

Rewarding truthful-telling in stated preference studies



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Presentation outline

- Context
 - Why would respondents lie?
- Methods
 - How do you prevent people from lying?
- Results and discussion
 - Does it work?

Consequentiality

- Environmental goods are often public goods:
Why would I pay? People can pay for me!.
- Hypothetical bias
why should I bother? It won't happen anyway
- People may just not care:
My vote doesn't matter

Consequentiality

- Two situations:

- **Consequential** : People will try to manipulate the outcome of the study

An open-ended request for willingness to pay compensation invites strategic overstatements (p20, NOAA Panel report)

- **Inconsequential** : People will not care about the survey

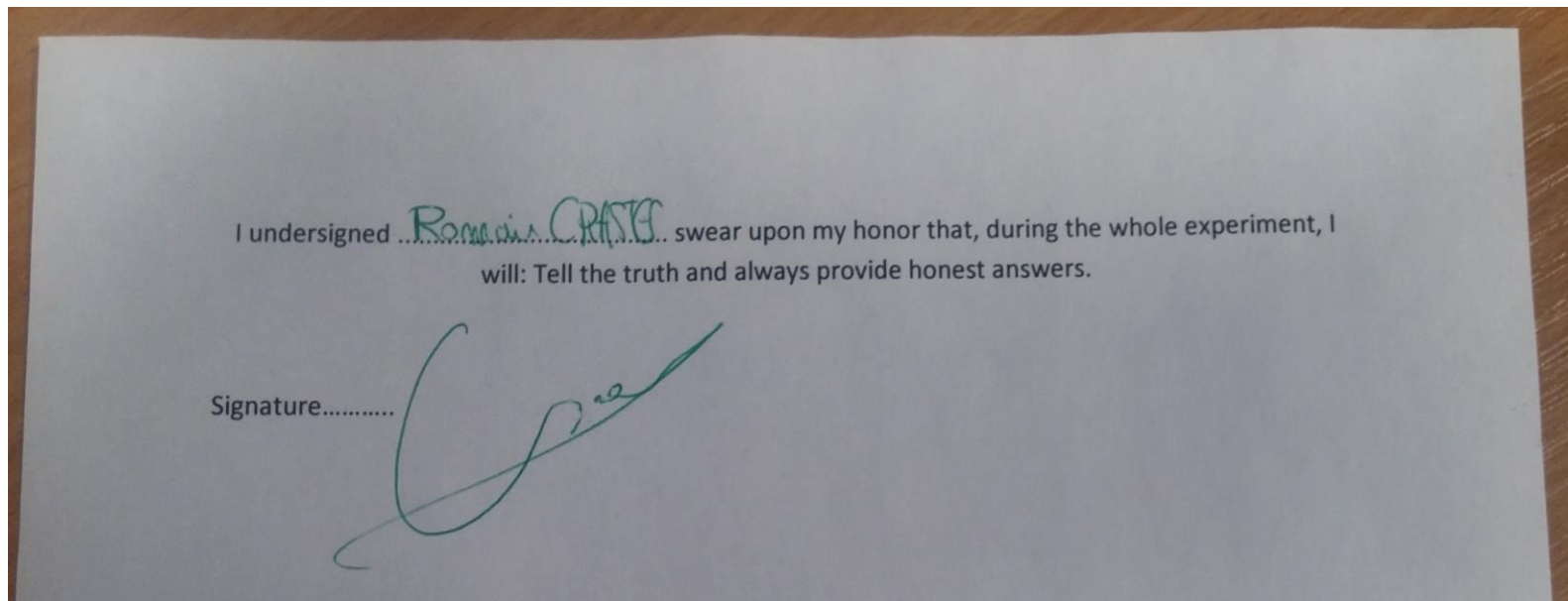
They can respond in a random way (minimize effort) or decide to overestimate their WTP to please interviewer, themselves (e.g., warm glow), etc...

Incentive compatibility

- Carson and Groves (2007):
- Two main conditions for truthful responses
 - Condition 1: Consequential
 - Condition 2: Dichotomous choice
- Very restrictive.
 - What about other survey formats
 - What about non-consequential surveys?
- How to make other survey formats **incentive compatible** in consequential and non consequential surveys?

Getting the truth – the oath

- Respondents must sign a piece of paper at the beginning of the survey where they swear they will tell the truth (Jacquemet *et al.*, 2013)



Getting the truth – The 10 commandments and chit chats

- Respondents must recall scriptural ethical guidelines about lying (Mazar *et al.*, 2008; Lim *et al.*, 2015)



Getting the truth - Limits

Biases

- Stresses the hypothetical nature of the survey
- Remind people that they can potentially act strategically

Lack of incentives

- People receive no benefits if they tell the truth
- People do not get punished if they lie

In this study, we propose one new tools to improve the reliability of NMV survey

The lie detector



The (real) lie detector



Method

We propose one new approach for inciting people to tell the truth

1)




2) A special device is employed.



If we have any doubt about the sincerity of your responses, you will not receive anything for participating in the survey

Lie detector versus oath

- 424 students were surveyed
- Students were asked to complete the survey by themselves using computers under the supervision of a researcher
- Real world program about reforestation: The logo for reforestACTION features a stylized green tree icon above the text "reforestACTION" in a bold, sans-serif font. Below this, the tagline "AGIR ENSEMBLE POUR L'HOMME & L'ENVIRONNEMENT" is written in a smaller, all-caps font.
- Respondent were invited to enter a prize draw at the end of the survey (€50 voucher). Respondents suspected of lying were told they would be excluded from the prize draw (lie detector group only)

Experimental design

	Description	Level
Country	The tree is planted in Senegal or in Peru	Senegal Peru
Online information	Donors are regularly updated with photos, mails, etc, about the project	Yes No
Ecosystem services	The project provides restoration or conservation of lands	Conservation Restauration
Cost	The price to plant a tree is	2, 5, 10, 15 EUR

Experimental design

1 -Choix 1/16	Programme 1	Programme 2	Aucun programme
Suivi en ligne	Non	Oui	ANNULER
Service écologique	Protection	Protection	VALIDER
Pays	Sénégal	Pérou	
Prix	2 €	15 €	
Je choisis le programme:	1	2	3 AUCUN

- 16 choice tasks
- 4 real choice attributes
- Main effect fractional factorial design
- 3 groups of respondents
- Control (n=146)
- Oath (n=137)
- Lie detector (n = 141)

Modelling approach

- 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)
- 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.

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	**
Age ²	0.0121	0.0041	***
Female	1.0650	0.3544	***
Income	-1.6361	1.0105	
Income ²	5.9715	1.8707	***

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

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

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	**

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

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

Discrete choice model

Random parameters model with scale covariates

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

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

Discrete choice model

Random parameters model with scale covariates

Random heterogeneity in preferences			
Variance covariance matrix			
<i>online</i>	0.6355	0.1142	***
<i>ecosystem * online</i>	0.0977	0.0526	*
<i>ecosystem</i>	0.6605	0.0837	***
<i>country * online</i>	-0.0748	0.0859	
<i>country * ecosystem</i>	-0.1879	0.0855	**
<i>country</i>	0.4232	0.0785	***
<i>asc * online</i>	0.3148	0.9899	
<i>asc * ecosystem</i>	0.2465	1.2889	
<i>asc * country</i>	-0.3354	0.3121	
<i>asc</i>	3.2219	0.3266	***

Conclusion

- “Lie detection” is easy to implement
- Doesn't take extra time. The cost is marginal too.
- It has significant effect on respondent's behaviour and welfare estimates:
 - Higher scale
 - Lower WTP
 - Better consideration of the budget constraint

Conclusion

- “Lie detection” allows to provide incentives to respondents to answer truthfully
- Some limits:
 - People react differently when they know that they are observed
 - Some people doubted the effectiveness of lie detection
 - People may be tempted to reply in a way that is consistent with researchers’ expectations
 - Can lie detection affect WTP certainty?