



Consequences of Participant Inattention with an Application to Carbon Taxes for Meat Products



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ABSTRACT

Despite widespread use in nonmarket valuation, data quality remains an ongoing challenge for survey methods. One key concern is whether participants attentively respond to survey questions or whether they exert less than full effort. To determine the prevalence and consequences of inattention bias in surveys, we estimate how meat demand varies across people who do and do not miss trap questions. Using a split-sample design with discrete choice experiments for meat products, we explore three different trap questions to determine how many potentially inattentive respondents are identified by each method. We find that individuals who miss trap questions respond differently to the choice experiment than individuals who correctly answer the trap question. Inattention generates vastly different compensating variation estimates of a carbon tax, ranging from 3.56 cents per meal choice for the least attentive to 6.13 cents per meal choice for the most attentive.

While conducting research at the Bank of England, British economist Josiah Stamp (1929; pp. 258–259) bluntly explained his worries regarding measurement error. Namely, he was concerned that “...every one of these figures comes in the first instance from the village watchman, who just puts down what he damn pleases.” Stamp’s message is even more resounding today as survey quality is thought to be declining (Curtin et al., 2005; Meyer et al., 2015). Participant attention is a scarce resource, so it can be rational for a respondent to inattentively complete a survey. Responding to a survey requires a non-trivial amount of attention and yields little monetary reward. The payment received is often independent of response quality, separating the effort required to think about answers on a survey from the incentive to return a completed survey. Consequently, survey methods can lead to ill-considered selections, as the participant is concerned with the minimum amount of effort required to finish the survey.

It should come as no surprise that ill-considered choices can have consequences for economic inferences and policy recommendations. Until recently, however, little research has been conducted to determine who is actually paying attention, and how inattention might bias parameter estimates in economic research. For the past decade, some social scientists have identified a concern regarding survey quality in the form of attribute non-attendance in discrete choice experiments. Where that literature seeks to determine the attributes most

important to a survey participant, we focus on the broader topic of participant inattention relevant to all types of survey valuation approaches not just to single attributes within a single survey design. By using “trap questions” (TQ) designated to identify potentially inattentive participants, we seek to catch both rapid responders and indecisive participants.¹ Specifically, we compare failure rates associated with three trap questions most commonly used in the psychology and political science literature. The trap questions instruct a participant to ignore the response format and select a specific answer. We employ this type of trap question relative to alternatives because an incorrect response is binary; there is no debate as to what the correct response should have been. As such, incorrect responses are generally considered in the psychology literature to signal participant inattention (Berinsky et al., 2014; Oppenheimer et al., 2009).

The overall contributions of this article are threefold. Most generally, (1) we identify the implications of inattentive behavior for survey research. As such, (2) we empirically test the effectiveness of three commonly used trap questions in identifying inattention. We find that each version has the potential to “trap” different numbers of people, and that some questions work better than others at identifying potential inattention. Finally, (3) we discuss what the findings suggest for future policy-relevant research by comparing compensating variation estimates of a carbon tax based on those who correctly and

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¹ Trap questions are synonymous with “validation” or “red herring” questions, and are sometimes referred to as Instructional Manipulation Checks (IMC’s). For consistency and clarity, we refer to them throughout as trap questions.

incorrectly responded to the TQ. We frame our discussion within results from an online survey of U.S. meat consumers. Our findings suggest that participant inattention can substantially bias parameter estimates and subsequent policy recommendations. The remainder of this paper is organized as follows. In the following section, we discuss prior research and the various methods previously used to identify inattention bias. Then, we describe our methods and results. The final section concludes with a brief review of our findings and suggestions for future research.

1. Background

Research in other disciplines has explored a variety of methods for identifying inattention to a survey, with some approaches working better than others (Curran, 2016; DeSimone et al., 2015). For example, it might be that excessively selecting “I don't know” actually reflects greater honesty rather than participant inattention (Baker et al., 2010). A more popular option might be equating respondent attention with the time the respondent took to complete the survey, and in fact, recent research indicates that faster responses lead to more random survey responses (Börger, 2016). Unfortunately, time-to-complete only identifies participants who respond to a survey quickly, and would miss participants who take a normal amount of time, yet do not attentively respond to questions. Indeed, in this study we show that completion time is uncorrelated with missing two of the three trap questions.

Survey researchers have recently begun utilizing a new method for detecting potentially inattentive participants. This method is relatively simple: embed an instruction inside a question. For example, one item in a list of agree-disagree questions might simply ask the respondent to “check strongly agree.” A key benefit to trap questions relative to alternatives is that an incorrect response is binary; there is no debate as to what the correct response should have been. Between a third and a half of respondents from national samples have been found to fail these simple tests (Berinsky et al., 2014), often resulting in a reduction in statistical power for the questions of interest when potentially inattentive respondents are included (Oppenheimer et al., 2009). The participants who miss these questions have the potential to bias policy-relevant outcomes, making their answers of particular interest to researchers who conduct research with primary data (Miura and Kobayashi, 2016). Only recently have trap questions been applied to participant inattention in economic surveys and choice experiments. Participants who miss trap questions have been found to exhibit significantly different willingness-to-pay for attribute changes in choice experiments (Gao et al., 2015). Additionally, participants who incorrectly answer a simple trap question before a choice experiment are more likely to violate axioms of revealed preferences (Jones et al., 2015; Gao et al., 2016).

Instead of focusing on the broad concept of inattention bias, most of the choice experiment literature has focused on the inattention specific to a specific attribute. Generally, this attribute non-attendance (ANA) literature argues that participants inattentively respond to parts of the choice question, and instead focus on only a few of the choice attributes (Colombo et al., 2013). Some researchers argue that this might occur because the participant has little to no actual preference for the non-attended attribute (Alemu et al., 2013; Campbell et al., 2011). Most studies focus on one of two methods for determining which attributes were left unattended: either the participant explicitly identifies which attributes were considered or the researcher uses a restricted latent class logit model to infer the probability each attribute was considered (Scarpa et al., 2013). Some evidence indicates that participants might not be able to explicitly identify which attributes were considered, making the *ex post* “inferred” method more accurate (Kragt, 2013). These studies rely on using answers to the choice experiment itself to identify inattentive respondents. While this is a worthwhile effort, it is difficult to know whether ANA arises from preferences (i.e., a participant does not care about a particular attribute) or true inattention. We identify inattention with questions asked outside the choice experiment

where it is unambiguous as to what is being measured. Thus, our method is more general than the choice experiment itself and can be used in a variety of survey approaches including those related to contingent valuation or the travel cost method.

2. Data and Methods

A growing body of literature has raised concerns regarding inattention in primary data analysis. Previous studies, however, fail to provide much information on the effectiveness of different types of traps. We show that some trap questions work better than others at identifying inattention bias. In this study, we compare the effectiveness of three different questions with varying levels of complexity.

2.1. Data

Data were collected in online surveys in October 2014, February 2015, and January 2016, each with at least 1000 respondents where the population of interest was U.S. consumers. The internet survey was administered to a panel maintained by Survey Sampling, Inc., who pays participants in points or other means worth roughly \$1.50 to complete the survey. A key contribution of this study is that it tests the effectiveness of three different versions of trap questions commonly utilized in the literature (Fig. 1). Our first trap question is the most basic as it does not disguise the correct response at all, but instead is designed as a standalone question that directs participants to check a box. The first trap question we test is formatted as a simple, standalone question: “If you live in the U.S., select ‘Strongly Agree.’” Because participants for this study are from the United States, “Strongly Agree” is the only correct answer. The second trap question takes that simple direction and embeds it inside a Likert-type scale with multiple items in which participants are more likely to straight-line. We embed the first trap question into a nine-item scale with eight other items, where we instruct participants to select “Not Safe at All.” The correct answer is that which corresponds best with the instruction, which in this case is “Very Unsafe.” Because of the additional cognitive requirement for a correct response, we hypothesize that a larger portion of participants will incorrectly respond to this trap question as compared to the standalone short trap question. For the final trap question, we embed the real instructions in a paragraph. Simply reading the first and last few sentences would direct participants to answer the question based on their mood, but fully reading the instructions in the question would notify attentive participants to select “none of the above.” Because of the length of the directions, we hypothesize that this style of question will “trap” the most potentially inattentive participants.²

It is possible that asking participants a trap question might illicit protest-like or other adverse behavior in the following portion of the survey (Oppenheimer et al., 2009). To avoid this potential confound, participants were asked the trap question *after* the choice questions. Therefore, there is no chance that the trap question could alter responses for any of the choice experiment questions. The short version of the trap question was included in the February survey. The embedded short version of the trap question was included in the January survey. Finally, the longer version of the trap question was included in the October survey.

In the choice experiment (CE) portion of the survey, participants are asked to choose between nine randomly ordered options (two beef, two pork, two chicken, two non-meat alternatives, and a “none” option) for nine varying choice combinations where the product is uncorrelated with the price, i.e. a main effects orthogonal fraction factorial design.

² Simply stating that missing a more complex trap question is akin to saying that higher hurdles on a track more accurately identifies who can jump hurdles. Because we are assuming that participant inattention is an underlying latent characteristic embedded within the data, we varied the complexity of the trap questions in an effort to potentially trap different inattentive subsections of our sample.

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