The "more is less" phenomenon in Contingent and Inferred valuation

Spiros Stachtiaris and Andreas Drichoutis and Stathis Klonaris

Agricultural University of Athens, University of Ioannina

March 2011

The “more is less” phenomenon in Contingent and Inferred valuation

Spiros Stachtiaris[1], Andreas C. Drichoutis [2], Stathis Klonaris[3]

[1] Department of Agricultural Economics & Rural Development, Agricultural University of Athens, Iera Odos 75, 11855, Athens, Greece, email: spiros.stachtiaris@gmail.com
[2] Department of Economics, University of Ioannina, University Campus, 45110, Ioannina Greece, email: adrihout@cc.uoi.gr
[3] Department of Agricultural Economics & Rural Development, Agricultural University of Athens, Iera Odos 75, 11855, Athens, Greece, email: s.klonaris@aua.gr

Abstract

We examine inconsistencies in preference orderings of the “more is less” kind (Alevy et al. 2011) using the Contingent valuation (CV) and the Inferred valuation (IV) method (Lusk and Norwood 2009a, 2009b). We find that when moving in a familiar market for consumers (i.e., the food market) we only observe weak effects of inconsistencies. In addition, we find that the IV method is no better than the CV method in generating more consistent preference orderings. Surprisingly, we also find that the IV method generates higher valuations than CV, rendering one of its advantages of mitigating social desirability bias questionable.

Key words: willingness-to-pay (WTP), Contingent Valuation (CV), Inferred Valuation(IV), preference reversals

JEL codes: C9, C93, D12, Q51

I. Introduction

Eliciting people's valuation for non-market goods has been central in the environmental economics literature. The Contingent Valuation method (CV) is by far the most popular valuation method and a big bulk of the literature deals with refinements that (attempt to) address a number of documented biases. Recently, in an article in this journal, Lusk and Norwood (2009a) developed a new method for addressing the so-called social desirability bias, that is, the utility that people derive from stating a value to please the researcher or themselves. Respondents, in CV studies may report socially desirable preferences, and thus misrepresent their "true" preferences, in order to either please the interviewer or to be consistent with social norms (Crowne and Marlowe 1960; Fisher 1993; Leggett et al. 2003; List et al. 2004; Plant et al. 2003). The respondent wishes to provide the answer that is most "socially acceptable" rather than speak his/her true feelings. Social desirability bias is intrinsic in CV studies.

Lusk and Norwood (2009a, 2009b) thought that instead of asking people what *they* are willing to pay, to ask them what *they think another (average) person would pay*[1]. This simple twist in the wording of the valuation question generated (inferred) valuations that were close to real valuations (as compared to an experiment) and lower than hypothetical valuations (where social desirability is prevalent). They coined the term Inferred Valuation (IV) to describe this type of questioning in valuation studies. The aim of the IV method is not only to alleviate social desirability but also to moderate hypothetical bias.

With the CV method people uncover preferences possibly including normative or moral considerations. On the contrary, with the IV method individuals are asked to predict how other people would behave and thus infer other's people preferences that are ideally free

[1] A similar concept was introduced in Cummings and Harrison's (1992) "inference game".

from normative or moral considerations. A natural question that follows is whether this prediction of preferences could result in more consistent and well defined preference orderings as compared to standard preference elicitation methods such as CV.

The often cited strand of the literature that deals with non-consistent preference orderings is the preference reversal literature (see Seidl 2002 for a review). Broadly defined, any systematic change in preference orderings between normatively equivalent conditions can be called a preference-reversal (Slovic and Lichtenstein 1983). The preference reversals literature took off with the study of Slovic and Lichtenstein (1968) and the help of economists (Grether and Plott 1979) that demonstrated the robustness of the effect. The phenomenon is an empirical regularity such that a pricing task for lotteries reveals opposite preferences from a choice task made out of the lotteries.

More recently, List (2002) (as well as Alevy et al. (2011)) demonstrated a different type of preference reversals; those that occur between joint and isolated valuation modes (as opposed to different elicitation methods e.g., the pricing and choice task mentioned above). List (2002) showed that preferences in the sports card market follow a "more is less" pattern: while in a joint evaluation mode a superior bundle of sports cards is consistently valued more highly than an inferior bundle, in an isolated mode the inferior bundle is valued more than the superior bundle of cards. Reversals of preferences have also been observed for tasks that involve different evaluation scales (Bazerman et al. 1992;Goldstein and Einhorn 1987) as well as across evaluation modes (Hsee 1996;Irwin et al. 1993).

Hsee (1996) (as well as Hsee et al. 1999) proposed the evaluability hypothesis as an explanation for preference reversals between valuation modes. He suggested that preference reversals between joint and separate evaluations occur because one of the attributes involved in the options is hard to evaluate independently and another attribute is relatively easy to evaluate independently. When these attributes are presented jointly, evaluation is facilitated. In fact, Hsee (1996) showed that when *both* attributes are hard to evaluate or easy to evaluate, preference reversals disappear.

The consequences of preference reversals are significant since they refute a basic assumption of the rational choice theory, that preferences are consistent and stable. In contrast, they back up a behavioral decision theory which states that preferences are constructed on the spot when asked to form a particular judgment or to make a specific decision (Johnson et al. 2005; Lichtenstein and Slovic 2006; Payne et al. 1999; Slovic 1995). In this sense values are not merely uncovered when elicited, they are partly constructed at that time which implies labile preferences.

We designed two market based surveys with experimental treatments that allow us to specifically test for valuation mode effects. As our valuation products, we chose private goods with environmental attributes that have specific quality dimensions that were signaled through appropriate forms of food labeling. Most qualitative attributes of food products can be considered as "credence" characteristics since their quality cannot be recognised before the purchase of food but also sometimes neither after their purchase (Caswell and Modjuzska 1996;Darby and Karni 1973). In our experiments we use "organic" (BIO) as well as "protected designation of origin" (PDO) food products as our superior quality products. The two experiments vary the saliency of the inferior quality product. In experiment 1, the inferior quality food product is the conventional counterpart. In experiment 2 we make the distinction between the inferior and superior quality product more salient by introducing a much more inferior product than in experiment 1. In addition, since the products used in experiment 1 are sold by their weight, we introduced an additional product in experiment 2 that is sold by number of items. The purpose was to mimic List's (2002) design that used bundles of 10-pack and 13-pack sports cards.

Thus, our experiments allow us to draw conclusions regarding: a) whether we observe inconsistent preference orderings when we move out of the unfamiliar market of sports cards into the more familiar food market b) whether or not evaluative predictions (inferred valuations) are better able to generate consistent preference orderings c) the effect of saliency of the inferiority of one of the goods on preference reversals between joint and isolated evaluation modes and d) the success of the IV method in mitigating social desirability bias. The latter is in essence a re-examination of Lusk and Norwood's (2009a;2009b) conclusions with different products, samples and in a different cultural context (given our sample of European consumers). We find, unexpectedly, that the IV method generates higher valuations than the CV method in both field experiments. Thus, we designed a complementary internet experiment to check whether the cheap talk script (CT) that we used in the CV method was responsible for generating valuations much lower than the IV method. We found that the pattern of higher inferred valuations than CV is consistent and independent of whether we use or not a cheap talk script.

II. Experimental design

The field experiments we designed are extensions of List's (2002) and Alevy et al. (2011) experiments. Therefore, several of the procedures for studying the implications of preference reversals across joint and separate valuation modes were similar to these studies. However, we alters List's (2002) and Alevy et al.'s (2011) studies by replacing the sport cards market (which trades commodities unfamiliar to the majority of consumers; especially true for non-US residents consumers) with a common and familiar market for most consumers i.e., the food market. The joint and separate modes are evaluated across two elicitations methods namely the Contingent and Inferred valuation methods. More than one product is used for each valuation method to check for the robustness of our results.

Data were collected in supermarkets from consumers while shopping. For half of the respondents valuations were elicited with the CV method and for the other half with the IV method. All valuation products were exhibited in photo stimuli (see Appendix B). Subjects were asked to report their willingness to pay for the good in the photo which was also described orally. In Field Experiment (FE) 1, the superior quality products were selected to be an "organic" (BIO) and a "protected designation of origin" (PDO) product. The inferior quality products were the conventional counterparts.

In FE 2, we made the inferiority of the low quality products more salient by selecting products that we presumed would be even less desirable as compared to conventional products. For this reason we selected a seed-oil as the lower quality counterpart of the organic olive oil. Moreover, in order to more closely mimic List's "sell-by-items" products (remember that *10-pack* and *13-pack* card bundles were offered in List (2002) and Alevy et al. (2011)), we used eggs as our second valuation product. Eggs can be sold in packs of 4, 6, 8 and 12 eggs in super-markets or in customized packs in open-air food markets.

Field Experiment 1: Design issues

FE 1 was carried out in super markets located in city AAA (removed for peer review; to be adjusted upon publication). The experimenter approached each participant and invited him/her to participate voluntarily in an interview. If the respondent accepted the invitation, then s/he was randomly allocated to one of the three evaluation modes ("less", "more" or “joint”) following the methodology of List (2002) and to one of the two elicitation methods (Contingent or Inferred valuation). This design results in six treatments exhibited in Table 1. Each subject was only exposed to one of the treatments.

In each treatment, subjects were asked to evaluate two product categories (olive oil and apples) in randomized order. The specific products used are exhibited in Table 2. In the “more” evaluation mode the inferior and superior quality products were tied together and presented as a single product. In the “Joint” evaluation mode subjects evaluated two products per product category side by side (the “less” and the “more” products) for a total of four products. Standard socio-demographic data were also collected. Appendix B exhibits photo stimuli of the products shown to subjects.

In all, it took twelve subjects to complete the full factorial design one time. An example is given in Table 3. As exhibited, twelve subjects are required to participate in six treatments for two quality products (BIO and PDO).

To sum up, in the “Less” treatments (*LI* for Less-Isolated) subjects report their valuation for a quality food product. In the “More” treatments (*MI* for More-Isolated) subjects report their valuation for a quality food product *tied with* a smaller quantity of a conventional product (see Table 2). In the “Joint” treatments subjects report their valuation for both the quality food product (*LJ* for Less-Joint) as well as the quality product *tied together with* a conventional product (*MJ* for More-Joint). This design was ran for two quality products (BIO and PDO) and two elicitation methods (CV and IV).

We should note that while the additional conventional food product is of lower quality than the PDO or BIO counterparts, in aggregate, the superior food quality product *tied with* the lower quality product have a greater market value than the superior food quality product itself. In the "Joint" treatment**,** subjects evaluate the exact same products as in treatments *LI* and *MI* but this time side by side.

We emphasize that no subject participated in more than one treatments, which means that each subject was exposed to either one of the valuation modes (i.e., Less, More or Joint). In addition, subjects evaluated the products using either CV or IV methods; that is, no subject reported valuations with both methods. Third, each subject reported his/her valuation for one quality product, either a PDO product or a BIO product but not both. However, each subject reported valuations for two product categories i.e., olive oil and apples. Lastly, order of appearance of valuation questions (and products) was completely randomized.

Field Experiment 1: The Survey

A hypothetical market was established and WTP was elicited in an actual market place just before subjects enter a super-market. Interviews took place at various locations throughout the city, at stores of the three of the biggest food retailers in the country. The interviews were conducted by a single proctor (one of the authors) from Monday to Saturday, during morning and afternoon hours. In total, 588 completed questionnaires were collected. Table 4a depicts socio-demographic information from this sample.

WTP was elicited using a payment card format in which subjects selected their most preferred choice among a series of sixteen price intervals. More specifically we designed two payment cards, one for each product i.e., olive oil and apples (see Appendix C). The payment card intervals were constructed using an exponential response scale (Rowe et al. 1996).

As Rowe, Schulze and Breffle (1996) discuss, psychologists experimenting with the brightness of a source of light define the difference between two sources of light as 'just noticeable' if the difference can be detected 75% of the time by a subject. If one has a sequence of sources arranged in order of increasing brightness, B_1, B_2, B_3, . . . B_n, so that each source is just noticeably brighter than the preceding one, the relationship between the sources is given by Weber's law:

$$B_n - B_{n-1} = k \times B_{n-1} \qquad (1)$$

and the sequence of sources can be described by:

$$B_n = B_1 \times (1 + k)^{n-1} \qquad (2)$$

Weber's law has been found to apply broadly when individuals are asked to discriminate between stimuli or in our case between "just noticeable" differences of values. The payment card intervals can be calculated by selecting the number of cells n and B_n. Drichoutis et al. (2009) describe this procedure in detail. The prices were selected so as to cover a wide range of market prices for conventional and BIO/PDO olive oil and apples, respectively.

Field Experiment 2: Design issues

In FE 2 we followed the same experimental design of FE 1 (see Table 1) with some modifications for the valuation products. First, in order to make the "inferiority" of the lower quality product more salient, we tied the organic olive oil with a seed oil (instead of a conventional oil). Seed oils are widely considered inferior quality products in the country as compared to olive oil.

In addition, since the products used up to now are sold by their weight, we introduced eggs (instead of apples) as the second valuation product. Eggs are sold by number of items. This allows us to more closely mimic List's (2002) and Alevy et al.'s (2011) itemized-products (10-pack and 13-pack card bundles).

Therefore, in each treatment subjects were asked to evaluate two product categories (olive oil and eggs) in randomized order. The specific products used are exhibited in Table 5. As in FE 1, in the "More" evaluation mode the inferior and superior quality products were tied together and presented as a single product. In the "Joint" evaluation mode subjects evaluated two products per product category side by side (the "less" and "more" products) for a total of four products. Appendix B exhibits photo stimuli of the products shown to subjects.

In all, it took six subjects to complete the full factorial design one time. An example is given in Table 6. As exhibited, six subjects are required to participate in six treatments for the organic quality product.

To sum up, in the "Less" treatments (*LI*) subjects report their valuation for an organic food product. In the "More" treatments (*MI*) subjects report their valuation for an organic food product *tied with* a smaller quantity (less items) of seed oil (conventional eggs) (see Table 5). In the "*Joint*" treatments subjects report their valuation for both the quality food product (*LJ*) as well as the quality product *tied together with* an inferior product (*MJ*). This design is repeated for two elicitation methods (CV and IV).

We should note that while the additional inferior food products are of lower quality than the BIO counterparts, in aggregate, the superior food quality product *tied with* the lower quality product have a greater market value than the superior food quality product itself. In the "Joint" treatment**,** subjects evaluate the exact same products as in treatments *LI* and *MI* but this time side by side.

No subject participated in more than one treatments, which means that each subject was exposed to either one of the valuation modes (i.e., Less, More or Joint). In addition, subjects evaluated the products using either CV or IV methods; that is, no subject reported valuations with both methods. Third, each subject reported valuations for two product categories i.e., olive oil and eggs. Lastly, order of appearance of valuation questions (and products) was completely randomized.

Field Experiment 2: The Survey

WTP was elicited in an actual market place just before subjects enter a super-market. Interviews were conducted by the same proctor as in FE 1. In total, 192 completed questionnaires were collected. Table 4a depicts socio-demographic information from this sample.

WTP was elicited using a similar payment card format to FE 1 (see Appendix C); payment card intervals were constructed using an exponential response scale. For olive oil the payment card was the same as in FE 1. The prices were selected so as to cover a wide range of market prices for conventional and organic olive oil, and eggs, respectively.

III. Hypotheses and Results

To test our hypothesis for “more is less” reversals we adopt the definitions from Alevy et al. (2011).

Definition 1: A strong evaluation mode effect is observed when, in aggregate, preferences over the goods are: *LI* (Less, Isolated) $\succ$ *MI* (More, Isolated) and *MJ* (More, Joint) $\succ$ *LJ* (Less, Joint).

Definition 2: A weak evaluation mode effect is observed when, in aggregate, preferences over the bundles are: *LI* ~ M*I* and *MJ* $\succ$ *LJ*.

To test whether the elicitation method (Contingent or Inferred valuation) mitigates mode effects (in case we do observe mode effects) we can test for $(LI - MI)_{CV} > (LI - MI)_{IV}$. That is, we test whether the gap between the "Less" and "More" isolated treatments becomes smaller in the IV elicitation method. Finally, to test the effect of Inferred valuation on elicited valuations we can directly test whether $Inferred < Contingent$.

Table 7 summarizes the test forms that we adopt to test each one of our hypothesis. We can directly test these hypotheses by estimating an interval regression model with robust clustered standard errors (to account for multiple responses by the same person in the *Joint* treatments). The empirical specification for FE 1 follows closely Alevy et al.'s (2011) specification:

$$\begin{aligned} WTP_i = {} & a_0 + a_1 More_i + a_2 Joint_i + a_3 Infer_i + a_4 BIO_i + a_5 More_i \times Infer_i + a_6 Joint_i \times Infer_i \\ & + a_7 More_i \times Joint_i + a_8 More_i \times BIO_i + a_9 Joint_i \times BIO_i + a_{10} BIO_i \times Infer_i \\ & + a_{11} BIO_i \times More_i \times Joint_i + a_{12} BIO_i \times Infer_i \times More_i + a_{13} BIO_i \times Infer_i \times Joint_i \\ & + a_{14} Infer_i \times More_i \times Joint_i + a_{15} Infer_i \times More_i \times Joint_i \times BIO_i + \mathbf{b'DEM} + u_i \end{aligned} \quad (3)$$

The **DEM** vector is a vector of demographic variables described in Table 4a. The *More*, *Joint*, *Infer* and *BIO* variables are dummies indicating conditions consistent with the variable name i.e., evaluation of the "More" product, evaluation in the "Joint" mode, evaluation using the inferred elicitation method and evaluation of the organic product respectively. A similar specification was adopted for FE 2 without the *BIO* dummy and its interactions (only organic products were evaluated in FE 2).

To test our hypothesis, we use specification (3) to derive linear combinations of coefficients for hypothesis testing. These are exhibited in Table 7. Detailed derivations are shown in Appendix D. Results from estimating equation (3) are shown in Appendix A.

Does CV and IV generate consistent preference orderings?

To answer this question we test the "more is less" hypothesis as described in Table 7. Notice that this test requires checking two hypotheses; a confirmation of inconsistent preference orderings requires that $MI \prec LI$ and $MJ \succ LJ$, in aggregate. Table 8a shows the results of these tests from Field Experiment 1. For each product (olive oil and apples), product category (organic, PDO) and method (contingent and inferred valuation) we first test whether the respective linear combination of coefficients from Table 7 is ≥ 0 ($H_0: Linear\ Comb. \geq 0$). The alternative hypothesis ($H_1: Linear\ Comb. < 0$) is consistent with $MI \prec LI$. We then test whether the respective linear combination of coefficients is ≤ 0 ($H_0: Linear\ Comb. \leq 0$). The alternative hypothesis ($H_1: Linear\ Comb. > 0$) is consistent with $MJ \succ LJ$. Note that any p-value exhibited in the table implies $(1 - pvalue)$ for the alternative hypothesis.

First notice that all linear combinations of coefficients are evaluated as positive which implies that $MI > LI$ and $MJ > LJ$. More specifically, all hypothesis involving $H_0: Linear\ Comb. \geq 0$ cannot be rejected which suggests that average WTP in the *MI* mode is statistically significantly higher than average WTP in the *LI* mode[2]. On the other hand, $H_0: Linear\ Comb. \leq 0$ is highly rejected in all cases implying that average WTP in the *MJ* mode is statistically significantly higher than average WTP in the *LJ* mode.

Therefore, our Field Experiment 1 shows no evidence of preference reversals of the "more is less" type. Data from Field Experiment 2 can help test the robustness of this result.

---

[2] Note that a high pvalue for $H_0: Linear\ Comb. \geq 0$, implies a low pvalue for $H_1: Linear\ Comb. < 0$. Therefore, a pvalue $> 90\%$ or $> 95\%$ for H_0 would be equivalent to a rejection for H_1 at the 10% or 5% level respectively.

In FE 2 we made two significant changes: (a) the inferiority of the lower quality product was made more salient for olive oil by using seed oil instead of conventional olive oil and (b) eggs were used instead of apples to test whether the sell-by-items nature of the product (similar to List's (2002) and Alevy et al.'s (2011) itemized card bundles) would make a difference.

Results are exhibited in Table 8b. The pattern is similar to FE 1. However, p-values for $H_0 : Linear\ Comb. \geq 0$ are, in most cases, much lower than FE 1 and further away from conventional significance levels. In essence, p-values lower than 90% (a p-value of 90% is equivalent to a 10% significance level) are equivalent to not rejecting $H_0 : Linear\ Comb. = 0$ which implies that average WTP in the *MI* mode is not statistically different than WTP in the *LI* mode. This in turn implies that *LI* ~ M*I*. On the other hand, the hypothesis $H_0 : Linear\ Comb. \leq 0$ is rejected in all cases implying that $MJ \succ LJ$. Therefore, in FE 2 we observe weak evaluation mode effects. Note that we do not observe weak evaluation mode effects for eggs in the CV method; we rather observe a similar pattern to FE 1. Therefore the IV method seems to be more susceptible to weak mode effects than the CV method.

Does IV mitigate mode effects?

Since we didn't observe mode effects in FE 1 we can only test whether IV mitigates mode effects in FE 2. The test form can only be applied for olive oil since we observe no mode effects for eggs under CV but observe weak mode effects for eggs under IV. Therefore the answer is obvious for eggs: IV is more susceptible to weak mode effects while with the CV method we do not observe preference reversals of the "more is less" kind.

Table 7 shows the test form we adopt for this hypothesis testing, as well as the respective linear combination of coefficients. Table 9 exhibits results from this test (only for FE 2 and olive oil). Notice, that the estimated linear combination of coefficients is positive, which indicates that $(LI - MI)_{CV} > (LI - MI)_{IV}$ i.e., a larger gap between the "Less" and "More" modes in CV rather than IV. However, the relative medium sized p-values are equivalent to not being able to reject $(LI - MI)_{CV} - (LI - MI)_{IV} = 0$. Given that we found that in FE 2 there are weak mode effects for olive oil, our results suggest that Inferred valuation is not able to mitigate these effects since $(LI - MI)_{CV} = (LI - MI)_{IV}$.

Does IV generate lower valuations than CV?

The aim of the inferred valuation method, as originally used, was to mitigate social desirability bias that is encompassed in hypothetical bias. Lusk and Norwood (2009a;2009b) found that IV generated lower valuations than hypothetical valuations and was more close to real valuations. Therefore, we would expect average WTP from IV to be lower than average WTP from CV: $Inferred < Contingent$. Table 7 indicates linear combinations of coefficients that are required to test our hypothesis, by treatment and product.

Table 10 exhibits results when testing the respective hypothesis appearing in Table 7. First notice that all linear combinations of coefficient estimates are positive indicating $Inferred > Contingent$. Significance tests are uniform across products, treatments and experiments: Inferred valuation generates statistically significant higher valuations than Contingent valuation. There are some minor exceptions for FE 1 where the conclusion is that IV does not generate statistically significant different estimates, in aggregate, than CV (MJ and LJ treatments for PDO apples; LJ treatment for organic olive oil; MI treatments for organic apples and olive oil respectively). Results for FE 2 provide even stronger support. In all, there is no single case where we can claim that Inferred valuation mitigates hypothetical or social desirability bias, given that Contingent valuation estimates are, in aggregate, always lower than estimates obtained from IV.

This result was unexpected and prompts the need for further investigation. Since we used a cheap talk script for elicited valuations with the CV method, it may have been that the CT script was more effective in moderating hypothetical bias than what IV has been in moderating both social desirability and hypothetical bias. The next section describes an internet experiment that was carried out to tackle this issue.

Is the CV method with a Cheap Talk script more effective than IV?

We utilized the power of the internet to quickly collect and analyze data for our study. Our purpose was not to generalize the elicited valuations to the population but rather to randomly expose groups of people to experimental treatments. Thus, we believe that results from comparisons of experimental treatments from this sample should hold in general. We do not claim that the elicited valuations represent the average consumer but we are not interested to the absolute valuations but rather to relative valuations between experimental treatments.

The internet experiment was administered with SurveyMonkey (http://www.surveymonkey.com/). A copy of the questionnaire is available at the anonymous website https://sites.google.com/site/morelesscviv/ . The experimental design involved valuation elicitation of Product 1 in FE 1 (organic olive oil) in three treatments: a CV question utilizing a Cheap Talk script, a CV question without utilizing a Cheap Talk script and an IV question. Each subject was randomly exposed to one of the treatments. The cheap talk script was similar to the ones we used in FE 1 and FE 2 and is exhibited in Appendix E.

The web link to fill in the survey was advertised in three popular news blogs in the country. In total, 634 subjects responded to the advertise with 539 of them filling in the questionnaire. Table 4b exhibits demographic characteristics of the internet sample. SurveyMonkey provides a safety mechanism to prevent subjects from responding more than one time in the questionnaire. The exact same payment card was used as in FE 1 and FE 2.

To test our hypothesis we adopt an empirical specification of the form:

$$WTP_i = a_0 + a_1 CVCT_i + a_2 CVNCT_i + \mathbf{b'DEM} + u_i \qquad (4)$$

The **DEM** vector is a vector of demographic variables described in Table 4b. The *CVCT and CVNCT* variables are dummies indicating whether the subject was exposed to the CV elicitation treatment with cheap talk and without cheap talk respectively. The *IV* is the omitted dummy and serves as the base category. Coefficient estimates are exhibited in table A3 in Appendix A. It is obvious that both CV methods (with and without cheap talk) generate lower valuations than IV. More precisely, the cheap talk script generates lower valuations than IV by 64 cents while the absence of the cheap talk script generates lower valuations than IV by 55 cents. Thus, the order of the estimates shows that: CV with $CT < CV$ without $CT < IV$.

This complementary internet experiment allows us to more safely conclude that the fact that we observe that IV generates higher valuations than CV does not depend on the use of a cheap talk script. On the contrary, we demonstrated that in more than one experiments the CV method (with and without a CT script) generates lower valuations than IV. Thus one of the advantages of the IV method in mitigating social desirability bias is questionable, at least in the context of this study.

IV. Discussion and Conclusions

We started this article with a series of question which we are now ready to answer. List's (2002) paper has been seminal in using data from the sports cards market to explore the preference reversal phenomenon. Our study showed that inconsistent preference orderings are harder to observe in the more familiar for consumers food market. In our first Field Experiment we found no evidence of preference reversals of the "more is less" kind. At best we observed some weak mode effects in Field Experiment 2 when we made the inferiority of the lower quality product more salient but not when we used a "sell-by-items" product that mimics List's itemized products in the sports card market. This may be an indication that preference reversals of a "more is less" kind in the food market are only present under very special conditions.

In one sense, our results are consistent with Alevy et al.'s (2011) results that find that market experience alleviates mode effects. The food market can be considered a market in which consumers are more experienced (as compared to the sports cards market) and we would therefore expect the "more is less" phenomenon to be less prevalent. However, other studies have observed inconsistent preference orderings in the food market (Boothe et al. 2007).

Since we did observe some weak mode effects in Field Experiment 2, our second purpose was to scrutinize the ability of the Inferred valuation method in mitigating mode effects. However, we found no evidence in favor of IV. The gap in valuations from different modes ("More" or "Less") was not statistically significantly different between CV and IV. Therefore, we cannot advocate in favor of IV for generating consistent preference orderings.

On the contrary, in one case while we observe consistent preference orderings when using the CV method, we observe weak evaluation mode effects when using the IV method.

Our last aim was to reexamine the effectiveness of the IV method in mitigating social desirability bias. In contrast to the results reported in Lusk and Norwood (2009a;2009b),our results show that Inferred valuation consistently generated higher valuations than Contingent valuation. To the extent that hypothetical bias and social desirability bias was present in our study (and we have no reason to believe that our study would differ from other hypothetical studies) this is a sign that IV failed to mitigate social desirability bias. Moreover, our internet experiment showed that this pattern of responses is robust even when not using a cheap talk script. Thus, we can safely rule out the case that the cheap talk script mitigated hypothetical bias more effectively than what IV mitigated social desirability bias and hypothetical bias. Even when we did nothing to mitigate social desirability bias (eliciting valuations without using a cheap talk script), IV valuations were statistically significantly higher than CV valuations.

Given that our study was conducted with a sample from a different cultural context than Lusk and Norwood's (2009a;2009b) US based studies, more studies from international samples are indeed warranted. It will take time and more studies of this kind to answer the question whether the inferred valuation method remains a promising method for mitigating biases in other contexts than the ones explored in the original studies. All in all, we believe that this topic could indeed be a prime area for future economic research.

V. References

Alevy, J.E.; J. List and W. Adamowicz 2011. "How Can Behavioral Economics Inform Non-Market Valuation;an Example from the Preference Reversal Literature." *Land Economics (forthcoming)*.

Bazerman, M.H.; G.F. Loewenstein and S.B. White. 1992. "Reversals of Preference in Allocation Decisions: Judging an Alternative Versus Choosing among Alternatives." *Administrative Science Quarterly*, 37 (220-240).

Boothe, J.; J.A. Schwartz and G.B. Chapman. 2007. "Preference Reversals Resulting from a Market Value Heuristic." *Marketing Theory*, 7(I), pp. 27-38.

Caswell, J.A. and E.M. Modjuzska. 1996. "Using Informational Labeling to Influence the Market for Quality in Food Products." *American Journal of Agricultural Economics*, 78 (1248-1253.).

Crowne, D.P. and D. Marlowe. 1960. "A New Scale of Social Desirability Independent of Psychopathalogy." *Journal of Consulting Psychology*, 24(4), pp. 349-50.

Cummings, R.G. and G.W. Harrison. 1992. "A New Approach to Eliciting Incentive Compatible Values for Public Goods: The Inference Game." *Working paper, Department of Economics, University of South Carolina.*

Darby, M. and E. Karni. 1973. "Free Competition and Optimal Amount of Fraud." *Journal of Law and Economics*, 16, pp. 67-88.

Drichoutis, A.C.; P. Lazaridis and R.M. Nayga, Jr. 2009. "On Consumers' Valuation of Nutrition Information." *Bulletin of Economic Research*, 61(3), pp. 223-47.

Fisher, R.J. . 1993. "Social Desirability Bias and the Validity of Indirect Questioning." *Journal of Consumer Research*, 20 (2), pp. 303-15.

Goldstein, W.M. and H.J. Einhorn. 1987. "Expression Theory and the Preference Reversal Phenomena. ." *Psychological Review*, 94(236-254).

Grether, D.M. and C.R. Plott. 1979. "Economic Theory of Choice and the Preference Reversal Phenomenon." *American Economic Review*, 69(4), pp. 623-38.

Hsee, C.K.; G.F. Loewenstein; Sally Blount and Max H. Bazerman. 1999. "Preference Reversals between Joint and Separate Evaluations of Options: A Review and Theoretical Analysis." *Psychological Bulletin*, 125 pp. 576--91.

Hsee, C.K. 1996. "The Evaluability Hypothesis: An Explanation for Preference Reversals between Joint and Separate Evaluations of Alternatives." *Organizational Behavior and Human Decision Processes 46: 247-57.*, 46, pp. 247-57.

Irwin, J.R.; P.Slovic; S. Lichtenstein and G. McClelland. 1993. "Preference Reversals and the Measurement of Environmental Values." *Journal of Risk and Uncertainty*, 6, pp. 5-18.

Johnson, E.J.; M. Steffel and D.G. Goldstein. 2005. "Making Better Decisions: From Measuring to Constructing Preferences." *Health Psychology*, 24(4), pp. S17–S22.

Leggett, C.G.; N.S. Kleckner; K.J. Boyle; J.W. Duffield and R.C. Mitchell. 2003. "Social Desirability Bias in Contingent Valuation Surveys Administered through in-Person Interviews." *Land Economics 79*, 79(4), pp. 561-75.

Lichtenstein, S. and P. Slovic. 2006. *The Construction of Preference*. Cambridge, UK: Cambridge University Press.

List, J.; R. Berrens; A. Bohara and J. Kerkvliet. 2004. "Examining the Role of Social Isolation on Stated Preferences." *American Economic Review of Agricultural Economics*, 94(3), pp. 741-52.

List, J.A. 2002. "Preference Reversals of a Different Kind: The "More Is Less" Phenomenon." *American Economic Review*, 92(5), pp. 1636-43.

Lusk, J.L. and B.F. Norwood. 2009a. "Bridging the Gap between Laboratory Experiments and Naturally Occurring Markets:An Inferred Valuation Method." *Journal of Environmental Economic and Management*, 58, pp. 236-50.

Lusk, J. and B.F. Norwood. 2009b. "An Inferred Valuation Method." *Land Economics*, 85(3), pp. 500-14.

Payne, J.W.; J.R. Bettman and D.A. Schkade. 1999. "Measuring Constructed Preferences: Towards a Building Code." *Journal of Risk and Uncertainty*, 19(1), pp. 243-70.

Plant, E.A.; P.G. Devine and P.C. Brazy. 2003. "The Bogus Pipeline and Motivations to Respond without Prejudice: Revisiting the Fading and Faking of Racial Prejudice." *Group Processes and Intergroup Relations*, 6 (2), pp. 187-200.

Rowe, R.D.; W.D. Schulze and W.S. Breffle. 1996. "A Test for Payment Card Biases." *Journal of Environmental Economics and Management*, 31, pp. 178-85.

Seidl, C. 2002. "Preference Reversal." *Journal of Economic Surveys*, 16(5), pp. 621-55.

Slovic, P. 1995. "The Construction of Preference." *American Psychologist*, 50(5), pp. 364-71.

Slovic, P. and S. Lichtenstein. 1968. "Relative importance of probabilities and payoffs in risk taking." *Journal of Experimental Psychology*, 78/3, Part 2, pp. 1–18.

Slovic, P. and S. Lichtenstein. 1983. "Preference-Reversals: A Broader Perspective." *American Economic Review*, 73(4), pp. 596-605.

Table 1. Field experiments - experimental design

		Elicitation method	
		Contingent valuation	*Inferred valuation*
Evaluation mode	*Less*	Less-CV	Less-IV
	More	More-CV	More-IV
	Joint	Joint-CV	Joint-IV

Table 2. Products by evaluation mode (FE 1)

		Evaluation modes		
		Less	**More**	**Joint**
Olive oil	*Product 1*	BIO olive oil (750 ml)		BIO olive oil (750 ml)
	Product 2		BIO olive oil (750 ml) + Conventional olive oil (250 ml)	BIO olive oil (750 ml) + Conventional olive oil (250 ml)
	Product 3	PDO olive oil (750 ml)		PDO olive oil (750 ml)
	Product 4		PDO olive oil (750 ml) + Conventional olive oil (250 ml)	PDO olive oil (750 ml) + Conventional olive oil (250 ml)
Apples	*Product 5*	BIO apples (1 Kgr)		BIO apples (1 Kgr)
	Product 6		BIO apples (1 Kgr) + Conventional apples (250 gr)	BIO apples (1 Kgr) + Conventional apples (250 gr)
	Product 7	PDO apples (1 Kgr)		PDO apples (1 Kgr)
	Product 8		PDO apples (1 Kgr) + Conventional apples (250 gr)	PDO apples (1 Kgr) + Conventional apples (250 gr)

Table 3. The full factorial design (FE 1)

Subject	Products evaluated[a] *(refer to Table 2)*	The higher quality product is...	Elicitation valuation method	Valuation mode
1	1 and 5	Organic (BIO)	Contingent	Less
2	1 and 5		Inferred	Less
3	2 and 6		Contingent	More
4	2 and 6		Inferred	More
5	1 and 2 side by side 5 and 6 side by side		Contingent	Joint
6	1 and 2 side by side 5 and 6 side by side		Inferred	Joint
7	3 and 7	Protected Designation of Origin (PDO)	Contingent	Less
8	3 and 7		Inferred	Less
9	4 and 8		Contingent	More
10	4 and 8		Inferred	More
11	3 and 4 side by side 7 and 8 side by side		Contingent	Joint
12	3 and 4 side by side 7 and 8 side by side		Inferred	Joint

[a] Product evaluation order was completely randomized

Table 4a. Variable description (Field experiments)

Variables	Variable description	Field experiment 1 Mean (Std.Dev.)	Field experiment 2 Mean (Std.Dev.)
$Income_1$ *	Dummy, Household's economic position is bad or very bad=1	0.049 (0.217)	0.047 (0.212)
$Income_2$	Dummy, Household's economic position is below average=1	0.066 (0.249)	0.073 (0.261)
$Income_3$	Dummy, Household's economic position is average=1	0.505 (0.500)	0.531 (0.500)
$Income_4$	Dummy, Household's economic position is above average=1	0.197 (0.398)	0.187 (0.391)
$Income_5$	Dummy, Household's economic position is good=1	0.143 (0.350)	0.130 (0.337)
$Income_6$	Dummy, Household's economic position is very good=1	0.039 (0.194)	0.031 (0.174)
$Educ_1$ *	Dummy, Education level is up to High school=1	0.059 (0.237)	0.062 (0.243)
$Educ_2$	Dummy, Education level is High school graduate=1	0.354 (0.479)	0.380 (0.487)
$Educ_3$	Dummy, Education level is University graduate=1	0.471 (0.499)	0.474 (0.500)
$Educ_4$	Dummy, Education level is Postgraduate=1	0.115 (0.320)	0.083 (0.277)
Age	Subject's age	45.094 (12.440)	44.328 (12.750)
Child	Dummy, Subject has underage children in household=1	0.415 (0.493)	0.271 (0.445)
HSize	Household size	2.901 (1.381)	3.094 (1.270)
Gender	Dummy, Male=1	0.349 (0.477)	0.266 (0.443)

* Variables with an asterisk were omitted from the econometric models

Table 4b. Variable description (Internet experiment)

Variables	Variable description	Mean (Std.Dev.)
Income$_1$ *	Dummy, Household's economic position is below average or bad or very bad=1	0.093 (0.290)
Income$_2$	Dummy, Household's economic position is average=1	0.482 (0.500)
Income$_3$	Dummy, Household's economic position is better than average=1	0.202 (0.402)
Income$_4$	Dummy, Household's economic position is good or very good=1	0.223 (0.416)
Educ$_1$ *	Dummy, Education level is up to High school graduate=1	0.067 (0.250)
Educ$_2$	Dummy, Education level is some college or student=1	0.135 (0.342)
Educ$_3$	Dummy, Education level is University graduate=1	0.386 (0.487)
Educ$_4$	Dummy, Education level is Postgraduate studies=1	0.412 (0.493)
Age$_1$*	Dummy, Subject's age is 18 to 25 years old=1	0.124 (0.330)
Age$_2$	Dummy, Subject's age is 26 to 35 years old=1	0.506 (0.500)
Age$_3$	Dummy, Subject's age is 36 to 45 years old=1	0.256 0.437)
Age$_4$	Dummy, Subject's age is ≥46 years old=1	0.113 (0.317)
Child	Dummy, Subject has underage children in household=1	0.286 (0.452)
HSize	Household size	3.017 (1.382)
Gender	Dummy, Male=1	0.440 (0.497)

* Variables with an asterisk were omitted from the econometric models

Table 5. Products by evaluation mode (FE 2)

		Evaluation modes		
		Less	**More**	**Joint**
Olive oil	*Product 1*	BIO olive oil (750 ml)		BIO olive oil (750 ml)
	Product 2		BIO olive oil (750 ml) + Seed oil (250 ml)	BIO olive oil (750 ml) + Seed oil (250 ml)
Eggs	*Product 3*	BIO eggs (8 eggs)		BIO eggs (8 items)
	Product 4		BIO eggs (8 eggs) + Conventional eggs (3 eggs)	BIO eggs (8 eggs) + Conventional eggs (3 eggs)

Table 6. The full factorial design (FE 2)

Subject	**Products evaluated**[a] ***(refer to Table 5)***	**The higher quality product is...**	**Elicitation valuation method**	**Valuation mode**
1	1 and 3	Organic (BIO)	Contingent	Less
2	1 and 3		Inferred	Less
3	2 and 4		Contingent	More
4	2 and 4		Inferred	More
5	1 and 2 side by side 3 and 4 side by side		Contingent	Joint
6	1 and 2 side by side 3 and 4 side by side		Inferred	Joint

[a] Product evaluation order was completely randomized

Table 7. Linear combinations of coefficients for hypothesis testing

Hypothesis Tested	Test form	Field experiment	Elicitation method or valuation mode	Organic[a]	PDO[a]
"More is less"	$MI \prec LI$ and $MJ \succ LJ$	1	Contingent	$More + More \times BIO < 0$ & $More + More \times Joint + More \times BIO + BIO \times More \times Joint > 0$	$More < 0$ & $More + More \times Joint > 0$
			Inferred	$More + More \times Infer + More \times BIO + BIO \times Infer \times More < 0$ & $More + More \times Infer + More \times Joint + More \times BIO + BIO \times More \times Joint + BIO \times Infer \times More + Infer \times More \times Joint + Infer \times More \times Joint \times BIO > 0$	$More + More \times Infer < 0$ & $More + More \times Infer + More \times Joint + Infer \times More \times Joint > 0$
		2	Contingent	$More < 0$ & $More + More \times Joint > 0$	
			Inferred	$More + More \times Infer < 0$ & $More + More \times Infer + More \times Joint + Infer \times More \times Joint > 0$	
Does IV mitigate mode effects?	$(LI - MI)_{CV} > (LI - MI)_{IV}$	1		$More \times Infer + BIO \times Infer \times More > 0$	$More \times Infer > 0$
		2		$More \times Infer > 0$	
Does IV generate lower valuations than CV?	$Inferred < Contingent$	1	MJ treatment	$Infer + More \times Infer + Joint \times Infer + BIO \times Infer + BIO \times Infer \times More + BIO \times Infer \times Joint + Infer \times More \times Joint + Infer \times More \times Joint \times BIO < 0$	$Infer + More \times Infer + Joint \times Infer + Infer \times More \times Joint < 0$
			LJ treatment	$Infer + Joint \times Infer + BIO \times Infer + BIO \times Infer \times Joint < 0$	$Infer + Joint \times Infer < 0$

		MI treatment	$Infer + More \times Infer + BIO \times Infer + BIO \times Infer \times More < 0$	$Infer + More \times Infer < 0$
		LI treatment	$Infer + BIO \times Infer < 0$	$Infer < 0$
	2	MJ treatment	$Infer + More \times Infer + Joint \times Infer + Infer \times More \times Joint < 0$	
		LJ treatment	$Infer + Joint \times Infer < 0$	
		MI treatment	$Infer + More \times Infer < 0$	
		LI treatment	$Infer < 0$	

[a] The expressions involved in these columns concern coefficients which are named of their respective dummies.

Table 8a. Hypothesis for "more is less" in Field Experiment 1

		Olive oil		Apples	
		Organic	PDO	Organic	PDO
		Linear combination (p-value)			
Contingent	$H_0 : Linear\ Comb. \geq 0$	1.337 (0.987)	1.452 (0.997)	0.393 (0.980)	0.477 (0.998)
	$H_0 : Linear\ Comb. \leq 0$	0.878 (0.00)	0.970 (0.00)	0.278 (0.00)	0.388 (0.00)
Inferred	$H_0 : Linear\ Comb. \geq 0$	1.268 (0.996)	1.316 (0.994)	0.279 (0.933)	0.639 (1.00)
	$H_0 : Linear\ Comb. \leq 0$	1.446 (0.00)	1.444 (0.00)	0.398 (0.00)	0.463 (0.00)

Table 8b. Hypothesis for "more is less" in Field Experiment 2

		Olive oil	Eggs
		Organic	Organic
		Linear combination estimates (p-value)	
Contingent	$H_0 : Linear\ Comb. \geq 0$	0.452 (0.684)	0.891 (0.961)
	$H_0 : Linear\ Comb. \leq 0$	0.570 (0.00)	0.329 (0.00)
Inferred	$H_0 : Linear\ Comb. \geq 0$	0.968 (0.899)	0.037 (0.531)
	$H_0 : Linear\ Comb. \leq 0$	1.084 (0.00)	0.742 (0.00)

Table 9. Hypothesis testing whether IV mitigates mode effects

		Organic Olive oil
		Linear combination estimates (p-value)
Field experiment 2	$H_0 : Linear\ Comb. \leq 0$	0.516 (0.337)

Table 10. Hypothesis testing whether IV generates lower valuations than CV[a]

			Olive oil		Apples	
			Organic	PDO	Organic	PDO
			Linear combination estimates (p-values)			
Field experiment 1	Joint	More	1.104 (0.963)	1.874 (0.998)	0.460 (0.979)	-0.013 (0.473)
		Less	0.536 (0.838)	1.400 (0.994)	0.341 (0.956)	-0.088 (0.297)
	Isolated	More	0.664 (0.875)	1.398 (0.997)	0.217 (0.861)	0.392 (0.986)
		Less	0.734 (0.928)	1.535 (0.998)	0.331 (0.970)	0.230 (0.922)
			Olive oil		Eggs	
			Organic			
Field experiment 2	Joint	More	3.885 (1.00)	-	1.055 (0.976)	-
		Less	3.371 (1.00)	-	0.641 (0.898)	-
	Isolated	More	2.062 (0.984)	-	0.245 (0.686)	-
		Less	1.545 (0.981)	-	1.099 (0.986)	-

[a] The hypothesis tested is $H_0 : Linear\ Comb. \geq 0$. Table 7 requires that the Linear Combination of coefficients is < 0.

Appendix A: Interval regression coefficient estimates

Table A1. Coefficient estimates (Field Experiment 1)

	Olive oil		Apples	
	Coefficient	(Standard error)	Coefficient	(Standard error)
Constant	4.164***	(0.942)	1.330***	(0.363)
More	1.452***	(0.527)	0.477***	(0.163)
Joint	-0.306	(0.616)	0.273	(0.179)
Infer	1.535***	(0.547)	0.230	(0.162)
BIO	1.307**	(0.562)	0.486***	(0.173)
$More \times Infer$	-0.137	(0.748)	0.162	(0.244)
$Joint \times Infer$	-0.135	(0.781)	-0.318	(0.236)
$More \times Joint$	-0.483	(0.546)	-0.090	(0.171)
$More \times BIO$	-0.115	(0.805)	-0.084	(0.249)
$Joint \times BIO$	-0.219	(0.849)	-0.492*	(0.278)
$BIO \times Infer$	-0.801	(0.738)	0.101	(0.237)
$BIO \times More \times Joint$	0.024	(0.823)	-0.026	(0.258)
$BIO \times Infer \times More$	0.067	(1.069)	-0.276	(0.356)
$BIO \times Infer \times Joint$	-0.062	(1.067)	0.327	(0.353)
$Infer \times More \times Joint$	0.611	(0.772)	-0.087	(0.253)
$Infer \times More \times Joint \times BIO$	0.026	(1.106)	0.321	(0.370)
$Income_2$	1.146*	(0.612)	0.438	(0.283)
$Income_3$	1.440***	(0.469)	0.423*	(0.234)
$Income_4$	1.574***	(0.538)	0.468*	(0.250)
$Income_5$	0.734	(0.566)	0.245	(0.260)
$Income_6$	2.729***	(0.743)	0.757**	(0.315)
$Educ_2$	1.991***	(0.555)	0.452**	(0.208)
$Educ_3$	1.553***	(0.553)	0.478**	(0.205)
$Educ_4$	2.179***	(0.685)	0.629***	(0.231)
Age	-0.042***	(0.011)	-0.013***	(0.004)
Child	-0.141	(0.322)	0.147	(0.112)
HSize	-0.188	(0.115)	-0.079**	(0.040)
Gender	-0.837***	(0.259)	-0.036	(0.086)
N	784			
Log pseudolikelihood	-2061.843		-2096.666	

*** (**) [*] notes significant at the 1% (5%) [10%] percent level.

Table A2. Coefficient estimates (Field Experiment 2)

	Olive oil		Eggs	
	Coefficient	(Standard error)	Coefficient	(Standard error)
Constant	7.423***	(2.034)	3.350***	(1.222)
More	0.452	(0.946)	0.891*	(0.506)
Joint	-1.848**	(0.898)	0.698	(0.478)
Infer	1.545**	(0.741)	1.099**	(0.497)
$More \times Infer$	0.516	(1.225)	-0.855	(0.709)
$Joint \times Infer$	1.826	(1.123)	-0.458	(0.708)
$More \times Joint$	0.118	(0.961)	-0.562	(0.517)
$Infer \times More \times Joint$	-0.002	(1.250)	1.268*	(0.729)
$Income_2$	-3.302**	(1.301)	-0.557	(0.717)
$Income_3$	-1.119	(0.922)	-0.109	(0.567)
$Income_4$	-0.040	(1.098)	0.159	(0.592)
$Income_5$	-1.085	(1.041)	0.693	(0.663)
$Income_6$	2.337	(2.198)	2.054	(1.360)
$Educ_2$	-0.577	(1.247)	-1.668**	(0.787)
$Educ_3$	-0.497	(1.239)	-1.227	(0.777)
$Educ_4$	-0.938	(1.416)	-1.721*	(0.921)
Age	-0.065**	(0.025)	0.030**	(0.014)
Child	-1.579***	(0.574)	0.163	(0.421)
HSize	0.639***	(0.226)	-0.115	(0.112)
Gender	0.377	(0.609)	-0.270	(0.330)
N	256			
Log pseudolikelihood	-673.241		-694.475	

*** (**) [*] notes significant at the 1% (5%) [10%] percent level.

Table A3. Coefficient estimates (Internet experiment)

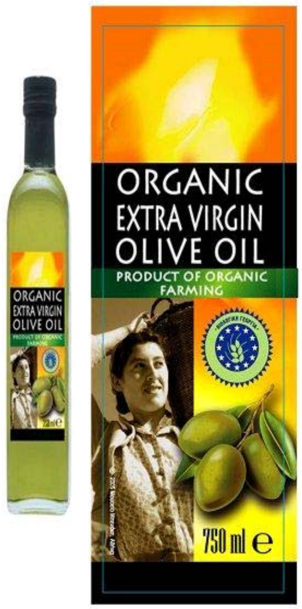
	Olive oil	
	Coefficient	(Standard error)
Constant	5.373***	(0.648)
CV - Cheap Talk	-0.640***	(0.239)
CV – No Cheap Talk	-0.547**	(0.238)
Age_2	-0.449	(0.324)
Age_3	-0.891**	(0.389)
Age_4	-1.009**	(0.443)
$Income_2$	0.519	(0.344)
$Income_3$	0.422	(0.382)
$Income_4$	0.206	(0.376)
$Education_2$	0.701	(0.492)
$Education_3$	0.351	(0.427)
$Education_4$	0.637	(0.434)
HSize	0.014	(0.077)
Child	-0.027	(0.258)
Gender	-0.518**	(0.203)
N	539	
Log pseudolikelihood	-1456.991	

*** (**) [*] notes significant at the 1% (5%) [10%] percent level.

Appendix B: Photo stimuli by treatment

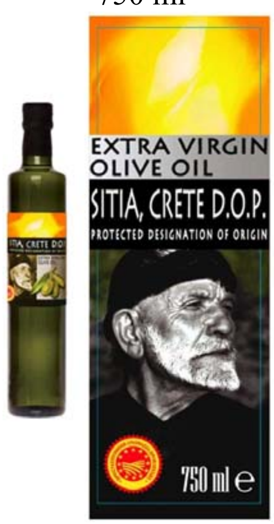
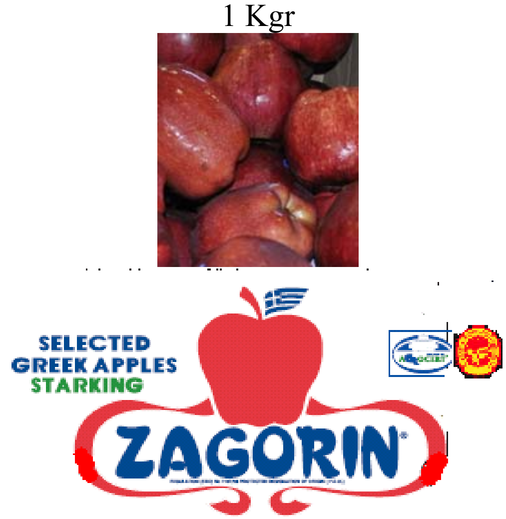
Field Experiment 1 – Less, isolated treatment (LI)

ORGANIC

<table>
<tr><th>Product 1</th><th>Product 5</th></tr>
<tr><td>750 ml

</td><td>1 Kgr

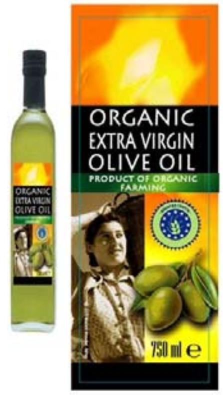
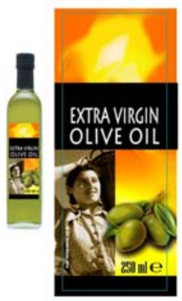
</td></tr>
</table>

PDO

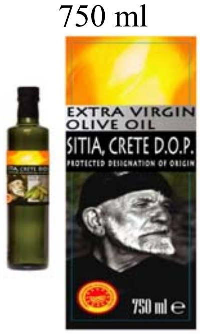
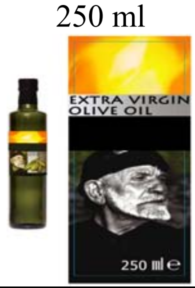
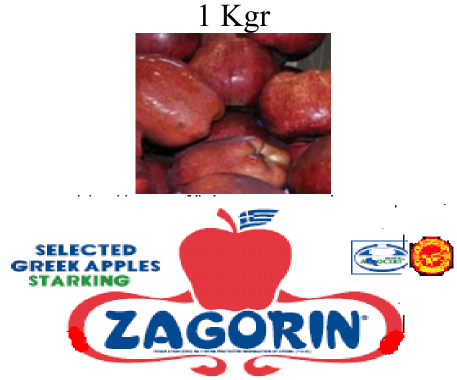
<table>
<tr><th>Product 3</th><th>Product 7</th></tr>
<tr><td>750 ml

</td><td>1 Kgr

</td></tr>
</table>

Field Experiment 1 – More, isolated treatment (MI)

ORGANIC

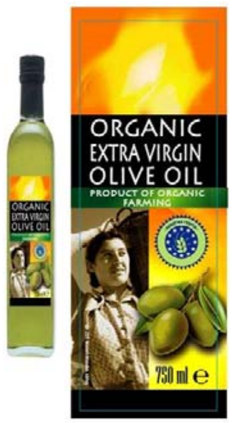
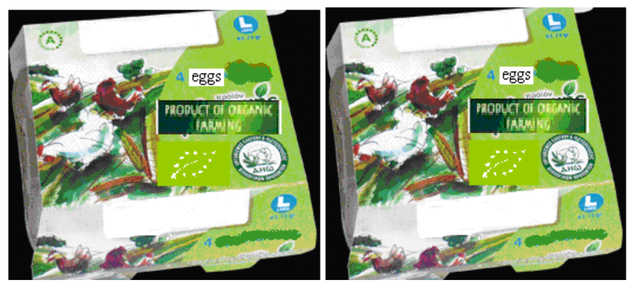
Product 2	**Product 6**
750 ml  **tied with** 250 ml 	1 Kgr  **tied with** 250 gr 

PDO

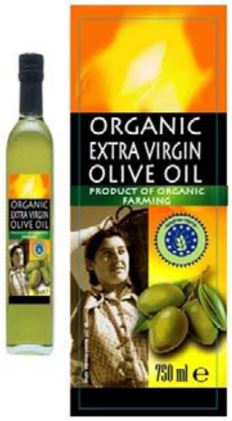
Product 4	**Product 8**
750 ml  **tied with** 250 ml 	1 Kgr  **tied with** 250 gr 

<table>
<tr><td></td><td>
</td></tr>
</table>

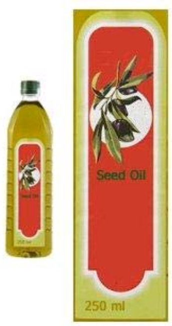
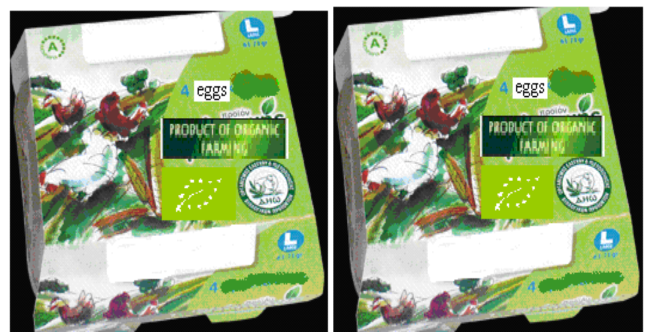
Field Experiment 2 – Less, isolated treatment (LI)

<table>
<tr><th>Product 1</th><th>Product 3</th></tr>
<tr><td>750 ml

</td><td>8 items of eggs

</td></tr>
</table>

Field Experiment 2 –More, isolated treatment (MI)

<table>
<tr><th>Product 2</th><th>Product 4</th></tr>
<tr><td>750 ml


tied with

250 ml

</td>
<td>8 items of eggs


tied with

3 items of eggs
</td></tr>
</table>

Appendix C: Payment cards

C1. Olive oil

Payment card (€)				
1.	**0**		9.	**4.96 - 5.55**
2.	**0.01 - 2.50**		10.	**5.56 - 6.22**
3.	**2.51 - 2.80**		11.	**6.23 - 6.97**
4.	**2.81 - 3.14**		12.	**6.98 - 7.81**
5.	**3.15 - 3.52**		13.	**7.82 - 8.76**
6.	**3.53 - 3.94**		14.	**8.77 - 9.82**
7.	**3.95 - 4.42**		15.	**9.83 - 11.00**
8.	**4.43 - 4.95**		16.	**>11.00**

C2. Apples

Payment card (€)				
1.	**0**		9.	**2.10 - 2.29**
2.	**0.01 - 1.20**		10.	**2.30 - 2.52**
3.	**1.21 - 1.32**		11.	**2.53 - 2.76**
4.	**1.33 - 1.44**		12.	**2.77 - 3.03**
5.	**1.45 - 1.58**		13.	**3.03 - 3.32**
6.	**1.59 - 1.74**		14.	**3.33 - 3.65**
7.	**1.75 - 1.91**		15.	**3.66 - 4.00**
8.	**1.92 - 2.09**		16.	**>4.00**

C3. Eggs

Payment card (€)				
1.	**0**		9.	**3.77 - 4.22**
2.	**0.01 - 1.90**		10.	**4.23 - 4.73**
3.	**1.91 - 2.13**		11.	**4.74 - 5.30**
4.	**2.14 - 2.39**		12.	**5.31 - 5.94**
5.	**2.40 - 2.67**		13.	**5.95 - 6.66**
6.	**2.68 - 3.00**		14.	**6.67 - 7.46**
7.	**3.01 - 3.36**		15.	**7.47 - 8.36**
8.	**3.37 - 3.76**		16.	**>8.36**

Appendix D: Linear combinations of coefficients for Hypothesis testing

D1. To test for "more is less" reversals for Field Experiment 1 we need:

Contingent Valuation & Organic:

$$MI \prec LI \to Constant + More + BIO + More \times BIO + \mathbf{b'DEM} < Constant + BIO + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times BIO < 0$$
$$MJ \succ LJ \to Constant + More + Joint + BIO + More \times Joint + More \times BIO$$
$$+Joint \times BIO + BIO \times More \times Joint + \mathbf{b'DEM} > Constant + Joint + BIO + Joint \times BIO + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Joint + More \times BIO + BIO \times More \times Joint > 0$$

Contingent Valuation & PDO:

$$MI \prec LI \to Constant + More + \mathbf{b'DEM} < Constant + \mathbf{b'DEM} \Rightarrow More < 0$$
$$MJ \succ LJ \to Constant + More + Joint + More \times Joint + \mathbf{b'DEM} > Constant + Joint + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Joint > 0$$

Inferred Valuation & Organic:

$$MI \prec LI \to Constant + More + Infer + BIO + More \times Infer + More \times BIO + BIO \times Infer$$
$$+BIO \times Infer \times More + \mathbf{b'DEM} < Constant + Infer + BIO + BIO \times Infer + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Infer + More \times BIO + BIO \times Infer \times More < 0$$
$$MJ \succ LJ \to Constant + More + Joint + Infer + BIO + More \times Infer + Joint \times Infer + More \times Joint$$
$$+More \times BIO + Joint \times BIO + BIO \times Infer + BIO \times More \times Joint + BIO \times Infer \times More$$
$$+BIO \times Infer \times Joint + Infer \times More \times Joint + Infer \times More \times Joint \times BIO + \mathbf{b'DEM} > Constant + Joint$$
$$+Infer + BIO + Joint \times Infer + Joint \times BIO + BIO \times Infer + BIO \times Infer \times Joint + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Infer + More \times Joint + More \times BIO + BIO \times More \times Joint + BIO \times Infer \times More$$
$$+Infer \times More \times Joint + Infer \times More \times Joint \times BIO > 0$$

Inferred Valuation & PDO:

$$MI \prec LI \to Constant + More + Infer + More \times Infer + \mathbf{b'DEM} < Constant + Infer + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Infer < 0$$
$$MJ \succ LJ \to Constant + More + Joint + Infer + More \times Infer + Joint \times Infer + More \times Joint$$
$$+Infer \times More \times Joint + \mathbf{b'DEM} > Constant + Joint + Infer + Joint \times Infer + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Infer + More \times Joint + Infer \times More \times Joint > 0$$

To test for "more is less" reversals for Field Experiment 2 we need:

Contingent Valuation:

$$MI \prec LI \to Constant + More + \mathbf{b'DEM} < Constant + \mathbf{b'DEM}$$
$$\Rightarrow More < 0$$
$$MJ \succ LJ \to Constant + More + Joint + More \times Joint + \mathbf{b'DEM} > Constant + Joint + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Joint > 0$$

Inferred Valuation:

$$MI \prec LI \rightarrow Constant + More + Infer + More \times Infer + \mathbf{b'DEM} < Constant + Infer + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Infer < 0$$
$$MJ \succ LJ \rightarrow Constant + More + Joint + Infer + More \times Infer + Joint \times Infer + More \times Joint$$
$$+ Infer \times More \times Joint + \mathbf{b'DEM} > Constant + Joint + Infer + Joint \times Infer + \mathbf{b'DEM}$$
$$\Rightarrow More + More \times Infer + More \times Joint + Infer \times More \times Joint > 0$$

D2. To test whether inferred valuation mitigates mode effects we test for Field Experiment 2:

$$\left(LI - MI\right)_{CV} > \left(LI - MI\right)_{IV} \rightarrow \left[\left(Constant + \mathbf{b'DEM}\right) - \left(Constant + More + \mathbf{b'DEM}\right)\right] >$$
$$\left[\left(Constant + Infer + \mathbf{b'DEM}\right) - \left(Constant + More + Infer + More \times Infer + \mathbf{b'DEM}\right)\right]$$
$$\Rightarrow More \times Infer > 0$$

D3. To test whether inferred valuation generates lower valuations than contingent valuation we need:

For the MJ treatment and Organic in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + More + Joint + Infer + BIO + More \times Infer + Joint \times Infer$$
$$+ More \times Joint + More \times BIO + Joint \times BIO + BIO \times Infer + BIO \times More \times Joint + BIO \times Infer \times More$$
$$+ BIO \times Infer \times Joint + Infer \times More \times Joint + Infer \times More \times Joint \times BIO + \mathbf{b'DEM} < Constant$$
$$+ More + Joint + BIO + More \times Joint + More \times BIO + Joint \times BIO + BIO \times More \times Joint + \mathbf{b'DEM}$$
$$\Rightarrow Infer + More \times Infer + Joint \times Infer + BIO \times Infer + BIO \times Infer \times More + BIO \times Infer \times Joint$$
$$+ Infer \times More \times Joint + Infer \times More \times Joint \times BIO < 0$$

For the MJ treatment and PDO in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + More + Joint + Infer + More \times Infer + Joint \times Infer$$
$$+ More \times Joint + Infer \times More \times Joint + \mathbf{b'DEM} < Constant + More + Joint$$
$$+ More \times Joint + \mathbf{b'DEM}$$
$$\Rightarrow Infer + More \times Infer + Joint \times Infer + Infer \times More \times Joint < 0$$

For the LJ treatment and Organic in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + Joint + Infer + BIO + Joint \times Infer$$
$$+ Joint \times BIO + BIO \times Infer + BIO \times Infer \times Joint + \mathbf{b'DEM} < Constant + Joint$$
$$+ BIO + Joint \times BIO + \mathbf{b'DEM}$$
$$\Rightarrow Infer + Joint \times Infer + BIO \times Infer + BIO \times Infer \times Joint < 0$$

For the LJ treatment and PDO in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + Joint + Infer + Joint \times Infer$$
$$+\mathbf{b'DEM} < Constant + Joint + \mathbf{b'DEM}$$
$$\Rightarrow Infer + Joint \times Infer < 0$$

For the MI treatment and Organic in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + More + Infer + BIO + More \times Infer + More \times BIO$$
$$+BIO \times Infer + BIO \times Infer \times More + \mathbf{b'DEM} < Constant + More + BIO + More \times BIO + \mathbf{b'DEM}$$
$$\Rightarrow Infer + More \times Infer + BIO \times Infer + BIO \times Infer \times More < 0$$

For the MI treatment and PDO in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + More + Infer + More \times Infer$$
$$+\mathbf{b'DEM} < Constant + More + \mathbf{b'DEM}$$
$$\Rightarrow Infer + More \times Infer < 0$$

For the LI treatment and Organic in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + Infer + BIO + BIO \times Infer + \mathbf{b'DEM} < Constant$$
$$+BIO + \mathbf{b'DEM}$$
$$\Rightarrow Infer + BIO \times Infer < 0$$

For the LI treatment and PDO in Field Experiment 1:

$$Inferred < Contingent \rightarrow Constant + Infer + \mathbf{b'DEM} < Constant + \mathbf{b'DEM}$$
$$\Rightarrow Infer < 0$$

For the MJ treatment in Field Experiment 2:

$$Inferred < Contingent \rightarrow Constant + More + Joint + Infer + More \times Infer + Joint \times Infer$$
$$+More \times Joint + Infer \times More \times Joint + \mathbf{b'DEM} < Constant + More + Joint$$
$$+More \times Joint + \mathbf{b'DEM}$$
$$\Rightarrow Infer + More \times Infer + Joint \times Infer + Infer \times More \times Joint < 0$$

For the LJ treatment in Field Experiment 2:

$$Inferred < Contingent \rightarrow Constant + Joint + Infer + Joint \times Infer$$
$$+\mathbf{b'DEM} < Constant + Joint + \mathbf{b'DEM}$$
$$\Rightarrow Infer + Joint \times Infer < 0$$

For the MI treatment in Field Experiment 2:

$$Inferred < Contingent \rightarrow Constant + More + Infer + More \times Infer + \mathbf{b'DEM} < Constant + More$$
$$+\mathbf{b'DEM}$$
$$\Rightarrow Infer + More \times Infer < 0$$

For the LI treatment in Field Experiment 2:

$$Inferred < Contingent \rightarrow Constant + Infer + \mathbf{b'DEM} < Constant + \mathbf{b'DEM}$$
$$\Rightarrow Infer < 0$$

Appendix E: Cheap talk script

In the next page you will be asked to indicate how much would you be willing to pay for an organic food product.

We'd like you to pay attention to the following: Surveys have shown that usually consumers respond **differently in a questionnaire** and **ACT differently in reality**. It is very common to state a higher willingness to pay than what they are actually willing to pay.

We believe this is due to the fact that **it's very easy to overstate** willingness to pay, since no one has to actually buy the product in question. Please answer the willingness to pay question thinking that **right now you are in a super market** in which you intend to buy a product from this category.

We'd like to remind you that **by choosing to pay** to buy organic food, available income for buying other products **will be reduced**.

Please have these in mind when answering the next questions.