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► **To cite this version:**

Maurice Doyon, Laure Saulais, Bernard Ruffieux, Denise Bweli. Hypothetical bias for private goods: does cheap talk make a difference?. *Theoretical Economics Letters*, 2015, 5 (6), pp.749-756. 10.4236/tel.2015.56087 . hal-01254936

**HAL Id: hal-01254936**

**<https://hal.science/hal-01254936>**

Submitted on 15 Jan 2016

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# Hypothetical Bias for Private Goods: Does Cheap Talk Make a Difference?

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Received 25 November 2015; accepted 26 December 2015; published 29 December 2015

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## Abstract

Economists and market researchers often need to accurately gauge consumers' willingness-to-pay for private goods. The experimental literature has identified a problem of hypothetical bias when using stated preferences techniques, such as open-ended questions. It has been suggested that using a cheap talk script has the potential to resolve this bias. Yet, few empirical studies on the efficiency of cheap talk for private goods exist. This study uses a between-subjects experimental design to compare consumers' willingness-to-pay for DHA-enriched milk using three elicitation methods: 1) Hypothetical open-ended stated preference question, without monetary consequence for the respondent; 2) Idem to the first with the addition of a cheap talk script; and 3) A Vickrey auction with real monetary consequences. In this experiment subjects have the choice to participate, or not, at each period. Our results indicate a significant hypothetical bias. While the use of cheap talk has no impact on this bias, it does however increase the level of participation to the market.

## Keywords

Experimental Economics, Willingness-to-Pay, Cheap Talk, Hypothetical Bias

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## 1. Introduction

Stated preference methods are widely used by marketers and applied economists to estimate the willingness-to-pay (WTP) for private goods, such as new or improved goods or food novelties [1] [2]. The simplest form is

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open-ended questions about the respondent's WTP for good or closed-ended, multiple-choice questions. More elaborate techniques, inspired from the passive-use values literature, such as choice experiments, are also common [3].

The validity of stated preference methods, more specifically their hypothetical nature, has generated a large literature on hypothetical bias [4] [5]. Researchers have attempted to correct the hypothetical bias using *ex post* calibration methods [6] [7], with limited success, or to reduce it using *ex ante* cheap talk script methods that inform people about the existence of a bias and ask them to avoid it [8].

Cummings and Taylor's [8] favorable results regarding the use of cheap talk as a calibration technique for hypothetical bias have popularised the technique. Later, List and Gallet [9] as well as Aadland and Caplan [10] have shown that cheap talk might not work for all types of subjects. Similarly, Harrison [11] cautions against using cheap talk as a "*magic bullet*" to remove hypothetical bias. Nevertheless, the use of cheap talk is widespread in the literature [12]. More specifically, cheap talk seems especially effective in reducing hypothetical bias for new goods or characteristics [3] [13]. Lusk [3] wrote "*Results of previous literature are clear: cheap talk effectively removes hypothetical bias for consumers relatively unknowledgeable about the good evaluated*" (p. 841). Although fewer studies have investigated the impact of cheap talk on hypothetical bias for private goods since then, the most recent studies show mixed results. [14]-[18] found a significant positive effect of cheap talk for private goods, while [19]-[21] found little or no effect.

In this paper, we used an  $n^{\text{th}}$  price auction to elicit the value of a novel food product, milk enriched with Omega-3 (DHA) obtained through the cows' feeding<sup>1</sup>. The elicitation is done in the laboratory with monetary consequences (actual payment for a purchase) and hypothetically with an open-ended contingent valuation survey. Our results show a significant hypothetical bias for Omega-3 milk while the use of cheap talk had no impact on the measured hypothetical bias, but did increase participation to the market. Our study design distinguishes itself from others by giving subjects the choice to not participate in any given period. Thus, it allows us to exclude non participants from our model while other studies would most likely have a zero or small bids in the estimation of WTP. We consider the effect this may have on the WTP estimate. This paper contributes to answering the need expressed by Loomis [12] to further our understanding of hypothetical bias for private goods. Our results reinforce [11] [22] caution regarding the use of cheap talk as a "*magic bullet*" to remove hypothetical bias and we innovate by measuring the impact of cheap talk on market participation.

The remainder of our study is crafted as follows. The next section describes our experimental procedure. Then, we describe the empirical models used, and report the results before the discussion and conclusion.

## 2. Experimental Design

We used three treatments in the study: one incentive compatible and consequential treatment (AUCTION), one hypothetical treatment (HYPOTHETICAL) and a hypothetical treatment with a cheap talk script (CHEAPTALK). The incentive compatible mechanism used in the AUCTION treatment was a  $n^{\text{th}}$  price auction, a variant of the second-price Vickrey auction, shown to engage more bidders than the second-price auction, especially for private goods with low market values [23]. The hypothetical treatments have a structure similar to the auction, but the  $n^{\text{th}}$  price auction was replaced by an open-ended WTP question. An English translation of the cheap talk script used can be consulted in Appendix. Using Ami *et al.* [24] description, the cheap talk script used would be qualified of positive and light.

The products used in each treatment of this study were 2-litre cartons of 2%-fat milk: a regular version and a rich-in-DHA alternative. The regular milk was easily accessible in supermarkets, while the specialty milk containing DHA was only found in small volumes in few retail outlets<sup>2</sup>. No brand of milk was mentioned to avoid framing effects associated with product presentation [25].

A subject participated in only one treatment. Five descriptions of products concerning the specialty milk containing DHA fatty acids, plus one description of a regular milk (for a total of six) were successively and independently presented in each treatment. Following [25], subjects were first asked whether they wished to participate or not. Participating subjects were then asked their WTP following each description. Therefore, six observations were elicited per participating subject. The participation option allows for the analysis of participation data and mitigates the problem associated with protest bids.

<sup>1</sup>DHA is derived from fish oil and is not the prominent type of Omega-3 found in food enriched with Omega-3.

<sup>2</sup>The research team had to order in advance the specialty milk to ensure that sufficient quantities would be available throughout the study.

Sessions in the CHEAPTALK and HYPOTHETICAL treatments lasted 40 minutes, with a compensation of \$20 per subjects. Sessions in the AUCTION treatment lasted 60 minutes with a \$35 of compensation<sup>3</sup>. To mitigate for the house money effect, subjects were reminded by a short script in the consent form and orally during the instructions that the money was theirs and that they could leave with it at any time<sup>4</sup>. Furthermore, respondents were given the choice to not participate in any given period. All sessions were conducted by the same experimenter. Explanations of the procedures were projected and read to subjects by the experimenter.

In the incentive-compatible treatment, the  $n^{\text{th}}$  price auction was explained following a standard training procedure for private good auctions. Examples were used and the optimal strategy of bidding one's own value was divulged and explained. Practice rounds using pens took place with further explanation of the auction mechanism. Subjects were informed that at the end of the session one auction out of six would be randomly selected to be binding. This maintains independence between bidding rounds and avoids a saturation effect by keeping interest in every auction round. Furthermore, with only one binding auction a participant can only take part in one transaction per session.

To mitigate the group effect, two cohorts participated in each treatment for a total of six cohorts. The average cohort size was roughly 22 participants. Thus, a total of 131 participants generated 786 observable decisions. The study was conducted in Quebec City. Subjects were recruited via email invitation using a list of Friends of Laval University and a list of subscribers who had voluntarily registered for nutrition information, seminars and studies. Participation required to be at least 18 years old and to consume milk<sup>5</sup>.

Statistical analysis of the data was performed using the R statistical environment (R-Development-Core-Team, 2011). The values elicited for all six observations are pooled together for the purpose of this article. The intra-individual effects induced by this methodological choice are neutralized using the statistical procedure explained below. We analysed the effect of treatments on two types of dependent variables:

- **The participation in the auctions or in the hypothetical questions (variable *participation*):** Participation is a binary variable whose value is 1 if an individual accepts to participate in an auction or a hypothetical question and 0 otherwise. In the experiment, there is one auction or question for each product description, which leads to a total of six values of variable "participation" for each individual. We estimate the effect of the treatment on the probability for an individual to participate in an auction or a question using a logistic regression model. The repetition of intra-individual measures is taken into account by estimating individuals as a random factor, while information levels are estimated as fixed effects. This estimation uses the R function `lmer`, from the `lme4` package.
- **The willingness-to-pay for the products (variable *wtp*):** only those individuals who accepted to participate in an auction or a hypothetical question ended up bidding in their respective treatment. For Values on non-participants would be inferior or equal to zero. Our analysis of *WTP* concentrates first on individuals that accepted to participate. To mimic experiments with no opt-out option, an analysis with non-participant included as zero bids on *WTP* is also realised for comparison.

### 3. Results

#### 3.1. Participation

The average participation rate, across all six auctions, is 54% for treatments AUCTION and HYPOTHETICAL, and 64% for CHEAPTALK. A mixed-effect logistic regression, with subject and information level as random effects and treatment as fixed factor, reveals that the probability to participate in treatment CHEAPTALK is significantly higher ( $p = 0.03861$ ) than the probability to participate in both other treatments. The participation levels in AUCTION and HYPOTHETICAL are not statistically different.

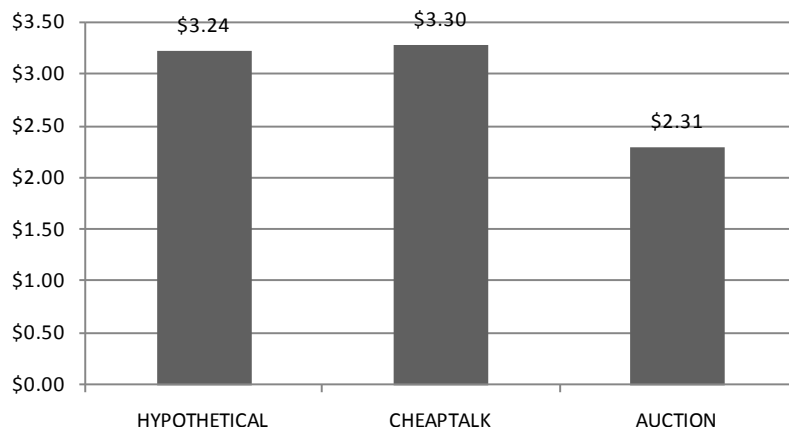
#### 3.2. Willingness-to-Pay

**Figure 1** reports the average *WTP* value of participants for each treatment. A mixed regression model (**Table 1**), taking into account the subjects as random effects and treatment as a fixed factor, indicates that treatments have

<sup>3</sup>In the incentive compatible treatment, participants were recruited on the basis of 28\$, but were given 35\$ upon arrival. In all sessions free parking was provided.

<sup>4</sup>In one instance a subject left with the compensation before the start of the experiment.

<sup>5</sup>Note that no significant differences between the groups of participants by treatments were found, with the exception of the age variable: participants were slightly younger in the AUCTION treatment group (average of 35 versus 40 in the two other treatments).



**Figure 1.** Average WTP of participants in each treatment.

**Table 1.** A mixed model estimation of the impact of treatments (relative to HYPOTHETICAL) on willingness-to-pay of participants.

	Estimate	Std. Error	t-value	Pr(>t)
(Intercept)	3.1606	0.1166	0.0956	0.0000
CHEAPTALK	0.0854	0.1577	0.5416	0.5892
AUCTION	-0.9585	0.1577	-6.0766	0.0000

a significant effect on the overall level of WTP. WTP in the AUCTION treatment is significantly lower than in the HYPOTHETICAL and the CHEAPTALK treatments, while the null hypothesis of equal means cannot be rejected between the HYPOTHETICAL and the CHEAPTALK treatments.

In most experiments available in the literature, recruited subjects do not have the choice of not participating in a period. It is common in such design for subjects to give “protest-bids” where they enter a zero or a very low bid [24]. Given that our results for cheap talk differ from what seems the consensus, we take a closer look at our design choice to include a non-participation option by attributing a null bid value to non-participant and by using a left-censored Tobit model. Under these analyses we find that CHEAPTALK significantly increases bids relative to the HYPOTHETICAL treatment (Table 2), instead of reducing them, as expected from the literature. Figure 2 illustrates the distribution of WTP for Omega-3 milk per treatment. The distribution of the AUCTION treatment clearly differs from the other two treatments and appears more representative of what one would expect of a bid distribution for a good.

For instance, the drop out price<sup>6</sup> for the CHEAPTALK, the HYPOTHETICAL and the AUCTION treatments are \$2.50, \$2.00 and \$0.75, respectively. The auction treatment is the only one that generated bids below \$2.00, in the presence of a non-participation option. Thus, the greater participation effect of CHEAPTALK earlier noted is not for low bids, but for bids of at least \$2.50.

Bids in the CHEAPTALK and the HYPOTHETICAL treatments also seem more sensitive to plateau bids or bids near round dollar amounts than in the AUCTION treatment. A closer look indicates that slightly more than 15% and 13% of bids in the CHEAPTALK and HYPOTHETICAL treatments are \$4.00, \$3.00 or \$2.00 (plus or minus one cent), respectively. This proportion is less than 7% in the AUCTION treatment.

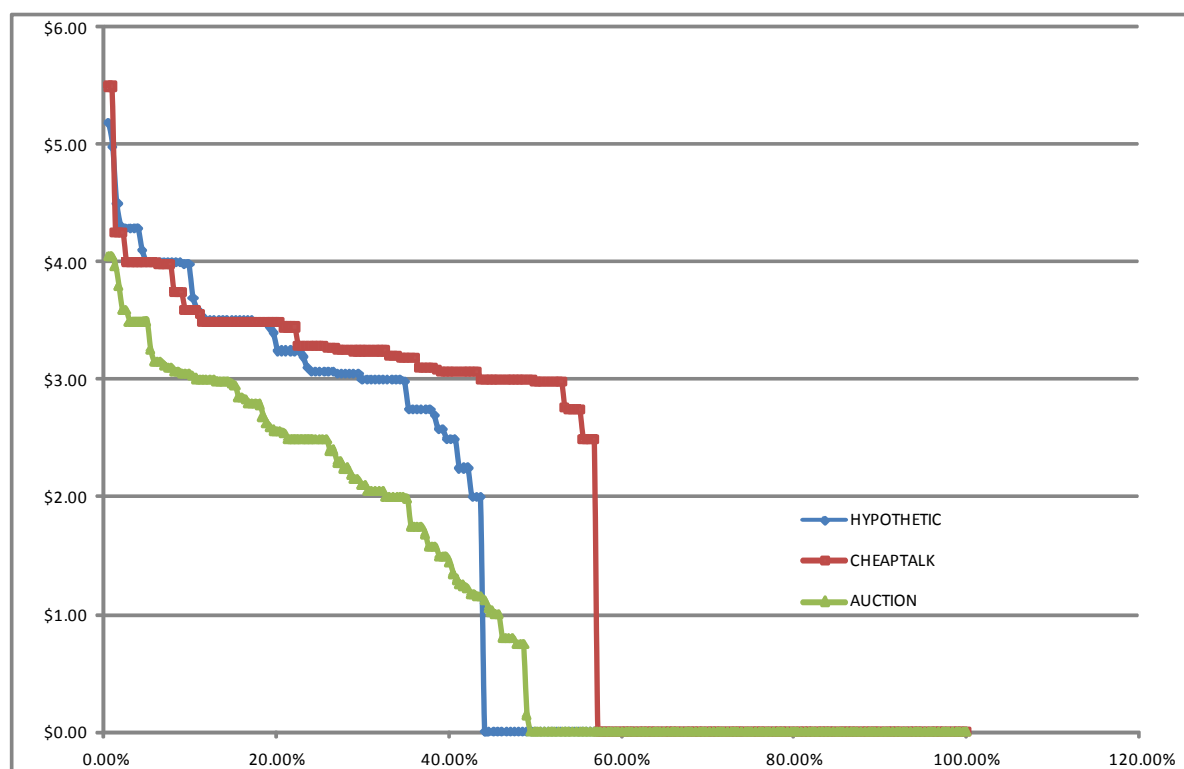
#### 4. Discussion

In our study, we compared the valuation of a private good (DHA-enriched milk) obtained with three elicitation procedures, in a sample of milk consumers. In accordance with predictions from the literature, we observed the presence of a significant difference between the values obtained with an incentive-compatible mechanism (n<sup>th</sup> price auction) with consequences (real transaction) and the values obtained with a hypothetical stated preference

<sup>6</sup>Drop out price is defined as the lowest sequence of at least two bids.

**Table 2.** Tobit estimation of the impact of treatments (relative to HYPOTHETICAL) on willingness-to-pay, with zero bids to account for non-participation.

	Estimate	Std. Error	t-value	Pr(>t)
(Intercept)	0.3774	0.1896	1.991	0.04650
CHEAPTALK	0.8013	0.2970	2.697	0.00699
AUCTION	-0.4726	0.2663	-1.774	0.07601
logSigma	1.0084	0.1046	9.639	<0.0000

**Figure 2.** Distribution of willingness-to-pay for Omega-3 milk per treatments, with zero bids to account for non-participation.

procedure (open-ended question). We find that participants declared a value in average 1.40 times greater with the open-ended questions than with the  $n^{\text{th}}$  price auction. Given that only 8.4% of the participants in our study had a good knowledge of the new characteristic (DHA enrichment) used in the experiment, one would expect from the previously cited literature that cheap talk would be effective<sup>7</sup>. Nevertheless, we find that cheap talk has no significant impact on WTP among individuals who had chosen to participate in the market.

When considering non participation in the analysis of the HYPOTHETICAL treatment, participants are found to be willing to pay \$0.80 more in the CHEAPTALK treatment and \$0.47 less in the AUCTION treatment. What appears to be an increase in hypothetical bias following cheap talk has previously been observed by Cummings *et al.* [26], as reported by Harrison [11]. However, the observation that market participation rate in the CHEAPTALK treatment is significantly higher than in the two other treatments appears to be central to explaining this observed negative effect of cheap talk on hypothetical bias. More precisely, it is the increase in participation (individuals moving from a zero bid to a positive bid) that explains the observed increase in hypothetical bias. It seems, in our experiment, that by inducing more participation with relatively high value, cheap talk might have helped participants to assess what would be a “good answer”. This raises questions on the role

<sup>7</sup>Knowledge was estimated based on three questions on Omega-3 milk in the questionnaire closing the experiment.

of cheap talk in capturing unbiased homegrown value or in signaling to participants expected results from the experimenters.

## 5. Conclusion

These results need to be investigated with further care. Nevertheless, our results caution against a certain excess of confidence perceived in the literature regarding the capability of cheap talk to offset hypothetical bias for private goods. Furthermore, they suggest that it is important to offer subjects an opt-out option in order to improve the elicited values and avoid biases created by an overestimation of market shares.

## Acknowledgements

We would like to acknowledge the financial support of the Institut de la Nutrition et des Aliments Fonctionnels (INAF) and the Centre Interuniversitaire de Recherche en Analyse des Organisations (CIRANO) for this project, as well as travel supports from the Consumer and Market Demand Agricultural Policy Research Network and the Canadian Dairy Commission Fellowship.

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## Appendix

### Cheap Talk Script (Translated from French)

You will soon be described a series of products, and you will be asked to declare your maximum willingness to pay for the products as if it was available for sale here and now.

*Before beginning, please take the time to read the following information.*

In recent studies, similar to the one you are currently participating in, we asked another group of people the maximum amount they were willing to pay for a product, as if that product was available for sale, there and then. Like it is the case for you today, no one in the group actually bought the product; the survey was in a hypothetical setting. The results from these studies show, on average, that the amount people declare as their maximum willingness to pay is superior to the amount they would actually pay if they had to actually buy the product.

Thus, differences exist in the response people give in hypothetical situations relative to real situation. This phenomenon is called “hypothetical bias”. These people were in a similar situation to the one you are currently in; they did not have to pay any amount of money.

Why do people declare different amounts when a product is in a hypothetical setting compared to an actual setting? How can we get an unbiased answer of people’s willingness to pay in settings where people will not, in fact, make a transaction?

In a real situation, people take into account their available money when considering buying a product; the spent money will not be available for another purchase. We believe that when people give a hypothetical value to a given product, they do not make the effort to consider the situation in a real setting, in other words, their willingness to pay for an actual sale.

For this reason, we ask you to answer the following questions by imagining that you will actually have to pay the declared amount for the given product.