



Two experiments in one: How accounting for context matters for welfare estimates



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ABSTRACT

By combining two different types of experiments in one experimental session, this paper aims at understanding how different contexts may influence participants' choices. This paper focuses on one hybrid experimental session that mixed one voluntary contributions mechanism (VCM), influencing the indemnity received by participants, and one mechanism eliciting willingness to pay (WTP) for milk bottles with public and private attributes. The VCM shows relatively high levels of contributions that are mainly influenced by the positive expectations of participants about the average group contribution, rather than by the variations in the design of this mechanism and the period of experiments. The WTP for milk bottles are particularly sensitive to the order of mechanisms and to the period of experiments. Conversely, the WTP differences between milk bottles for a given round of information are invariant across the order of mechanisms and the period of experiments. For each bottle, the variations of WTP coming from the messages about private and public attributes are also stable over the order of mechanisms and the period of experiments. This confers validity to experiments for measuring WTP for public and private attributes related to food. In other words, these variations of WTP contribute to welfare estimates and are useful to evaluate market regulations focusing on public and/or private attributes.

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1. Introduction

Willingness to pay (WTP) for food are intensively used for estimating the impact of new product adoption or quality improvement, as well as for cost-benefit analyses. In particular, lab experiments elicit either WTP for private goods or contributions to a game with a public good. The lab context is useful for eliciting well-informed, thoughtful preferences. However, this advantage is hobbled by limitations stemming from the artificial environment and the limited number of products (or payoffs) at stake, while real-life choices are multi-tasks and imply quick decision under uncertainty, imperfect information, tasks overload and/or imperfect recall (see Levitt and List, 2007).¹ As underlined by behavioral

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¹ These criticisms explain the economists' efforts to turn to field experiments for understanding social choices under real-life contexts. However, Falk and Heckman (2009) mention that testing some complex theories or algorithms with field experiments is notoriously impossible, because people are influenced by too many incentives and parameters that renders the econometric estimations of field experiments hard to decipher.

economists, many factors may sway the determination of preferences, which potentially weakens the credibility of survey/lab results (see Ariely et al., 2003).

Despite these flaws, the lab allows a tight control of both environments and participants' actions (see Falk and Heckman, 2009; Kagel and Roth, 2000). This tight control is particularly precious for studying the stability of preferences. Extrapolations of experimental results for general explanations regarding behaviors are only possible, if elicited preferences are relatively stable, both across different contexts and over a period of time.²

When considering choices coming from the lab for a welfare analysis related to WTP, this is particularly important to understand what choices are invariant with respect to the design or the period of experiments. In particular, if choices are relatively similar with different samples of participants who represent the same population, extrapolations of experimental results to the whole population make sense for a consistent welfare analysis (Roosen and Marette, 2011). This acute question particularly

² Regarding general foundations in economics, Becker (1976) mentioned that "preferences are assumed not to change substantially over time".

matters with food, for which many experiments/surveys tackled controversial topics like Genetically Modified Organisms, pesticides use, animal cloning, meat substitutes, animal welfare, food safety, food security, food wasting, protection of resources or sustainability of crops...

This paper aims at precisely understanding how different designs and/or periods of time may influence or not participants' choices in the lab. This paper focuses on two successive experiments (or mechanisms) run in one session. Each hybrid experimental session combined one VCM influencing the indemnity received by participants, and one elicitation mechanism measuring WTP for private goods offered to participants. The VCM was a simplified game of voluntary provision to a threshold public good, leading to the possibility to increase the indemnity that participants could receive, if the percentage of contributors choosing to invest was higher than a contribution threshold. For eliciting WTP, we chose milk bottles from cows fed a diet without linseed and alternative milk bottles from cows fed a diet with linseed. Purchasing milk from cows fed a diet with linseed contributes to reduce methane emissions from cows (namely, a public attribute) and increase content in omega-3 polyunsaturated fatty acids in milk.³ Successive WTP for both products were elicited after successive messages on the impact of linseed.

We conducted the experiments in the same tasting room in Dijon, France, in April and November 2013. Different sessions allowed minor variations regarding some parameters of the VCM (threshold levels and/or money back conditions) and the order of the two different mechanisms, namely the VCM preceding the WTP elicitation and vice versa. With our between-subject design, the participants attending the April sessions were different from participants attending the November sessions, even if the *ex ante* criteria of recruitments for both periods were strictly similar. New participants in November allow us to guarantee the novelty of VCM and the novelty of messages on linseed preceding successive WTP elicitation. *A priori*, with samples of participants who represent the same population of a city like Dijon, the order of two mechanisms and/or the periods of sessions conducted a few months apart should not influence the choices, if preferences are stable.

Results are the following. The VCM shows a relatively high level of contributions that is mainly influenced by the positive expectations of participants about the average group contribution, rather than by variations in the design of this mechanism. The contributions to the VCM are invariant with the order of mechanisms and the period. The WTP for milk bottles are particularly sensitive to the orders of mechanisms and the periods of experiments. Conversely, the WTP differences between milk bottles for a given round of information are invariant across the order of mechanisms and the period of experiments. For each bottle, the variations of WTP coming from the messages about private and public attributes are also stable over the order of mechanisms and the period of experiments. When compared to regulatory costs, these variations of WTP can credibly contribute to evaluate market regulations focusing on public and/or private attributes. Eventually, econometric estimations show some positive links between the participants' contribution to the VCM and the WTP variations, coming from information about the public attribute related to greenhouse gases and linseed in milk, even this link is weak and not systematic.

By combining two different mechanisms in one unique and hybrid session, this paper differs from previous papers, only using

VCM for public goods, or only focusing on WTP for private goods. The possible influences between the two types of different mechanisms were overlooked by previous papers. To the best of our knowledge, this paper contains the first attempt to combine one VCM and one WTP elicitation mechanism for a private good with public and private attributes.

Our paper is mainly related to papers studying consistency and stability of preferences. Previous studies suggest opposite results when stability of preferences is studied. Regarding public goods experiments, Volk et al. (2012) find that cooperation preferences are very stable at the aggregate level, and, to a smaller degree, at the individual level.⁴ However, Brosig et al. (2007) found the opposite result, since they observe a decrease of cooperative behavior over time. Regarding valuation of environmental attributes with methods based on hypothetical choices, Loomis (1989), Bliem et al. (2012) and Brouwer (2012) tend to show stability of preferences, while Liebe et al. (2012) and Schaafsma et al. (2014) contest this stability of preferences. Regarding the WTP for private goods, Ariely et al. (2003) show that WTP, rather than being stable, are highly sensitive to irrelevant influences and “surprising” anchoring. Ariely et al. (2003) also underscore that WTP differences between two different bottles of wine vary a lot across subgroups of participants. Alfnes et al. (2011) also reject preference stability of WTP for private goods at the individual level, but not at the aggregate market level.

Our paper differs from these previous contributions by gathering all the previous dimensions in one experiment, namely the public good aspect with the VCM, the environmental/public attribute with the reduction of methane emissions, and the WTP for private goods with the bottles of milk.⁵ We also pay attention to an overlooked issue, namely the questions of the stability of WTP differences between products for a given round, and the variations of WTP for each product coming from information about public or private attributes.⁶ In our paper, these variations of WTP are invariant across the design and the period of experiments, which differs from Ariely et al. (2003) underlining large WTP differences between products, only for a single round of WTP determination. These questions were not studied by Alfnes et al. (2011).⁷

Our paper is also related to previous experiments studying public goods, including the threshold public goods (see for instance Cadsby and Maynes, 1999; Croson and Marks, 2000). Coats et al. (2009) show the positive impact of the refund of the investment if the threshold is not reached, a result that does not hold in our VCM in November. In our paper, the novelty also comes from the fact that the order of mechanisms and the period of the experiment do not influence the participants' contribution to the VCM.

This paper is organized as following. Both experiments are detailed in the next section. The third and fourth sections

⁴ Andersen et al. (2008) find stability in risk attitudes over a 17-month span.

⁵ Our paper also differs from previous studies on multiple public goods analyzed with several VCM. In particular, Moir (2006) and Bernasconi et al. (2009) show that contributions increase when public goods are split into two identical public goods (see also Falk et al., 2013; McCarter et al., 2013; Corazzini et al., 2013). Our approach differs by showing a weak link between the participants' contributions to the VCM and the variation of WTP for the public attribute related to greenhouse gases and linseed in milk. As these two mechanisms are not similar, participants disconnect their contribution to each mechanism.

⁶ Our study also contributes to the literature on global warming and climate change, by focusing on consumers' choices between two foods related to climate mitigation, via a reduction in methane emissions. This differs from a recent public-good experiment made by Hasson et al. (2010), in which mitigation of greenhouse gases is viewed as a public good and adaptation to climate change is viewed as a private good, but without any reference to existing products sold in supermarkets. Conversely, we focus on real bottles of milk.

⁷ This is also related to the Lusk's and Schroeder's (2004) result, showing that marginal WTP for a change in quality/characteristic with food is not statistically different across hypothetical and real payment settings (see also Taylor et al., 2010).

³ According the Kotchen's definition, milk can be seen as an “impure public good” generating numerous private attributes like the taste, the nutrition, the long-term health impact (...), and a few environmental public attributes related to greenhouse gas emissions and other environmental pollution coming from cows (see Kotchen, 2005).

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