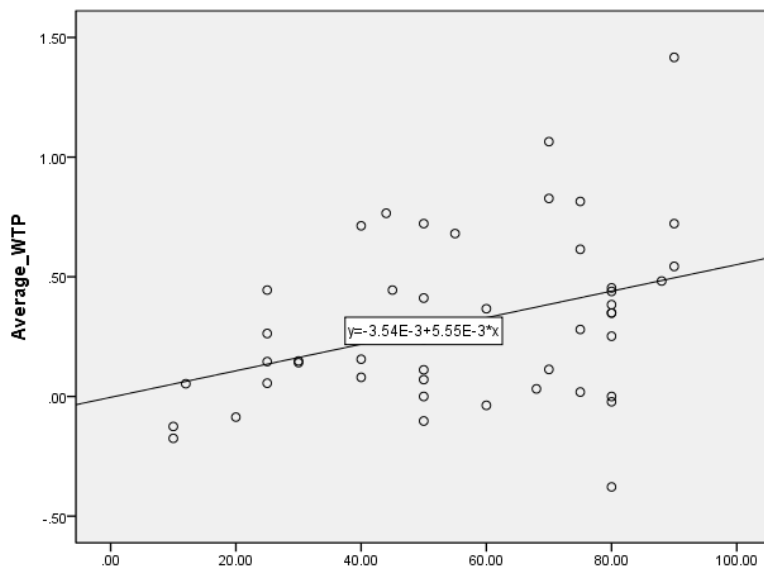
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)



Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)



Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)



Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)

**Table 3** Correlations between participants' WTP rates of nine products as well as average WTP against underestimation proportion of others consumer spending self-control, Study 2

**Correlations**

		LEGO_WTP_GAP	Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)
LEGO_WTP_GAP	Pearson Correlation	1	.388**
	Sig. (2-tailed)		.005
	N	50	50
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	.388**	1
	Sig. (2-tailed)	.005	
	N	50	50

\*\* Correlation is significant at the 0.01 level (2-tailed).

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	CD_WTP_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.311*
	Sig. (2-tailed)		.028
	N	50	50
CD_WTP_GAP	Pearson Correlation	.311*	1
	Sig. (2-tailed)	.028	
	N	50	50

\* Correlation is significant at the 0.05 level (2-tailed).

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Printer_WTP_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.337*
	Sig. (2-tailed)		.017
	N	50	50
Printer_WTP_GAP	Pearson Correlation	.337*	1
	Sig. (2-tailed)	.017	
	N	50	50

\* Correlation is significant at the 0.05 level (2-tailed).

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Peanuts_WTP_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.197
	Sig. (2-tailed)		.169
	N	50	50
Peanuts_WTP_GAP	Pearson Correlation	.197	1
	Sig. (2-tailed)	.169	
	N	50	50

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Kitkat_WTP_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.238
	Sig. (2-tailed)		.097
	N	50	50
Kitkat_WTP_GAP	Pearson Correlation	.238	1
	Sig. (2-tailed)	.097	
	N	50	50

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Cucumber_WTP_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.100
	Sig. (2-tailed)		.491
	N	50	50
Cucumber_WTP_GAP	Pearson Correlation	.100	1
	Sig. (2-tailed)	.491	
	N	50	50



**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	DVD_WTP_G AP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.258
	Sig. (2-tailed)		.071
	N	50	50
DVD_WTP_GAP	Pearson Correlation	.258	1
	Sig. (2-tailed)	.071	
	N	50	50

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Softdrink_WT P_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.453**
	Sig. (2-tailed)		.001
	N	50	50
Softdrink_WTP_GAP	Pearson Correlation	.453**	1
	Sig. (2-tailed)	.001	
	N	50	50

\*\* Correlation is significant at the 0.01 level (2-tailed).

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Voucher_WT P_GAP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	-.040
	Sig. (2-tailed)		.785
	N	50	50
Voucher_WTP_GAP	Pearson Correlation	-.040	1
	Sig. (2-tailed)	.785	
	N	50	50

**Correlations**

		Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Average_WTP
Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)	Pearson Correlation	1	.378**
	Sig. (2-tailed)		.007
	N	50	50
Average_WTP	Pearson Correlation	.378**	1
	Sig. (2-tailed)	.007	
	N	50	50

\*\* Correlation is significant at the 0.01 level (2-tailed).

First, Figure 1 shows the plot of participants' WTP rates of nine products against the underestimation proportion of others' consumer spending self-control.

In this study, three findings were illustrated.

First, participants estimated that others would like to pay more than themselves regarding most of the products, which is clearly shown with data clustering being more above the 0.00 average WTP. This is also shown in Table 2. For eight out of nine products ( $p < 0.05$ ), consumers generally estimated that others would pay more than they were willing to.

Second, there is confirmation that respondents tend to believe that others have lower consumer spending self-control than they do. On average, participants believe that they have higher consumer spending self-control than 55.84% of the ordinary population. As many as 60% of participants reported that they had higher consumer spending self-control than the average level. Only 34% of participants believed that they had lower consumer self-control than others. In other words, the belief that others' consumer spending self-control could be lower is strong in participants' minds.

Third, we can also say that the overestimation of others' willingness to pay is positively correlated with the underestimation of others' consumer spending self-control levels, which is shown in Figure 1. As such, there is an upward-sloping regression line for the average WTP gap and consumer spending self-control underestimation. Specifically, when looking at the WTP gap for each product, eight of the nine regression lines sloped upward, showing the same trend. Moreover, when we ran a linear regression to test the correlation efficiency between the average WTP and participants' estimates of the percentage of other participants who had lower consumer spending self-control than themselves, the p-value was 0.007, which is smaller than the 0.05 significance threshold. Also, from Table 3, we could observe that there was a significant correlation between WTP rates and underestimation of others' consumer spending self-control percentages, with a correlation coefficient of 0.378 and a p-value of 0.007 (smaller than 0.05). However, when we saw the correlations between each product and consumer spending self-control estimation rates, the results were not very satisfactory. This might have been caused by subtle and uncontrollable reasons. Since Frederick (2012) relied heavily on average results without log-transformation, we chose to accept the result of the correlation test of consumer spending self-

control and the average WTP gap. Hence, the correlation between underestimation of others' consumer spending self-control and overestimation of others' willingness to pay is significant.

In brief, the idea of self-control as a reason behind the WTP phenomenon from Frederick's (2012) reviewer is therefore supported. and our hypothesis 1 is accepted.

### **Study 3 Hedonic VS Utilitarian product types**

#### ***Pretest***

Before we started study 3, we did a pretest to find out if the selection of products for this study fits in hedonic/utilitarian category from the angle of participants' perceptions. Hedonic products always contain fantasy elements, so they were items like designer clothes, sports cars, and luxury watches. By contrast, utilitarian products contain instrumental and functional values, for instance minivans, personal computers and microwaves (Dhar & Werternbroch, 2000). After reading previous research, we found that it was difficult to equalize different products, but Lu, Liu and Fang (2016) showed a good example by selecting products with both hedonic and utilitarian attributes. In our study, we adopted their general product types, but utilized four specific products, which are Sony Gold Wireless Stereo Headset, Caudalie Instant Foaming Cleanser, Asus ROG Strix GL502 Laptop, and Oasis Tropical Mango Smoothie.

We adopted the pretest method "Frivolous VS Practical product" from Strahilevitz and Myers' (1988) study. The only difference is Strahilevitz and Myers (1998) asked participants to choose between practical, frivolous, practical and frivolous, and neither practical nor frivolous. In our study, we only asked participants to choose between "Frivolous product" and "Practical product".

#### **Participants**

We recruited 20 participants online via CrowdFlower (12 male, 8 female), aged 22-57. (M=37.8, SD=10.1).

#### **Design and Procedures**

Participants first read the instructions for the pretest. Then they were shown the definitions of "Frivolous products" and "Practical products": "Frivolous Products – Pleasure-oriented

consumption. Something fun, experiential, and perhaps even 'decadent.'" and "Practical products – Goal-oriented consumption. Something which one ordinarily buys to carry out a necessary function or task in one's life." Then they were asked to choose one category for each product.

Results of the pretest

Results showed that the attributes we gave products fit the right direction (hedonic or utilitarian) as we had expected. Therefore, they could be used as hedonic and utilitarian products in main study 3.

### ***Main Study 3***

Participants

Recruited via CrowdFlower, participants took part online. Therefore, participants who were under the age of 18 or who could not complete the task were removed from the data pool. The dataset eventually came to contain 87 participants (34 male, 53 female), aged 19–81 ( $M=42.8$ ,  $SD=12.6$ ).

Design and Procedures

After reading the initial instructions, participants were asked to offer the highest price they would be willing to pay for four products. Then, as in study 2, they were asked to give their own price offers for a list of four consumer products first and then estimate others' willingness to pay for the same products from the list. Participants were randomly assigned to two groups (one consisting of 43 of them and the other 44). In the first group, the headset and laptop had descriptions with hedonic attributes, while the foaming cleanser and smoothie had utilitarian attributes. In the second group, the headset and laptop had utilitarian attributes, whereas the foaming cleanser and smoothie had hedonic attributes. All participants only encountered one of four products that had either hedonic or utilitarian attributes once.

Demographic information, such as age, gender, and annual pre-tax household income, was collected at the end.

## Results and Discussions

**Table 4** Geometric Mean Price offer for Self- and Other-WTP values of hedonic and utilitarian attributed products, Study 3

	Mean Price offer after log transformation*		Sig	WTP_GAP **
	Self	Other		
<b>Hedonic Attributes</b>				
Sony Gold Wireless Stereo Headset	2.13	2.21	.004	0.08
Caudalie Instant Foaming Cleanser	1.37	1.45	.000	0.08
Asus ROG Strix GL502 Laptop	2.95	3.01	.000	0.06
Oasis Tropical Mango Smoothie	0.64	0.76	.000	0.12
			Average:	<b><u>0.085</u></b>
<b>Utilitarian Attributes</b>				
Sony Gold Wireless Stereo Headset	2.08	2.16	.000	0.08
Caudalie Instant Foaming Cleanser	1.38	1.44	.000	0.06
Asus ROG Strix GL502 Laptop	2.94	2.99	.000	0.05
Oasis Tropical Mango Smoothie	0.63	0.73	.000	0.1
			Average:	<b><u>0.0725</u></b>

\*Note: The prices of these four products are widely distributed. Hence, we conducted log transformation for the price offers given by participants to symmetrize the data.

\*\*Note: WTP\_GAP was calculated by using log-transformed mean price offer for self minus log-transformed mean price offer for others

**Table 5** Arithmetic Mean Price offer for Self- and Other-WTP values of hedonic and utilitarian attributed products, Study 3

	Mean Price offer		Sig	WTP (%) ***
	Self	Other		
<b>Hedonic Attributes</b>				
Sony Gold Wireless Stereo Headset	149.36	198.36	.016	32.8%
Caudalie Instant Foaming Cleanser	26.43	33.39	.012	26.3%
Asus ROG Strix GL502 Laptop	929.6	1089.26	.006	17.2%
Oasis Tropical Mango Smoothie	5.48	8.5	.002	55.1%
			Average	<b><u>32.9%</u></b>
<b>Utilitarian Attributes</b>				
Sony Gold Wireless Stereo Headset	119.66	158.5	.007	32.5%
Caudalie Instant Foaming Cleanser	25.94	31	.001	16.0%
Asus ROG Strix GL502 Laptop	892.27	1003.11	.000	11.47%
Oasis Tropical Mango Smoothie	4.58	6.04	.000	31.9%
			Average	<b><u>23.0%</u></b>

\*\*\* Note: WTP rate were calculated by paired t-test between mean price offers of self and other

Firstly, the effect of overestimation of others' willingness to pay is still robust. Table 4 and table 5 show paired t-tests between the mean price offers of self and others, both log-transformed and non-log-transformed. Results showed that the WTP gaps calculated by using the log-transformed mean price offer for self minus the log-transformed mean price offer for others generally were always larger among hedonic products than they were among utilitarian products. Moreover, the average overestimating rates were 32.9% and 23.0% for goods described as hedonic and

utilitarian, respectively. Hence, it is remarkable to see that the overestimation rate for hedonic products is greater than for utilitarian goods. This outcome was consistent with our expectations.

Furthermore, we compared the mean price offer (after log transformation) between the same products with different hedonic or utilitarian attributes for both self and others. In this case, we could clearly observe that price offers for hedonic products are always higher than utilitarian products. This was true in every case except for with the foaming cleanser, whose price offer for utilitarian goods was slightly higher than for its hedonic counterpart. The situation of offering price for others was even more absolute, with all of the greater offers coming for hedonic products rather than utilitarian ones.

In short, subjects have a higher overestimation trend towards others' willingness to pay when they encounter hedonic products rather than utilitarian goods. Thereby, our Hypothesis 2 is supported.

#### **Study 4 Main effect – Affluence belief and WTP**

##### **Participants**

Participants took part in the study online and were recruited via CrowdFlower. Eventually, participants who were under the age of 18 or unable to complete the task were removed from the dataset. The final dataset comprised 50 participants (23 male, 27 female), aged 22-81 (M=42.7, SD=12.1)

##### **Design and procedure**

This study adopted the methods of one of Matthews' et al. (2016) studies to test the robustness of the relationship between affluence beliefs and the overestimation of others' willingness to pay.

In Study 4, participants were first asked, "What is the comparison between the amount you can spend as you wish after paying taxes and unavoidable spending (e.g., bills/mortgage/rent) and that of the typical person who takes this survey?" The judgements were made using a 9-point scale: "Mine is very much lower"; "Mine is much lower"; "Mine is somewhat lower"; "Mine is slightly lower"; "They are exactly the same"; "Mine is slightly higher"; and "Mine is very much higher". It was coded from +4 to -4, respectively. The coding method was referenced from

Matthews et al. (2016), but the wording of the question was slightly modified to suit Canadian English users.

On the next page, participants were told to offer prices for a list of four consumer products. They were told, "Please give the maximum price you would like to pay for each product". Product selection was based on the availability of their organic counterparts. In the end, four products were selected as they had exact ethical alternatives under the same brands in same product lines. These products were Adidas Speed Trainer Sneaker, Naturegg Omega 3 Eggs (6 eggs), Bertolli Extra Virgin Olive Oil, and American Apparel Fine Jersey Crewneck T-Shirt.

The next page presented the participants with the same list of consumer products. However, this time, participants were asked to estimate the typical person taking this survey's willingness to pay by reading "Please estimate the maximum price the typical person taking this survey would like to pay for each product."

At the end, the participants reported their demographic information.



## Results and Discussion

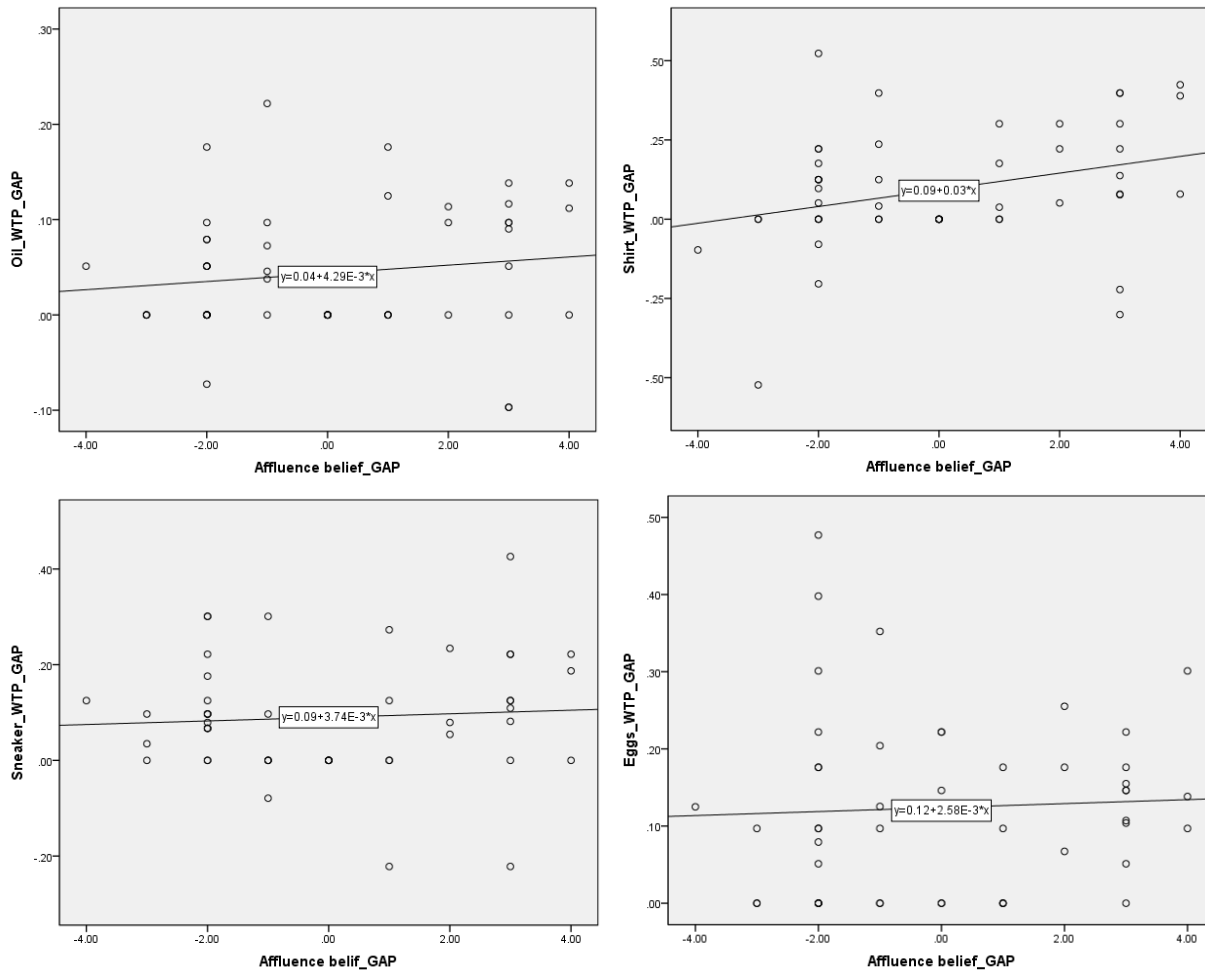
**Table 6** Geometric means for Self- and Other-WTP values in Study 4

Products	Mean Price offer after log transformation		Sig	WTP gap
	Self	Other		
Adidas Speed Trainer Sneaker American	1.92	2.01	.000	0.09
Naturegg Omega 3 Eggs (6 eggs)	0.6	0.72	.000	0.12
Bertolli Extra Virgin Olive Oil	0.98	1.02	.000	0.04
Apparel Fine Jersey Crewneck T-Shirt	1.36	1.46	.001	0.09
			Average	<b><u>0.085</u></b>

**Table 7** Arithmetic means for Self- and Other-WTP values, Study 4

Products	Mean Price offer after log transformation		Sig	WTP (%)
	Self	Other		
Adidas Speed Trainer Sneaker American	89.58	109.64	.000	22.4%
Naturegg Omega 3 Eggs (6 eggs)	4.22	5.64	.000	33.6%
Bertolli Extra Virgin Olive Oil	10.39	11.62	.000	11.8%
Apparel Fine Jersey Crewneck T-Shirt	27.44	34.79	.001	26.8%
			Average	<b><u>23.65%</u></b>

**Figure 2** Results of Study 4. The plot shows participants' WTP gaps against affluence belief of others' towards four products



First, from Table 6, we can see that the WTP effect is significant for all four products after conducting a paired t-test of log-transformed mean price offers. We also calculated the WTP gap by using mean price estimates for others minus the one for the self. All values are positive with an average WTP gap of 0.085. Moreover, the WTP rate was also calculated by comparing the real mean price offers in Table 7, which showed the same results as the WTP gap, with an average WTP rate of 23.65%. Hence, all the figures show a robustness of the WTP effect.

Second, the affluence belief of others is positively related to the WTP gap. We plotted Figure 2 using the WTP gap against a subjective difference in discretionary income for each of the four

products. Therefore, greater values on the y-axis stand for the greater overestimation of others' willingness to pay while greater values on the x-axis represent the stronger affluence belief of others. From Figure 2, we can clearly find that when people feel they have less discretionary affluence than others, they tend to overestimate others' willingness more, illustrated as all four rising regression lines. Therefore, the relationship between affluence belief and WTP gap in Matthews et al.'s (2016) studies is also supported here.

### **Study 5 A causal link between beliefs about others' affluence and beliefs about their willingness to pay for ethical products**

Similar steps were adopted from Matthews et al. (2016) to build the causal link between affluence belief and willingness to pay for ethical products.

#### **Participants**

Participants were recruited via CrowdFlower, and IDs that had been involved in Studies 1 and 2a were excluded. Eventually, in total, there was a sample of 117 participants (44 male and 73 female) aged 18-81 ( $M=42.2$ ,  $SD=12.7$ ).

#### **Design and procedure**

Participants were asked to imagine that a person is going to pay the maximum prices for a series of consumer products. On the next page, participants were randomly assigned to a "low income" ( $N=55$ ) or a "high income" ( $N=62$ ) condition. They were told that the person has a personal income of either \$10000 or \$90000 per year, "which puts them in about the bottom [and top] 10 percentile of people in Canada."

The next page showed a list of ethical products. Participants were asked to answer, "What is the maximum price would the person pay for each product?" They entered their responses in a text box for each product. Eventually, they answered questions about their demographic information.

Results and discussion

**Table 8** Arithmetic Mean price offers in high and low income groups, Study 5

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel)	high income group	62	202.4837	136.05055	17.27844
	low income group	55	75.8905	36.45295	4.91531
Naturegg Organic Eggs (6 eggs)	high income group	62	8.2253	7.73999	.98298
	low income group	55	5.1960	2.88384	.38886
Bertolli Organic Extra Virgin Oil (500ml)	high income group	62	13.8269	12.77335	1.62222
	low income group	55	8.0413	3.63978	.49079
American Apparel Organic Fine Jersey Crewneck T-Shirt	high income group	62	41.3868	27.91135	3.54474
	low income group	55	26.7125	18.70736	2.52250

**Table 9** Independent Sample Test Results to compare mean price offer in high and low income conditions, Study 5

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel)	Equal variances assumed	18.535	.000	6.688	115	.000	126.59316	18.92829	89.09986	164.08647	
	Equal variances not assumed			7.047	70.749	.000	126.59316	17.96398	90.77180	162.41453	
Naturegg Organic Eggs (6 eggs)	Equal variances assumed	4.294	.040	2.738	115	.007	3.02932	1.10647	.83761	5.22103	
	Equal variances not assumed			2.866	79.390	.005	3.02932	1.05710	.92538	5.13326	
Bertolli Organic Extra Virgin Oil (500ml)	Equal variances assumed	7.033	.009	3.243	115	.002	5.78566	1.78406	2.25178	9.31954	
	Equal variances not assumed			3.414	71.996	.001	5.78566	1.69483	2.40707	9.16425	
American Apparel Organic Fine Jersey Crewneck T-Shirt	Equal variances assumed	5.541	.020	3.296	115	.001	14.67423	4.45159	5.85648	23.49198	
	Equal variances not assumed			3.373	107.331	.001	14.67423	4.35066	6.04986	23.29860	

We ran the one-sample test for both the high- and low-income groups to compare the price offers. As shown in Table 8, the mean price offers in the high-income group for all four products are significantly greater than those in the low-income groups. We can see from Table 9, as shown in the independent sample test results, the difference between the mean price offers in two conditions was significant, as the p-values were all smaller than 0.05. Therefore, the estimated WTP of the person with a high income was higher in the low-income group. This finding is consistent with the previous arguments that ethical products are always linked to a "higher price." Moreover, the

finding also provides reasonable evidence that the affluence beliefs of others causally influences beliefs about their willingness to pay for ethical products.

### **Study 6 Ethical products' moderating effect**

Study 6 is a replication of Study 4 where the difference is to replace all products in Study 4 with their ethical alternatives (same brand, same product line, same size, and similar package; if there is one). Two ethical product choices were based on previous ethical papers: organic eggs (Krystallis & Chryssohoidis, 2005) and organic olive oil (Krystallis & Chryssohoidis, 2005). The other two were inspired by high street brands: Adidas and American Apparel. Eventually, four ethical products include Adidas Futurecraft sneakers (biodegradable and made with biosteel), Natureeg organic eggs (6 eggs), Bertolli Organic extra virgin olive oil, and an American Apparel organic fine jersey crewneck t-shirt. This attempt is to confirm that the ethical products reduced by affluence belief have a moderating effect on participants' willingness to pay in the positive direction.

#### **Participants**

Participants of the study online were recruited from CrowdFlower and geographically limited in Canada. Eventually, participants who were under the age of 18 or unable to complete the task were removed from the dataset. The final dataset included 52 subjects (19 males, 33 females), aged 18-81 ( $M=41.2$ ,  $SD=13$ ).

#### **Design and procedure**

Participants were told to offer prices for a list of four ethical consumer products. They were told to offer the maximum price they would like to pay for each product: "Please give the maximum price you would like to pay for each ethical product."

The next page presented the participants with the same list of ethical consumer products. However, this time, participants were asked to estimate the typical person taking this survey's willingness to pay: "Please estimate the maximum price the typical person taking this survey would like to pay for each ethical product."

Finally, participants reported their demographic information.

## Results and Discussion

**Table 10** Geometric means for Self- and Other-WTP values, Study 6

Products	Mean Price offer after log transformation		Sig	WTP gap*
	Self	Other		
Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel)	1.98	2.08	.000	0.1
Natureeg Organic Eggs (6 eggs)	0.72	0.81	.000	0.09
Bertolli Organic Extra Virgin Olive Oil	0.98	1.02	.000	0.04
American Apparel Organic Fine Jersey Crewneck T-Shirt	1.38	1.5	.000	0.12
			Average:	<b><u>0.0875</u></b>

\* Note: WTP\_GAP was calculated by using log-transformed mean price offer for self minus log-transformed mean price offer for others

**Table 11** Arithmetic means for Self- and Other-WTP values, Study 6

Products	Mean Price offer after log transformation		Sig	WTP (%) **
	Self	Other		
Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel)	106.58	133.62	.000	25.4%
Natureeg Organic Eggs (6 eggs)	5.55	6.81	.000	22.7%
Bertolli Organic Extra Virgin Olive Oil	9.75	10.92	.001	12%
American Apparel Organic Fine Jersey Crewneck T-Shirt	28.13	35.83	.000	27.4%
			Average:	<b><u>21.9%</u></b>

\*\* Note: WTP rate were calculated by paired t-test between mean price offers of self and other

In study 6, we ran a paired t-test to compare log-transformed prices offered by participants regarding four ethical products. The reason we conducted a log transformation is the same as that of Matthews et al. (2016), namely to make data less skewed. Also, we calculated the WTP gap by using log-transformed mean price offers for others minus those for self. As seen from table 10, four comparisons between the WTP of self and others yielded significant results, as the p-values are all smaller than 0.05.

Therefore, firstly, we could see that the mean prices offered for every product, for both self and others, are higher than their counterparts in study 4, which is consistent with previous literature's determining that people do consider ethical products to be more expensive.

Secondly, the overestimation of WTP between self and others is also significant here among ethical products. As shown in table 10, all prices estimated that others would pay are higher than self-paid prices. And the paired t-test indicates that the comparison is significant.

Third, if we compare Table 10 and Table 6 in Study 4, we can clearly see that not only are all prices offered for both self and others higher in Table 11 (for ethical products), but also the WTP gap between self and others is always larger in Table 10 (three out of four products, except the eggs). Moreover, we can observe the overestimation of the WTP rate calculated from arithmetic price means of bio sneakers, organic oil, and ethical t-shirts, all show a higher WTP rate when compared with their non-ethical counterparts in Study 4. This shows us that when consumers estimate others' willingness to pay for ethical products, they tend to overestimate the price gap to a larger extent. Since the causal link between affluence beliefs and ethical products was already tested in Study 5, these findings combined support our Hypothesis 3: When the overestimation of WTP is induced by affluence beliefs, if it is for an ethical product, people tend to overestimate more than they estimate others' willingness to pay for a general product.

### **Study 7 Self-control, Affluence belief, hedonic VS utilitarian and WTP**

#### Participants

Participants of the study were recruited from CrowdFlower, geographically limited to Canada. Eventually, participants who were under the age of 18 or unable to complete the task were removed from the dataset. The final dataset included 88 subjects (30 males, 58 female), aged 18-66 (M=40.2, SD=12.0).

#### Design and procedure

This study is a combination of factors tested in our previous studies. The purpose of this study was to discover potential relationships between consumer spending self-control, affluence belief, and hedonic and utilitarian product categories.



Our participants were put into two conditions, high income and low income, with 46 and 42 subjects each, by informing them that their peer participants in the same survey had an average income of \$90000 [or \$10000], which put them in the top [or bottom] 10% revenue population in Canada.

To measure if this manipulation actually worked, we asked participants to compare their discretionary income to that their peer participants' in the same survey: "What is the comparison between the amount you can spend as you wish after paying taxes and unavoidable spending (e.g., bills/mortgage/rent), and that of the typical person who takes this survey?" The question was modified from Matthews et al (2016)'s study, by changing words to fit Canadian English users.

Then, in both peer income conditions, participants were asked to compare of consumer spending self-control between themselves and others: "Estimate the proportion of people taking part in the survey who have lower consumer spending self-control than you do (%)."

After that, participants were told to give the maximum price for a list of four products. Then, they were asked to estimate the maximum price what the typical person taking the same survey would like to pay. The product selection was the same as in Study 3, which contained four products with either hedonic or utilitarian attributes. However, all participants only encountered each product once. In other words, they only witnessed either the hedonic or utilitarian attribute of a product, not the other one.

At the end, the demographic information of the participants was recorded.

## Results and Discussions

**Table 12** Correlation test to confirm the effectiveness of affluence belief manipulation, Study 7

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
What is the comparison between "the amount you can spend as you wish after paying taxes and unavoidable expenses (e.g., bills/mortgage/rent)" and that of the typical person taking this survey?	Equal variances assumed	.039	.845	-3.904	86	.000	-1.997	.511	-3.014	-.980
	Equal variances not assumed			-3.890	83.612	.000	-1.997	.513	-3.018	-.976

**Table 13** General linear model to investigate the relationship between groups, setting underestimation of others' consumer spending self-control as a covariate, Study 7

Tests of Between-Subjects Effects					
Dependent Variable: WTP_GAP					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.106 <sup>a</sup>	2	.053	5.262	.007
Intercept	.027	1	.027	2.736	.102
Self-control	.072	1	.072	7.191	.009
High/Low groups	.040	1	.040	3.953	.050
Error	.853	85	.010		
Total	1.588	88			
Corrected Total	.959	87			

a. R Squared = .110 (Adjusted R Squared = .089)

In Study 7, we manipulated two groups by telling participants that their peer participants had low or high incomes, and then their estimation of other consumers' spending self-control and willingness to pay for both the self and others were investigated. Then, to test if the manipulation actually worked, we asked our participants to state their comparison of discretionary income and

their peers. The result of the independent t-test between discretionary income comparisons in high or low groups, shown in Table 12, could tell that the manipulation was successful, as the p-value was 0.000 for both groups, which is smaller than 0.05. Participants had a higher affluence belief estimation in a high-income group when compared to a low-income group.

Therefore, we first made an interesting finding: on average, people tend to underestimate others' consumer spending self-control to a larger extent in the low income group than in the high income group with percentages of 50% and 46.2%, respectively. This finding suggests that when affluence belief rises, it will not necessarily deepen people's underestimation of others' consumer spending self-control. On contrary, it might lessen this trend. The reasons will be discussed in a general discussion chapter.

Second, a linear model was found, in which the underestimation of others' consumer spending self-control works as a covariate together with high/low-income groups as a fixed factor to affect the dependent variable - WTP gap. To test this relationship, we run a univariate general linear model test (ANCOVA), as shown in Table 13. Here, we found that the p-value of underestimation of others' consumer spending self-control and high/low-income groups were 0.009 and 0.05, respectively. The p-value of underestimation of others' consumer spending self-control percentage was much lower than 0.05, and that of groups was just equal to 0.05, which could be seen as marginally significant. We would still argue that there was a significant difference in willingness to pay between income groups when controlling for the underestimation rate of others' consumer spending self-control. In other words, the introduction of consumer spending self-control did not remove the effect of affluence belief.

In brief, from this study, we found that the underestimation of others' consumer spending self-control does not necessarily rise when belief in others' affluence increases. A sound relationship was also discovered—namely, when controlling the underestimation of others' consumer spending self-control percentage, there is a significant difference in peoples' willingness to pay between high and low affluence belief. Moreover, at the same time, consumer spending self-control does not remove the effect of affluence belief.

## General Discussion

In this paper, there are seven research goals which we achieved in our research. These are: (1) the robustness of the overestimation of others' WTP; (2) the explanation of the overestimation of others' WTP – the underestimation of others' consumer spending-self control; (3) the moderating effect of hedonic/utilitarian product attributes on the WTP gap; (4) the robustness of the existing explanation – affluence belief; (5) the link between affluence belief and ethical products; (6) the moderating effect of ethical products on the WTP gap; and (7) a deeper investigation to examine the underestimation of others' consumer spending self-control. They were tested in seven studies in an orderly fashion.

In study 1, we retested the robustness of the phenomenon – the overestimation of others' willingness to pay. We found that this phenomenon exists significantly among the consumer products we selected. Our participants consistently overestimated others' price offers by the "typical person." Also the paired t-tests between price offer for self and others are generally significant. Therefore, Frederick's (2012) finding of overestimation of others' willingness to pay is constant and robust.

In Study 2, we explored a new explanation of the WTP gap, which is the underestimation of others' consumer spending self-control. This possibility was first mentioned in Frederick's (2012) future research segment, which was recommended as a direction by one of the reviewers. We narrowed the general self-control to a more specified concept, which was consumer spending self-control (Haws et al., 2012). As a result, participants had a trend by which to underestimate others' consumer spending self-control. Moreover, overestimation of others' WTP for a list of commercial products, on average, was found to be positively related to the underestimation effect. Hence, the underestimation of others' consumer spending self-control as an explanation to the "X effect" -- overestimation of others' WTP -- is primarily supported. Hence, it is assumed that people do have a trend to be biased as a subconscious "double standard" when they rate themselves and estimate others. When the trait is good, people tend to overestimate their own capabilities, such as consumer spending self-control; however when the behavior is considered to be a little bit guilty or painful, such as spending money, they are more likely to exaggerate others' possibility of conducting it.

Later, in Study 3, we tried to emphasize the same products with different hedonic or utilitarian attributes to induce participants' different perceptions. This attempt was not very common in

previous literature, so we expected that the findings might be creative. We first conducted a pretest to confirm the correct setting of hedonic and utilitarian attributes. As a result, our participants did overestimate others' WTP to a larger extent when they faced the products with hedonic attributes than when they offered prices and estimated utilitarian-attributed products for others.

In study 4, in the end, we re-proved the existence of a reason for WTP gap - affluence belief of others' (Matthews et al, 2016) with four consumer products we selected. Results showed that when affluence belief was raised, WTP gap also increased. This is consistent with previous findings that hedonic products are more likely to be selected for others, but are estimated as having a higher price.

Study 5 was an adopted research method from Matthews et al. (2016). In their study, there was a causal link to prove between affluence belief and willingness to pay. Nevertheless, in our study, we adopted the method but tried to test another causal link between affluence belief and ethical products. When people were told to have either high income or low income, their price offers towards ethical products were highly different. Noticeably, we used a list of four ethical products, which were precisely the alternatives of conventional products in study 4, with same brand, under same product lines, and with similar size or packaging. Eventually, the causal link was supported. This suggests that the previous research pointing out that ethical products have a price premium and are linked to wealthier groups is sound and consistent with our current findings.

Study 6 was a confirmation of ethical products' moderating effect on WTP phenomenon. The methodology was same as Study 4, and the consumer products were same as Study 5. The design of research was consistent from Studies 4 and 5 to remain the validity of results. The results showed that there was not only a generally higher price offer phenomenon among ethical products, but likewise a larger WTP gap among ethical products than among conventional products as well.

In the last study, Study 7, we combined and tested the potential relation(s) between the underestimation of other consumers' spending self-control, affluence belief, and WTP gap. In short, we found a meaningful relationship that noted that when controlling underestimation of other consumers' spending self-control percentages, there is a significant difference in people's willingness to pay between people having high and low affluence beliefs. Hence, we could say that consumer spending self-control did not remove the effect of affluence beliefs. This suggests that underestimation of others' consumer spending self-control, and affluence beliefs are two

separate factors that could both explain the overestimation effect. Moreover, we found that when people believe that others are more affluent, this does not necessarily lead to underestimation of those others' consumer spending self-control. This may be related to the thought of elite theory, which describes the high-income group as having high culture, rationality, self-control, and respect and is worth future research dedication.

In conclusion, this study suggested that there is a new explanation for the overestimation of others' willingness to pay effect, which is the underestimation of other consumers' spending self-control. When people underestimate others' consumer spending self-control more, they tend to overestimate others' willingness to pay to a larger extent. Moreover, new moderators of the WTP gap were found, which are hedonic/utilitarian products and conventional/ethical products. Specifically, people overestimate others' willingness to pay for hedonic products more than for utilitarian alternatives; they have a larger overestimation rate for ethical products than for their conventional counterparts. Last but not least, there was a relation found when controlling for underestimation of others' consumer spending self-control percentage; there is a significant difference in peoples' willingness to pay between people having high and low affluence belief. The underestimation of others' consumer spending self-control does not remove the effect of affluence belief.

## **Contributions**

This project fills a lack of research on the topic of others' WTP and sheds light on the validity of one explanation of the phenomenon, as well as two moderators of the WTP gap.

Our first contribution is providing an assessment of the merit of proposed factors underlying the phenomenon of overestimation of others' WTP. We confirm that there is an explanation based on an estimate of others' consumer spending self-control capabilities being a significant predictor of over-estimation effects. This offers more directions to the academic area when looking at the overestimation of others' WTP effect. Together with affluence belief as a reason behind WTP effect found by Matthews et al (2016), now there are two explanations, which could therefore widen the current research paths and bring more potentials, because researchers could use these two factors as new starting points.

Second, we make a theoretical contribution by extending existing research to assess whether or not overestimation effects vary systematically across product types. Although several different stimuli were used by Frederick (2012) and Mathews et al. (2016), product type was not incorporated as a factor in either article; nor was it systematically varied. Within the broad umbrella of product type, we see two classifications of products that can yield potential moderators: the classification of products into hedonic (vs. utilitarian) products and the classification of products into those with a significant number of ethical attributes vs. those without such attributes. With regard to the first classification, we find that hedonic products elicit higher levels of overestimation of others' WTP than utilitarian attributed products. As for products with ethical attributes, these products are commonly found to charge premium prices, and it is consistent that inferences made about the values of people who buy these products, as well as their affluence, leads to the overestimation of others' WTP.

Thirdly, this research makes an applied contribution in that the accurate estimation of others' WTP is a key input into pricing decisions both for individuals and companies. Just as the underestimation of others' WTP may lead to foregone profits and other opportunity costs, chronic overestimation of others' WTP is likely to lead to lost sales, excessive inventory holding costs, and poor investment decisions. It may also make a public policy contribution by making resale markets more efficient, if sellers can choose realistic prices which allow the purchase of used goods instead of those used goods ending up in landfills.

Fourthly, the two moderators to the X effect we find out would also contribute to strategic implications, such as promotion strategy design and location strategy. For example, product managers may want to emphasize different hedonic/utilitarian attributes on the same products when they need to promote in such a direction. Moreover, marketers might wish to use the ethical/conventional product moderator flexibly in their location strategy—for instance, conducting promotions of ethical products in a CBD with a high distribution of companies and business offices, which might witness a greater success than if such promotions occurred in a general supermarket.

### **Limitations and future research directions**

First, the term of "typical person taking the same survey" is used in our studies and also being the used as the compared subject in other self-other studies, such as Frederick (2012) and Matthews

et al. (2016). Similar terms are like "the other people taking this survey," "the median price that other people are taking this survey give," etc. However, the effectiveness of these terms used to make participants understand is under-examined. Hence, future methodology research could focus on the effectiveness of the phrasing from both psychological and linguistic ways.

Second, different people may have different attitudes toward product types because of their various personalities, so the overestimation effect may be moderated by personalities. And also, there were not previous research in WTP field dressing on personality varieties. Hence, this could be a very interesting research direction.

Third, people's sensitivity to different kinds of ethical products is different based on their background, lifestyle, exposure to ethical categories, and influence of mass media. So it will be interesting to investigate people's reaction and willingness to pay to different types of ethical products, together with those potential moderators, such as education background, gender, knowledge of a specific ethical product category, etc.

Fourth, we did have few outliers in the results (i.e., in Studies 1 and 2) that opposed our hypotheses and the majority of our results. Also outliers changed, for example peanuts and DVD were not significant in Study 1, but DVD turned to be significant in Study 2. Hence, it might be meaningful to dig deeper into the reasons of those outliers, which will probably bring new moderators or special conditions to consider. Thus, the exploration of these outlier products may be worth further work, as well.

Fifth, our sample sizes are relatively limited and could be developed to a larger scale. This could also be one reason why we did have some outliers in our results. Therefore, future studies could expand sample sizes to increase validity. What's more, our research is limited to one country; hence, future research might look into the same issue from a cross-country perspective.

Sixth, this research on consumer spending self-control is primary and could be enriched further by adding empirical work that considers several aspects of consumer spending self-control, the factors that could strengthen or weaken consumer spending self-control estimation. Also, the timing of perception of others' consumer spending self-control is also worth researching on, for example, when the perception is near to the time to make a purchase decision, does it make a difference to influence WTP effect?





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## Appendices

### Appendix A Main effect - Overestimation of others' WTP, Study 1 & 2

Instructions: "For each of the nine products, please indicate the most you would like to pay for it."

- |   |        |
|---|--------|
| (1) LEGO Classic - Creative Bricks                          | Price: |
| (2) Music CD of your favorite singer/band                   | Price: |
| (3) HP DeskJet 1112 Printer                                 | Price: |
| (4) 2lbs Joe's Tasty Travels Roasted Jumbo Virginia Peanuts | Price: |
| (5) NESTLÉ KITKAT Minis Milk Chocolate Bar (10x12g)         | Price: |
| (6) 1 large Cucumber  | Price: |
| (7) Manchester by the sea DVD                               | Price: |
| (8) 500 ml Canada Dry                                       | Price: |
| (9) A voucher giving a large pizza at Pizza Hut             | Price: |

“Please look at these products again and estimate the most price the typical person taking this survey would like to pay for each product.”

- |  |        |
|--|--------|
| 1) LEGO Classic - Creative Bricks                          | Price: |
| 2) Music CD of your favorite singer/band                   | Price: |
| 3) HP DeskJet 1112 Printer                                 | Price: |
| 4) 2lbs Joe’s Tasty Travels Roasted Jumbo Virginia Peanuts | Price: |
| 5) NESTLÉ KITKAT Minis Milk Chocolate Bar (10x12g)         | Price: |
| 6) 1 large Cucumber  | Price: |
| 7) Manchester by the sea DVD                               | Price: |
| 8) 500 ml Canada Dry                                       | Price: |
| 9) A voucher giving a large pizza at Pizza Hut             | Price: |

Demographic information

Gender: Female ( ) Male ( )

Age: 18-30( ) 30-45( ) 45-60( ) 60-75( ) 75-90( ) Above 90( )

Household income: Below\$25000( ) \$25000-\$45000( ) \$45000-\$65000( ) \$65000-\$85000( ) Above \$85000( )



## Appendix B Consumer spending self-control estimation, Study 2 & 7

### Instructions

Consumer spending self-control is “the ability to monitor and regulate one’s spending related thoughts and decisions in accordance with self-imposed standards”.

“What is the comparison between the amount you can spend as you wish after paying taxes and unavoidable expenses (e.g., bills/mortgage/rent) and that of the typical person taking this survey?”

Mine is very much lower ( )

Mine is much lower ( )

Mine is somewhat lower ( )

Mine is slightly lower ( )

They are exactly the same ( )

Mine is slightly higher ( )

Mine is somewhat higher ( )

Mine is much higher ( )

Mine is very much higher ( )

Demographic information ( )

Gender: Female( ) Male( )

Age: 18-30( ) 30-45( ) 45-60( ) 60-75( ) 75-90( ) Above 90

Household income: Below \$25000 ( ) \$25000-\$45000 ( ) \$45000-\$65000 ( ) \$65000-\$85000 ( ) Above\$85000 ( )

## Appendix C Hedonic VS Utilitarian attributes, Study 3

### Hedonic attributes

**Sony Gold Wireless Stereo Headset** (Great for gamers showing everything from the big booms to whisper-quiet warnings in stunning, trendy and sleek design, virtual surround sound for perfect music lovers)

**Caudalie Instant Foaming Cleanser** (A natural blend of grape extracts, sage, and chamomile, with delicate scent, sensuous and soft foam) 150ml

**Asus ROG Strix GL502 Laptop** (A classic, timeless design, optimized for smooth computing and a multimedia experience, high resolution screen, full audio with extra bass)

**Oasis Tropical Mango Smoothie** (A joyful combination of flavors and sensations, creamy blend with exceptional taste) 1.75L

### Utilitarian attributes

**Sony Gold Wireless Stereo Headset** (Long battery life, great sound clarity, microphone for conversations, portable and ideal for daily use)

**Caudalie Instant Foaming Cleanser** (Functionally deep cleansing, solution for dryness, dullness and uneven texture, for all skin types)

**Asus ROG Strix GL502 Laptop** (Shock-proof, great performance on professional computing and spreadsheet calculations, ideal business laptop)

**Oasis Tropical Mango Smoothie** (1 glass (250ml) equals 2 out of 5 portions fruit and vegetables a day, source of fibres and vitamins, lactose free)

### Demographic information

Gender: Female( ) Male( )

Age: 18-30( ) 30-45( ) 45-60( ) 60-75( ) Above 75( )

Household income: Below\$25000( ) \$25000-\$35000( ) \$35000-\$45000( ) \$45000-\$55000( ) Above\$55000( )

**Appendix D** Affluence belief and WTP gap, Study 4 & 7

What is the comparison between "the amount you can spend as you wish after paying taxes and unavoidable expenses (e.g., bills/mortgage/rent)" and that of the typical person taking this survey?

Mine is very much lower      ( )

Mine is much lower      ( )

Mine is somewhat lower      ( )

Mine is slightly lower      ( )

They are exactly the same      ( )

Mine is slightly higher      ( )

Mine is somewhat higher      ( )

Mine is much higher      ( )

Mine is very much higher      ( )

Please give the maximum price **you** would like to pay for each product. (CAD)

1) Adidas Speed Trainer Sneaker

Price:

2) Naturegg Omega 3 Eggs (6 eggs)

Price:

3) Bertolli Extra Virgin Oil (500ml)

Price:

4) American Apparel Fine Jersey Crewneck T-Shirt

Price:

Please estimate the maximum price **the typical person** taking this survey would like to pay for each product. (CAD)

- |  |        |
|--|--------|
| 1) Adidas Speed Trainer Sneaker                  | Price: |
| 2) Naturegg Omega 3 Eggs (6 eggs)                | Price: |
| 3) Bertolli Extra Virgin Oil (500ml)             | Price: |
| 4) American Apparel Fine Jersey Crewneck T-Shirt | Price: |

Demographic information

Gender: Female( ) Male( )

Age: 18-30( ) 30-45( ) 45-60( ) 60-75( ) Above 75( )

Household income: Below\$25000( ) \$25000-\$35000( ) \$35000-\$45000( ) \$45000-\$55000( ) Above\$55000( )

**Appendix E** Causal link between affluence belief and WTP for ethical product, Study 5

Please think about a person who is going to give the maximum prices for a list of ethical products.

*Low income group*

This person has a personal income of \$10000 per year, which puts him/her in about the bottom 10% of people in Canada.

Now please give the maximum price this person would like to pay for each product. (CAD)

- |  |        |
|--|--------|
| 1) Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel) | Price: |
| 2) Naturegg Organic Eggs (6 eggs)                                    | Price: |
| 3) Bertolli Organic Extra Virgin Oil (500ml)                         | Price: |
| 4) American Apparel Organic Fine Jersey Crewneck T-Shirt             | Price: |

*High income group*

This person has a personal income of \$90000 per year, which puts him/her in about the top 10% of people in Canada.

Now please give the maximum price this person would like to pay for each product. (CAD)

- |  |        |
|--|--------|
| 1) Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel) | Price: |
| 2) Naturegg Organic Eggs (6 eggs)                                    | Price: |
| 3) Bertolli Organic Extra Virgin Oil (500ml)                         | Price: |
| 4) American Apparel Organic Fine Jersey Crewneck T-Shirt             | Price: |



Demographic information

Gender: Female( ) Male( )

Age: 18-30( ) 30-45( ) 45-60( ) 60-75( ) Above 75( )

Household income: Below\$25000( ) \$25000-\$35000( ) \$35000-\$45000( ) \$45000-\$55000( ) Above\$55000( )

**Appendix F** WTP for ethical products, Study 6

Now please give the maximum price you would like to pay for each ethical product. (CAD)

1) Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel) Price:

2) Naturegg Organic Eggs (6 eggs) Price:

3) Bertolli Organic Extra Virgin Oil (500ml) Price:

4) American Apparel Organic Fine Jersey Crewneck T-Shirt Price:

Now please give the maximum price the typical person would like to pay for each ethical product. (CAD)

1) Adidas Futurecraft Sneaker (Biodegradable and made with BioSteel) Price:

2) Naturegg Organic Eggs (6 eggs) Price:

3) Bertolli Organic Extra Virgin Oil (500ml) Price:

4) American Apparel Organic Fine Jersey Crewneck T-Shirt Price:

Demographic information

Gender: Female( ) Male( )

Age: 18-30( ) 30-45( ) 45-60( ) 60-75( ) Above 75( )

Household income: Below\$25000( ) \$25000-\$35000( ) \$35000-\$45000( ) \$45000-\$55000( ) Above\$55000( )