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Poster prepared for presentation at the Agricultural & Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, Washington, August 12-14, 2012

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On the use of honesty priming task to mitigate hypothetical bias in choice experiments

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AAEA Annual Meeting, Seattle, Washington, August 12-14, 2012

1. INTRODUCTION

Eliciting people's preferences for various goods using stated preference methods is a common practise in the applied economics and the marketing literature. In particular, the choice experiment (CE) approach is now the most widely used stated preference method in valuing products or attributes. Hypothetical bias, however, still represents a challenging issue in stated preference CE studies. It is well known that hypothetical bias occurs when individuals overstate their willingness-to-pay (WTP) in hypothetical settings due to among others, lack of economic incentive to reveal their true valuations (List and Gallet 2001; Murphy et al. 2005; Hensher 2010).

Research related to hypothetical bias can be split into two groups. The first group is focused on the introduction of incentive compatible mechanisms to obtain more realistic value estimates in CEs. These studies test hypothetical bias by comparing hypothetical WTPs with non-hypothetical WTPs from these incentive compatible CEs. The second group of papers, while not necessarily utilizing CE, works in the development of various techniques for mitigating the hypothetical bias.

In the second group of studies, the seminal paper by Cummings and Taylor (1999) introduced a cheap talk script which explained the problem of hypothetical bias to participants prior to administration of the valuation questions. The authors found that the cheap talk script was effective in removing the hypothetical bias with public goods. However findings show a mixed evidence on the ability of the cheap talk technique to mitigate hypothetical bias in stated preference studies

Recently, several studies in social cognition and psychology research have demonstrated that "priming" can unconsciously influence peoples' perception, evaluations, behavior and choice (Maxwell, Nye, and Maxwell 1999; Bargh et al. 2001; Kay and Ross 2003; Chartrand et al. 2008). In other words, when people are incidentally exposed to some cues or words in an unrelated subsequent choice task, these stimuli can activate different buying goals, thereby influencing their subsequent decision in a non-conscious manner

2. OBJECTIVE

Taking into account the mixed evidence on the ability of the cheap talk technique to mitigate hypothetical bias in stated preference studies, we propose and test a new type of *ex-ante* calibration method taken from the social psychology literature: a honesty priming technique.

3. EXPERIMENTAL DESIGN

Sample: 265 subjects were randomly drawn from a list of people who are responsible for food shopping in their household.

Participation fees: 10€

Choice design

Attributes	Labels
Price (€/per package)	1.35, 1.84, 2.33 and 2.82 (€/PC)
EU organic label	No label EU organic label (ORGANIC)
"Food miles" label	No label 100 kilometers (100km) 800 kilometers (800km) 2000 kilometers (2000km)

Treatments

In the **first treatment (T1)**, we used a hypothetical choice experiment without any cognitive task. In the second one, we introduced a generic and **short cheap talk**. In the third and fourth treatments, called **neutral priming treatment (NP)** and **honesty priming treatment (HP)**, respectively, we used a subliminal priming technique (before presentation of the CE questions) called "scrambled sentence test" where participants were asked to construct 24 grammatically correct sentences out of a series of words presented in a scrambled order. The difference between the neutral and the honesty tasks is that while in the honesty task the final sentences are related to honesty, fairness and truthfulness (16 out of 24). **Finally, the fifth treatment (T5)** is similar to the first treatment (T1) but with the addition of an incentive aligned elicitation mechanism to make the CE non-hypothetical. We used treatment 1 (T1) and treatment 5 (T5) as our baseline treatments.

Hypothesis

- H01: (WTP_{T1} - WTP_{T5}) = 0 H11: (WTP_{T1} - WTP_{T5}) > 0
- H02: (WTP_{NP} - WTP_{HP}) = 0 H12: (WTP_{NP} - WTP_{HP}) > 0
- H03: (WTP_{T1} - WTP_{HP}) = 0 H13: (WTP_{T1} - WTP_{HP}) > 0
- H04: (WTP_{CT} - WTP_{HP}) = 0 H14: (WTP_{CT} - WTP_{HP}) > 0
- H05: (WTP_{NP} - WTP_{T1}) = 0 H15: (WTP_{NP} - WTP_{T1}) ≠ 0
- H06: (WTP_{HP} - WTP_{T5}) = 0 H16: (WTP_{HP} - WTP_{T5}) ≠ 0

Task 1 and Task 2

Subjects who participated in our choice experiment faced different choice set scenarios and they had to choose between two products with different attributes and prices plus a no-buy option, just in case they choose not to pick either of the two products (Task I). Moreover, in our experiment, to validate our results, we designed a **holdout task (Task II)** to get an assessment of how well our hypothetical and non-hypothetical choice experiment correctly predicts actual purchases. Specifically, following Ding et al. (2005), participants in the holdout task faced eight different products, which were the remaining profiles from the original full fractional design that were not used in task I, plus a no-buy option. The holdout task was the same for all participants.

4. RESULTS

Table 1. First two Hypotheses Testing of the Marginal mean WTPs estimates

	H0 ₁ (WTP ^{T1} - WTP ^{T5})=0			H0 ₂ (WTP ^{NP} - WTP ^{HP})=0		
	T1	T5	p-value ^a	HP	NP	p-value ^a
ORGANIC	0.89 €	0.61 €	0.083*	0.40 €	0.60 €	0.087*
Km100	1.01 €	0.73 €	0.054*	0.70 €	1.06 €	0.036**
Km 800	0.26 €	-0.2 €	0.036**	0.01 €	0.30 €	0.067*
Km 2000	-0.52 €	-1.20 €	0.028**	-0.53 €	-0.64 €	0.33

Note: ***, **, * = Significance at 1%, 5%, 10% level.
p-values were identified using the combinational method of Poe, Giraud, and Loomis (2005) with 1,000 Krinsky-Robb (1998) bootstrapped WTP estimates.
ap-value reports results of the one-sided test for our hypothesis for each corresponding almond attributes pair.

Table 2. First four Hypotheses Testing of the Marginal mean WTPs estimates

	H0 ₃ (WTP ^{T1} - WTP ^{HP})=0			H0 ₄ (WTP ^{CT} - WTP ^{HP})=0		
	T1	HP	p-value ^a	CT	HP	p-value ^a
ORGANIC	0.89 €	0.40 €	0.001***	0.55 €	0.40 €	0.14
Km100	1.01 €	0.70 €	0.021**	0.92 €	0.70 €	0.10*
Km 800	0.26 €	0.01 €	0.10*	0.38 €	0.01 €	0.010***
Km 2000	-0.52 €	-0.53 €	0.47	-0.40 €	-0.53 €	0.284

Note: ***, **, * = Significance at 1%, 5%, 10% level.
p-values were identified using the combinational method of Poe, Giraud, and Loomis (2005) with 1,000 Krinsky-Robb (1998) bootstrapped WTP estimates.
ap-value reports results of the one-sided test for our hypothesis for each corresponding almond attributes pair.

Table 3. Last two Hypotheses Testing of the Marginal mean WTPs estimates

	H0 ₅ (WTP ^{NP} - WTP ^{T1})=0			H0 ₆ (WTP ^{HP} - WTP ^{T5})=0		
	NP	T1	p-value ^b	HP	T5	p-value ^b
ORGANIC	0.60 €	0.89 €	0.14	0.40 €	0.61 €	0.12
Km100	1.06 €	1.01 €	0.82	0.70 €	0.73 €	0.86
Km 800	0.30 €	0.26 €	0.9	0.01 €	-0.20 €	0.34
Km 2000	-0.64 €	-0.52 €	0.64	-0.53 €	-1.20 €	0.020*

Note: ***, **, * = Significance at 1%, 5%, 10% level.
p-values were identified using the combinational method of Poe, Giraud, and Loomis (2005) with 1,000 Krinsky-Robb (1998) bootstrapped WTP estimates.
ap-value reports results of the one-sided test for our hypothesis for each corresponding almond attributes pair.

Table 4. Comparisons of Number and Percentage of correct prediction across

Treatment	Number of correct prediction	%	p-value ^b
T1	14	26	0.05**
T5	22	42	
HP	21	40	0.41
NP	17	32	
HP	21	40	0.07*
T1	14	26	
HP	21	40	0.69
CT	19	36	
T1	14	26	0.26
NP	17	32	
T5	22	42	0.42
HP	21	40	

Note: ***, **, * = Significance at 1%, 5%, 10% level.
a p-value reports results of the one-sided test that number of correct prediction in T5 is > of number of correct prediction in hypothetical setting; and that number of correct prediction in HP is > of number of correct prediction in hypothetical setting.

5. DISCUSSION

Results (table 1) show that our first hypothesis is rejected in the four analysed labels (i.e., ORGANIC, km100, km800 and km2000) confirming that WTPs in hypothetical settings are greater than WTPs in non-hypothetical setting and that hypothetical bias in our baseline hypothetical CE exists. Our second hypothesis is rejected in three of the four analysed labels confirming that priming effects do not arise purely due to the nature of the scrambling task but rather due to the activation of honesty concepts.

Results (table 2) show that the hypothesis 3 is also rejected in these three labels indicating that marginal WTPs from the CE using the honesty priming task is lower than those from our baseline treatment (hypothetical CE without cognitive task). This result implies that the honesty priming task can reduce the hypothetical bias in hypothetical choice experiments. In the same way, hypothesis four is also rejected in two of the four labels suggesting that the marginal WTPs in the honesty priming treatment are lower than the WTPs in the cheap talk treatment. While not definitive, this result could suggest that an honesty priming task can potentially reduce the hypothetical bias more than a cheap talk script.

In contrast (Table 3) we failed to reject the fifth hypothesis H05 which suggests that WTP estimates in neutral priming treatment (NP) are not statistically different from WTPs in the first treatment (T1). This result confirms that the neutral priming (NP) treatment did not induce either a task or priming effect. Finally, we also failed to reject hypothesis 6 in three of the four analysed labels

Results (Table 4) suggest that the percentage of correct predictions in the T1 hypothetical treatment is significantly lower than those in the honesty priming (HP) and non-hypothetical (T5) treatments. Moreover, the percentage of correct predictions in the honesty priming hypothetical treatment and the non-hypothetical treatment are statistically not different.

6. CONCLUSIONS

- Honesty priming task can indeed reduce the hypothetical bias in hypothetical choice experiments
- The change in behavior in the honesty priming treatment is due only to the honesty priming task and not due to the nature of the scrambling sentence test.
- Overall, our finding seems to suggest that, among all the possible reasons, untruthful choice revelation is one of the major reasons for the occurrence of hypothetical bias in hypothetical CE studies, given the effectiveness of the honesty priming task