REWARDING TRUTHFUL-TELLING IN STATED PREFERENCE STUDIES

Pierre-Alexandre Mahieu
University of Nantes, France

Jordan Louviere
University of South Australia, Australia

Romain Crastes
University of Leeds, United Kingdom

Ewa Zawojska
University of Warsaw, Poland

ezawojska@wne.uw.edu.pl

Stated preference methods

- Used to determine public's preferences, especially towards non-market goods
- Survey-based – in specially designed surveys respondents state what they would do
- Important for cost-benefit analysis – allow to estimate the benefits
- Flexible – enable valuation of hypothetical states

Stated preference methods

- Used to determine public's preferences, especially towards non-market goods
- Survey-based – in specially designed surveys respondents state what they would do
- Important for cost-benefit analysis – allow to estimate the benefits
- Flexible – enable valuation of hypothetical states

BUT much scepticism whether survey responses reflect actual preferences

- Surveys are often hypothetical
- Empirical evidence on hypothetical bias

Stated preference methods

- Used to determine public's preferences, especially towards non-market goods
- Survey-based – in specially designed surveys respondents state what they would do
- Important for cost-benefit analysis – allow to estimate the benefits
- Flexible – enable valuation of hypothetical states

BUT much scepticism whether survey responses reflect actual preferences

- Surveys are often hypothetical
- Empirical evidence on hypothetical bias

How to incentivise respondents to answer truthfully in surveys?

Conditions for truthful preference disclosure

Carson and Groves 2007, Carson et al. 2014

1. Respondents understand and answer the question being asked.
2. The survey is seen as a take-it-or-leave-it offer.
3. The survey involves a yes-no answer on a single project.
   (the Gibbard-Satterthwaite theorem)
4. The authority can enforce the payment (coercive payment).
5. The survey is perceived as consequential:
   - Respondents care about the good being valued.
   - Respondents believe that their responses affect the finally introduced policy.

Conditions for truthful preference disclosure

Carson and Groves 2007, Carson et al. 2014

1. Respondents understand and answer the question being asked.
2. The survey is seen as a take-it-or-leave-it offer.
3. The survey involves a yes-no answer on a single project.
   (the Gibbard-Satterthwaite theorem)
4. The authority can enforce the payment (coercive payment).
5. The survey is perceived as consequential:
   - Respondents care about the good being valued.
   - Respondents believe that their responses affect the finally introduced policy.

- **Very restrictive**
- **Limit efficiency – a single binary question**

Conditions for truthful preference disclosure

Carson and Groves 2007, Carson et al. 2014

1. Respondents understand and answer the question being asked.
2. The survey is seen as a take-it-or-leave-it offer.
3. The survey involves a yes-no answer on a single project.
   (the Gibbard-Satterthwaite theorem)
4. The authority can enforce the payment (coercive payment).
5. The survey is perceived as consequential:
   - Respondents care about the good being valued.
   - Respondents believe that their responses affect the finally introduced policy.

Recently developed for other formats

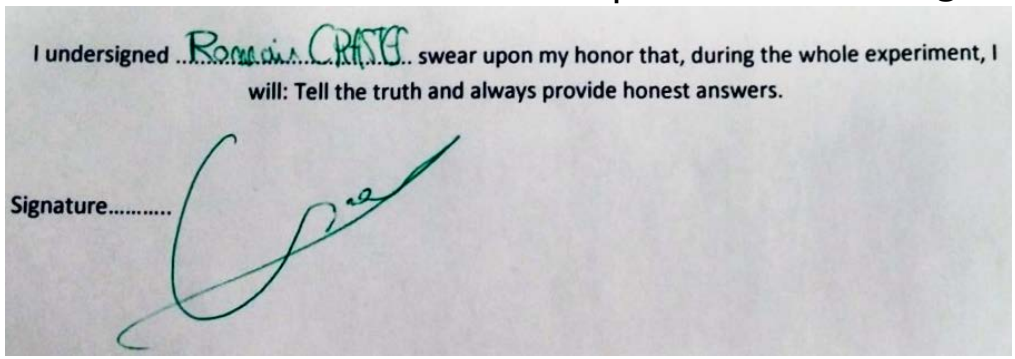
- A sequence of questions – Vossler et al. 2012
- Open-ended format – Holladay and Vossler 2016

But additional conditions are imposed – even more restrictions

As it is difficult to meet the conditions…

Alternative approaches

- Cheap talk – scripts informing about hypothetical bias (Cummings and Taylor 1999)
- Oath – respondents swear to tell the truth (Jacquemet et al. 2013)



- Honesty priming – respondents complete a task involving honesty and truthfulness concepts (De-Magistris et al. 2013)
- Repetitive reminder about an opt-out / status quo option (Ladenburg and Olsen 2014)

- All of them are not grounded in economic theory.
- Theoretically, no difference is expected in the behaviors of respondents who answer surveys with and without any of the approaches.

Alternative approaches – limitations

- Lack of economic-based incentives
- Emphasise the hypothetical nature of the survey
- Mixed evidence on the effectiveness of the approaches

We propose a new tool to increase reliability of stated preference surveys.

Our approach

Lie detection
Information for the researcher

+

Monetary reward for respondents who answer truthfully
Economic-based incentives

Our study

- Laboratory, computer-based experiment
- In February 2015, in Nantes, France
- Reforestation programme in Senegal and Peru
- Planted trees would help restore eroded lands (Restoration) or mitigate ongoing erosion (Protection)

	Programme 1	**Programme 2**	**None of the programmes**
Online information	No	Yes	
Ecosystem service	Protection	Restoration	
Country	Senegal	Peru	
Price to plant a tree	2 €	15 €	
Your choice	□	□	□

Regular update with photos and e-mails about the project

2, 5, 10, 15 €

- 16 choice tasks per respondent
- 424 undergraduate students

Our study – three treatments

Baseline
146 participants

Oath
137 participants
Asked to sign a form to swear to tell the truth

Lie detection
141 participants
Pulse measurement with an oximeter; Those suspected of lying excluded from the monetary reward

Reward for participation: a lottery at the end of the experiment
in which one participant wins a gift voucher of 50 €

The treatments – additional remarks

- No significant differences in socio-demographics (gender, age, income) across treatments.
- Nobody refused to use the oximeter or to sign the oath form.
- Four participants suspected of lying were excluded.
- Lie detection based on:
  - always choosing Programme 1 or Programme 2,
  - taking very little time to complete the survey,
  - extremely high cardiac pulse rates.
- We excluded participants only when we had strong doubts.

Modelling approach

- Based on the random utility framework (McFadden 1974)
- Utility of consumer *n* from choosing alternative *j* in choice task *t* (U_{njt}):

$$U_{njt} = \alpha c_{njt} + bX_{njt} + e_{njt}$$

monetary attribute

non-monetary attributes

error term (deviations from the mean parameters estimates)

- A consumer derives utility from: observable characteristics of the good and unobservable factors (random component)

- Our goal to examine the effects of oath and lie detection on:
  - Preferences – the coefficient of the cost attribute
  - Randomness of respondents' choices – the variance of the error term (scale)

Modelling approach

- Respondents were asked to report their level of stress when completing the survey. (from 1 to 10)
- In lie detection, respondents were asked to state how credible they think the device is. (from 1 to 10)

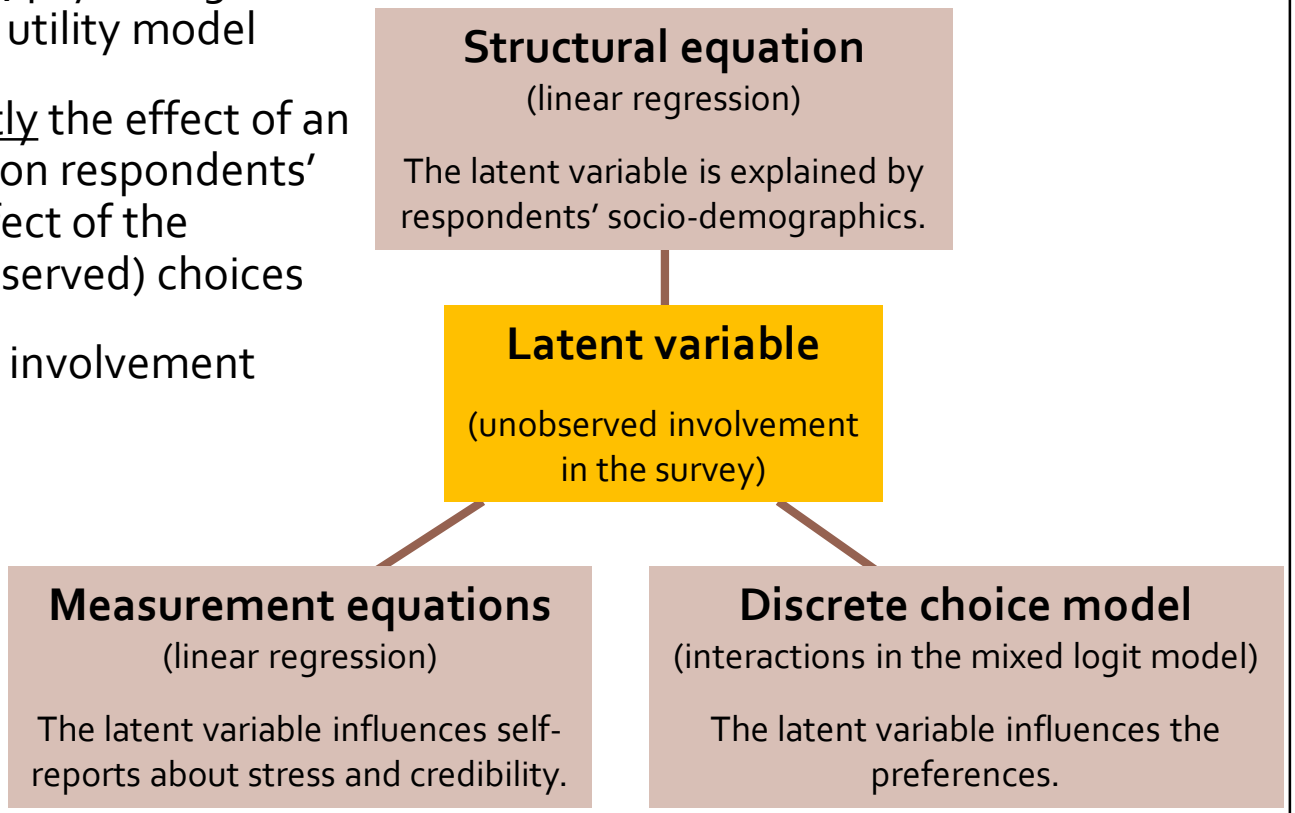
- These two aspects are indicators of respondent's (unobservable) engagement.
- They may affect stated preferences.
- They may also be affected by the treatment itself.

- Thus, we estimate a hybrid choice model.

Modelling approach

Hybrid Choice Model

- Incorporate perceptions, psychological factors into the random utility model
- Enable to model explicitly the effect of an experimental condition on respondents' perceptions, and the effect of the perceptions on their (observed) choices
- A psychological factor – involvement in the survey



- All equations are estimated simultaneously

Measurement equations

- Dependent variables (continuous):
  - Indicator of experienced stress
  - Indicator of perceived credibility of lie detection

} Both affected by latent involvement in a survey

- The likelihood for the indicators of stress is $L_{I_{stress}} = \phi\left[\frac{(\alpha - \beta_{stress} * LV)}{\sigma_{stress}}\right]$ and σ_{stress} and ζ_{stress} are estimated.

	Coeff.	St. Err.	
β_{stress}	0.1041	0.0871	
σ_{stress}	1.7886	0.0710	***
$\beta_{credibility}$	1.5307	0.2430	***
$\sigma_{credibility}$	3.0132	0.2873	***

*** - Significance at the 1% level.

- Latent involvement in the survey is positively correlated with self-reported measures of the credibility of lie detection.
- No significant relationship between involvement in the survey and stress – difficult to measure stress.

Structural equation

- Dependent variable: Involvement in the survey (latent variable, LV)

	Coeff.	St. Err.	
Age	0.1471	0.0734	**
Age²	0.0121	0.0041	***
Female	1.0650	0.3544	***
Income	-1.6361	1.0105	
Income²	5.9715	1.8707	***

***, ** - Significance at the 1% and 5% levels, respectively.

- Individual's socio-demographics influence unobservable involvement in the survey.

Discrete choice model

Random parameters model with scale covariates

Preference parameters

	Coeff.	St. Err.	
Status quo	-5.2782	0.8464	***
Online	0.7684	0.0775	***
Restoration	-0.0549	0.0875	
Senegal	0.0215	0.0546	
Price	-0.1774	0.0215	***
Price x Oath	-0.1341	0.0913	
Price x Oath x LV	0.0961	0.0476	**
Price x Lie det.	-0.1190	0.0377	***
Price x Lie det. x LV	0.0452	0.0188	**

***, ** - Significance at the 1% and 5% levels, respectively.

Covariates of scale

	Coeff.	St. Err.	
Oath	0.4681	0.5676	
Lie detection	-0.7413	0.1911	***
Oath x LV	-0.3184	0.3528	
Lie detection x LV	0.8908	0.3039	***

On average, less uncertainty / randomness in respondents' choices in lie detection when combined with involvement in the survey

Discrete choice model

Random parameters model with scale covariates

Preference parameters

	Coeff.	St. Err.	
Status quo	-5.2782	0.8464	***
Online	0.7684	0.0775	***
Restoration	-0.0549	0.0875	
Senegal	0.0215	0.0546	
Price	-0.1774	0.0215	***
Price x Oath	-0.1341	0.0913	
Price x Oath x LV	0.0961	0.0476	**
Price x Lie det.	-0.1190	0.0377	***
Price x Lie det. x LV	0.0452	0.0188	**

***, ** - Significance at the 1% and 5% levels, respectively.

Covariates of scale

	Coeff.	St. Err.	
Oath	0.4681	0.5676	
Lie detection	-0.7413	0.1911	***
Oath x LV	-0.3184	0.3528	
Lie detection x LV	0.8908	0.3039	***

- Lower willingess to pay in lie detection – smaller hypothetical bias?
- Involvement in a survey increases willingness to pay

Conclusions

- Rewarding truthfulness :
  - 1) Based on economic theory
  - 2) Easy to implement
  - 3) Not indifferent to respondents

- How does it affect respondents' choices?
  - Lower randomness
  - Lower willingness to pay values

  } More considered responses?

- Possible limitations
  - People react differently when they know that they are observed
  - Some respondents doubted the effectiveness of lie detection
  - Respondents may want to comply with researchers' expectations

REWARDING TRUTHFUL-TELLING IN STATED PREFERENCE STUDIES

Ewa Zawojska
ezawojska@wne.uw.edu.pl