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Monetary Assessment and Predicted Utility Dissociation Across Two Goods

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Abstract: This paper studies the dissociation between two common measures of value: the monetary assessment (price) of a purchase option and the predicted utility (enjoyment) of owning or consuming the option. This paper specifically investigates whether this dissociation varies across two goods: water, a necessity, and beer, a luxury. This dissociation leads to non-optimal consumption and welfare and seems to arise from differences in salient information when evaluating monetary assessment and when evaluating predicted utility. Evolutionary psychology states that the human mind developed specific cognitive systems to solve adaptive problems and that the type of adaptive problem a human faces determines the salient information in his environment. On this basis, this paper argues that the human brain reduces this dissociation for goods that are necessary to survival because the consequence of obtaining or not obtaining the good are related to survival and thus made salient when assessing both measures of value. This paper's survey finds some evidence in support of this idea.

1. Introduction

Imagine a Minnesota winter. A severe snow storm has covered your driveway in snow and you now need a shovel to clear the snow. At the store, you notice that the price of shovels has tripled from before the storm and you may refuse to pay this higher price due to an intuition on the cost of producing a shovel based on the pre-storm price. Back at your driveway without a shovel, you realize the snow will not melt soon and the lost time and frustration of making your way through piles of snow for the next couple months may justify paying the high shovel price after all. This example highlights a failure to map willingness to pay (WTP) to predicted utility (PU) that may result in welfare loss. Ariely (2008) argues that this dissociation between WTP and PU is due to a focus on “transaction cues” when assessing WTP and a focus on “experience cues” when assessing PU. This paper argues that the salience of transaction cues or experience cues also depends on the type of good assessed.

In the above example, the dissociation leads to a small welfare loss. In cases involving goods necessary to human survival, the dissociation could lead to serious welfare losses. Of course, in life or death situations, consequences of obtaining or not obtaining the good are salient far beyond considerations of the good’s production costs. Based on this observation and an evolutionary psychology conception of the human brain, this paper’s central idea is that experience cues are more salient when assessing WTP for necessities than for luxuries. This increase in salience could be due to higher availability of experience cues related to necessities that have been present throughout human evolution, but also due to the more extreme nature of these cues that involve life or death situations and force the human brain to more carefully consider the outcome of the assessment of WTP.

The study of this dissociation is relevant to consumer welfare, marketers that can play off this dissociation and policy makers that can reduce this dissociation. The study across goods provides a better understanding of the causes of the dissociation and allows consumers, marketers and policy makers to target situations where the dissociation is more or less present.

We design a survey of 2 variations within participants and 2x2x2 variations between participants where each participant assesses 2 goods [water/beer] either on WTP or PU and receives one of 2 experiences cues [comfortable/uncomfortable] and transaction cues [high/low]. The analysis of the 324 responses provides statistical evidence that experience cues may indeed be more salient for necessities than for luxuries.

This paper is divided into five sections. Section two examines the literature documenting the dissociation and the importance of evolutionary psychology in shaping the human brain and issues of saliency. Section three describes the experimental design. Section four presents the experimental results and a broader discussion of this topic concludes this paper in section five.

2. Literature Review

Ariely (2008) documents the dissociation between WTP and PU and explains that this could arise from different ways of evaluating WTP and PU. Ariely conducts an experiment where participants are told that their favorite artist is giving a concert. He gives participants a high or low cost of organizing the event (transaction cue) and a high or low temperature in the auditorium (experience cue). He finds that when assessing WTP, participants focus on the transaction cue and that when assessing PU, they focus on the experience cue. Ariely states that this dissociation may explain well known prediction-decision inconsistencies and fairness effects.

Hsee (1999) studies PU and inconsistent decisions that do not maximize utility. Hsee conducts an experiment where participants are separated into two groups: one to assess the PU of

eating one of two types of chocolate, the second to decide which of the two chocolates they eat. The first chocolate costs 50 cents and is small heart-shaped. The second chocolate costs \$2 and is large cockroach-shaped. 46% of the participants in the first group predicted higher utility from consuming the heart-shaped chocolate. However, 68% of the participants in the second group decided to eat the large chocolate. The first group may well have focused on the feeling of putting a heart-shaped versus cockroach-shaped chocolate in their mouths, while the second group may well have focused on choosing and eating the expensive versus the cheap chocolate. The salience of experience cues in evaluating PU and of transaction cues in evaluating which chocolate to eat may well explain this prediction-decision inconsistency.

Ariely (2008) believes the dissociation to underlie another behavioral trait of humans called the fairness effect. Kahneman et al. (1986), whose study inspired this paper's opening snow shovel example, conducts an experiment where participants rate as fair or unfair the decision of a hardware store to increase the price of snow shovels from \$15 to \$20 the morning following a large snow storm. 82% of participants consider this unfair. The previous day's price of \$15 may well be salient when assessing the price of the shovel while the increased utility that a shovel brings after a snow storm (perhaps in the form of a clear driveway) is not.

As a final example of the dissociation, Tversky and Griffin (1991) also study PU and inconsistent decisions, but arguably combined with the fairness effect. Tversky and Griffin conduct an experiment where participants are separated into two groups: one to assess the PU of one of two job offers, the second to decide which of the two offers they accept. The first offer is for \$33,000 knowing that colleagues earn \$30,000. The second is for \$35,000 knowing that colleagues earn \$38,000. The first group predicts higher utility from the \$33,000 job earning \$3,000 more than colleagues. However, the second group decides to choose the \$35,000 job

earning \$3,000 less than colleagues. The first group may have focused on the feeling of unfairness of earning less than their equals while the second group may have focused on accepting \$35,000 versus \$33,000. Differences in salient cues lead to a dissociation between PU and willingness to accept that explains prediction decision inconsistencies and the fairness effect.

The question now becomes why certain cues are more salient in one situation but not in the other? This paper believes that humans must have addressed this dissociation when faced with goods necessary for survival. For example, if the dissociation between the PU and WTP of water leads humans not to obtain water, then serious health consequences could ensue. Of course, life or death situations make salient the immense utility of water consumption. This paper argues that this potential of necessities to appear in life or death situations in humans' evolutionary past, now makes experience cues more salient when evaluating WTP for these necessities.

Evolutionary psychology views the human brain as a collection of information processing neural circuits designed through natural selection and millennia of solving "adaptive problems" (Tooby, 1992). Adaptive problems are recurrent, cross-generational situations that affect human's reproductive capacities. Natural selection led the human brain to develop specific, automatic, efficient and reliable circuits to overcome these problems (Tooby, 1992). Obtaining a minimum of water and food is an adaptive problem and the brain thus possesses specific circuits to address this problem. For example, remember your last walk in the woods. A single glance should be enough to develop a feel for whether certain berries or plants are edible or harmful.

Buss (2009) argues that "psychological adaptations define which aspects of the environment are rendered psychologically salient." Buss' idea is that humans focus on different cues based on their belief of the adaptive problem they currently face. Purchasing necessity goods could invoke adaptive situations and prompt an automatic response in the human brain. These psychological

adaptations are designed to make salient the information most relevant to solving the adaptive problem (Buss, 2009). Thus, the dire consequences of not obtaining a necessity or the immensely beneficial consequence of obtaining a necessity may become more salient. For example, in water purchases, the nature of water as a necessity incites an automatic and unconscious response in the human brain. The last time you experienced thirst and satisfied thirst may become more salient in order to prevent thirst from reoccurring. This increase in salience could be due to higher availability of experience cues related to necessities but also due to the more extreme nature of these cues that involve life or death situations and force the human brain to retrieve these experience cues to more carefully consider the outcome of the assessment of WTP. This paper designs a survey to test this evolutionary psychology based hypothesis that experience cues become more salient when evaluating WTP for a necessity.

3. Experimental Design

Three hundred and twenty-four subjects participated in this paper's survey. The design consists of 2 variations within subjects and 2x2x2 variations between subjects. Within variations depends on 2 types of goods and between variations depends on 2 types of assessments, experience cues, and transaction cues. The survey question closely resembles Thaler's (1985) survey question in his study of the fairness effect:

“You are on the beach on a [hot/cold] day, it is [95/55] degrees F [35/12 C].

A companion gets up to make a phone call and offers to bring back a bottle of [water/beer] from the only nearby place where [water/beer] is sold, a [fancy hotel/run-down supermarket]. There is no chance to bargain with the [bartender/store owner]. What price do you state? / How much pleasure do you expect from drinking the [water/beer]?”

A type of assessment, experience cue, and transaction cue were randomly assigned to subjects. In addition, the [water/beer] question order within subjects was randomly assigned to reduce sequential bias. This addition proves necessary as subjects' WTP for water is significantly higher when assessed after WTP for beer and vice-versa. Subjects indeed anchored responses to the second question on responses to the first question.

Water and beer are comparable standard goods most subjects can relate to. Water has been present throughout human evolution, is essential to survival and thus evokes the idea of a necessity. On the other hand, beer is recent, is not essential to survival and thus evokes the idea of a luxury. The choice of similar goods like water and beer allows the structure of the survey question to be parallel and thus make salient the contrast between the one good and the other. The choice of beer may limit results given differences in types of beer that may be salient to some subjects while others do not drink beer. However, this last point may not have strong effects on college subjects and beer may be the most standard and most consumed luxury good.

The choice of hot temperature and cold temperature day experiences cues are also motivated by concerns that subjects can relate to parallel cues. In addition, Thaler's original question situates the subject on a beach and temperature appears relevant to this situation. Explicitly including temperature numbers aims to make more salient the experience cue beyond the three letter words "hot" and "cold." The choice of cold may limit results given the unusual situation of being on a beach on a cold day.

Finally, the choice of fancy hotel and run-down supermarket transaction cues are based on Thaler's original survey whose results validate this choice. This paper recognizes that survey use has limitations: subjects answer in hypothetical situations and may not reflect real-world behavior. In addition, the extent to which subjects interpret the situation conceived by the

experimenter may be limited and they may use unspecified assumptions in forming answers. However, despite limitations, a carefully constructed survey can provide insightful information.

4. Results

The survey goals are two-fold: 1) Confirm Ariely's (2008) results that transaction cues are more salient in assessing WTP and that experience cues are more salient in assessing PU; 2) Investigate this paper's hypothesis that experience cues in assessing WTP are more salient for necessities than for luxuries.

In Figure 1 the immediate observation is that in general individuals are willing to pay more for beer than for water, but are predicting less utility from beer than from water. This would imply a welfare loss. Table 1 gives the means observed in each survey variation. These summary statistics allow an initial and intuitive analysis of the results. As first observation, WTP for both goods is higher when water or beer is from a fancy hotel than when from a run-down supermarket. The transaction cues thus seem to matter in assessing WTP. As a second observation, PU for both goods is higher when water or beer is consumed on a hot day than on a cold day. The experience cues thus seem to matter in assessing PU. Further observations indicate that experience cues also matter in assessing WTP and transaction cues also seem to matter in assessing PU. Interestingly, while a high experience cue increases WTP (WTP for water and beer is higher when consumed on a hot day), a high transaction cue decreases PU (PU for water and beer is higher when purchased from a run-down supermarket). The observation that a high transaction cue decreases PU is inconsistent with Ariely's findings; a potential explanation for this is discussed further below using Thaler's (1985) transaction utility theory. To determine the absolute and relative importance of transaction and experience cues in evaluating WTP and PU, this paper conducts the following hypotheses tests.

Hypothesis 1: For both water and beer, transaction cues are more salient when evaluating WTP and experience cues are more salient when evaluating PU. To test this hypothesis, the following regression specifications are run separately for water and for beer:

$$PU = \alpha + \alpha_E \text{ Hot Day} + \alpha_T \text{ Fancy Hotel}$$

$$WTP = \beta + \beta_E \text{ Hot Day} + \beta_T \text{ Fancy Hotel}$$

Hypothesis 1 states that $\beta_T > \beta_E$ and $\alpha_E > \alpha_T$, but also implies that $\beta_T > \alpha_T$ (transaction cues affect WTP more than PU) and $\alpha_E > \beta_E$ (experience cues affect PU more than WTP). Table 2 gives the estimated regression coefficients. Keep in mind that for each α_E , α_T , β_T and β_E in the specifications above correspond two estimated coefficients: one for water and one for beer.

For water, $\alpha_E > \alpha_T$ ($2.137 > -0.735$), $\alpha_E > \beta_E$ ($2.137 > 0.841$) and F-tests across both pairs of coefficients indicate that the values are significantly different (both $F > 5$, both $p < 0.001$). These results are consistent with Ariely's findings and support hypothesis 1 for water. However, $\beta_T < \beta_E$ ($0.662 < 0.841$), in other words, experience cues and not transaction cues are more salient in assessing WTP for water. While this contradicts Ariely's findings and does not support hypothesis 1 for water, the survey situation in this paper is different than Ariely's and this supports this paper's second hypothesis based on evolutionary psychology that experience cues are more salient when evaluating WTP for necessities. Finally, the comparison between β_T and α_T and the seemingly different roles of transaction cues on WTP and on PU in this survey are discussed further below.

For beer, $\beta_T > \beta_E$ ($1.107 > 0.048$), $\alpha_E > \alpha_T$ ($1.368 > -0.049$), $\alpha_E > \beta_E$ ($1.368 > 0.048$) and F-tests across each pair of coefficients indicate that the values are significantly different (all $F > 5$, all $p < 0.001$). Further, β_T and α_E are significant at the 0.1% level while β_E and α_T are not. In other words, in assessing WTP for beer only transaction cues are highly significant while in

assessing PU for beer only experience cues are highly significant. These results are highly consistent with Ariely's findings and support hypothesis 1 for beer.

The comparison of β_T to α_T , of the effects of transaction cues on WTP and PU, as mentioned earlier, shows that high transaction cues increase WTP for water and beer (β_T of 0.662 and 1.107 respectively) but decrease PU for water and beer (α_T of -0.735 and -0.049 respectively). Thaler's (1985) transaction utility theory provides an explanation for this inconsistency with hypothesis 1. Thaler argues that transaction utility is based on the perceived merits of the deal while acquisition utility is based on the inherent value of the good. The subjects of this study are college students and purchasing a similar good from a run-down supermarket as opposed to a fancy hotel may seem like a good deal and outweigh considerations that a good from a run-down supermarket may be inferior to one from a fancy hotel. This could explain the inverse relationship of high transaction cues to PU.

Hypothesis 2: Experience cues are more salient when evaluating WTP for water than beer. To test this hypothesis, the following regression specification is run jointly on water and beer:

$$WTP = \beta + \beta_E \text{ Hot Day} + \beta_T \text{ Fancy Hotel} + \beta_G \text{ Water} + \beta_{E*G} \text{ Hot Day*Water}$$

The above specification interacts the experience cue with the type of good, so that the β_{E*G} intuitively measures the difference in salience of experience cues when evaluating WTP for water as opposed to beer. Hypothesis 2 states that $\beta_{E*G} > 0$. Table 3 gives the estimated regression coefficients. β_E (0.039) is not significant ($p < 0.889$) while β_{E*G} (0.812) is significant at the 5% level ($p < 0.036$). In other words, when evaluating overall WTP for water and beer, experience cues do not seem to play an important role but when evaluating the WTP for water, the salience of experience cues significantly increases. The results discussed for hypothesis 1 indicate that this increase in salience is significant enough that experience cues then play an

important role in evaluating the WTP for water (β_E for water is 0.841, $p < 0.002$) and even play a more important role than transaction cues ($\beta_E > \beta_T$ and β_E significant at the 0.2% level while β_T significant at the 1.2% level).

These experimental results provide strong evidence in favor of hypotheses 1 and 2. However, limitations exist. First, not all subjects are beer drinkers and the accuracy of results would improve if non beer drinkers could be excluded from the data or if a similar luxury beverage option had been offered. Second, only one necessity and one luxury are considered. The variety of goods is immense and generalizations from water to all necessities and from beer to all luxuries can break down along a variety of aspects. Finally, salience of experience cues for necessities may depend on the specific necessity. For example, water relates directly to survival, no substitutes exist and thus the salience of experience cues may be large. On the other hand, while food is a necessity, many varieties of food satisfy the necessity requirement (rice, bread...) and salience of survival may not be as large.

5. Conclusion

This paper investigates the dissociation between two measures of value: WTP and PU. This dissociation originates from differences in salient information when evaluating WTP and when evaluating PU, and leads to personal welfare losses. This paper finds evidence that the degree of dissociation varies between necessity goods and luxury goods. However, this study can improve by considering more varieties of necessity and luxury goods, different subject demographics, and different experimental scenarios. A neural-scientific approach can further inform the evolutionary argument of this paper by investigating whether neural circuits behave differently when assessing WTP and PU across goods. In addition, a specific study on the degree of

dissociation for low income subjects who may be more sensible to the necessity versus luxury issue can test whether the degree of dissociation indeed depends on these two types of goods.

The implications of this study are especially relevant to marketing, a field built on making various information salient to consumers. The findings suggest that salient transaction cues affect consumers' decisions to purchase luxuries while salient experience cues affect consumers' decisions to purchase necessities. However, with luxuries, in the long run the quality is also salient and individuals will not be willing to consistently pay high prices for bad quality products.

Finally, a key assumption that this paper is based on is that PU indeed corresponds to actual personal welfare. As mentioned in the results section, overall, individuals are willing to pay more for beer than for water, but are predicting less utility from beer than from water. If PU is assumed to be consistent with welfare, this implies a welfare loss. However, this may not be the case for two reasons. First, individuals are not always accurate in utility predictions (Tversky, 1974). Second, predicted utility may not measure actual welfare. If actual welfare is influenced not only by the pleasures of consumption but also by transaction utility, then decisions regarding willingness to pay in some cases may actually maximize welfare. Either way, the dissociation between WTP and PU is undoubtedly important to welfare maximization and a better understanding of the causes of the dissociation and the factors influencing the degree of dissociation may help to improve social welfare and personal decision making.

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Appendix

Table 1: Summary Statistics of the Survey Variations

	Willingness To Pay				Predicted Utility			
	Hot Day		Cold Day		Hot Day		Cold Day	
	Fancy Hotel	Run-down Market	Fancy Hotel	Run-down Market	Fancy Hotel	Run-down Market	Fancy Hotel	Run-down Market
Water								
Mean	3.58	2.45	2.28	2.11	7.03	7.88	5.00	5.63
SD	2.11	1.35	1.18	1.85	2.19	1.98	2.40	2.31
Beer								
Mean	4.95	3.07	4.14	3.84	5.00	5.76	4.30	3.71
SD	2.49	1.18	1.49	1.64	2.87	2.70	2.61	2.42

Table 2: Hypothesis 1 OLS Results

	OLS Results							
	WTP Water		WTP Beer		PU Water		PU Beer	
	Coeff.	P-Val	Coeff.	P-Val	Coeff.	P-Val	Coeff.	P-Val
Hot Day	0.841	0.002	0.048	0.865	2.137	0.000	1.368	0.001
Fancy Hotel	0.662	0.012	1.107	0.000	-0.735	0.039	-0.049	0.908
Adj R-Squared	0.0801		0.076		0.207		0.052	
N	163		163		161		161	

Table 3: Hypothesis 2 OLS Results

	OLS Results	
	WTP	
	Coeff.	P-Val
Hot Day	0.039	0.888
Fancy Hotel	0.885	0.000
Water	-1.800	0.000
Hot Day*Water	0.812	0.036
Constant	3.524	0.000
Adj R-Squared	0.1934	
N	326	

Figure 1: Mean Reservation Prices and Predicted Pleasure Ratings

