Behavioral Environmental Economics & Nudges: Using Non-market Commitment to Improve Choice Experiments

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ACES

Introduction

- Stated preference methods - a popular tool to value non-market goods such as environmental quality, reduced risks to life and limb, recreation, ...

- Questions remains how reliable answers to hypothetical surveys are as a measure of reality. Well-designed DCE surveys can do a reasonable job of predicting actual behavior ?? $\implies$ usual
- response : external / predictive ability
  Predictive validity leaves open the question of the ability of DCE to measure and convert behavior into the money metrics commonly
- used in cost-benefit analysis (CBA).
  But understanding the behavior at work in a DCE requires more control than can be delivered in the field $\implies$ back into the lab to
- gain this control with an induced values design.

Induced value Discrete Choice Experiment : Design

- Induce preferences for multi-attribute laboratory good (a Token)
- Discrete attributes associated with monetary values, and combined to generate alternatives:

- Best choice for a subject is to buy the token with the highest profit in each choice set, i.e., the token in which the difference between the value (sum of attribute levels) and cost is greatest (c= 2, 3 or 4 pounds)

Induced value Discrete Choice Experiments : Sample and setting

We replicate a typical DCE task in the lab (in z-tree software)

- Subjects make 9 choices (choices sets defined based on a factorial design):

Choice task

Subjects are offered two tokens, and can choose either to buy one of the two tokens to sell back to us later, or to buy no token at all.

- Same choices but in a randomised order
- Students from University of Aberdeen - 327 subjects (24 sessions) in 7 experiments.

Experiment 1 (Baseline): Hypothetical choices

- Subjects' choices are hypothetical as in a DCE survey (Subjects are paid 12 pounds for taking part in the experiment irrespective of the choices they make)
- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	Hyp. $n = 47$ (%)
A	5.5	6.5	1	14.9
B	2.5	9.5	7	38.3
C	3.5	8	4.5	14.9
D	-0.5	7	7.5	76.5
E	8	3	5	72.3
F	4.5	3	1.5	72.3
G	6	4	2	74.4
H	3	0.5	2.5	68.1
I	8	1	7	74.4
Overall (%)				**56.3%**

Experiment 1 : Proportion of payoff maximizing choices by subject


(a) Baseline
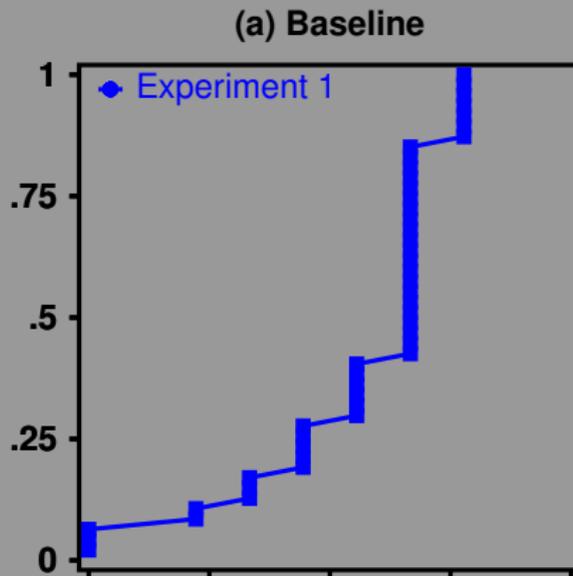
Experiment 2 (Calc): DCE with the help of a calculator

- Subjects are provided with a computerized calculator to help them make the calculations (choices are hypothetical)
- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	Calc $n = 47$ (%)
A	5.5	6.5	1	4.3
B	2.5	9.5	7	36.9
C	3.5	8	4.5	10.0
D	-0.5	7	7.5	78.3
E	8	3	5	80.4
F	4.5	3	1.5	80.4
G	6	4	2	84.8
H	3	0.5	2.5	82.6
I	8	1	7	93.5
Overall (%)				**59.9%**

Experiment 2 : Proportion of payoff maximizing choices by subject

(b) Baseline & calculator

Experiment 1
Experiment 2

Payoff maximazing choices (%)
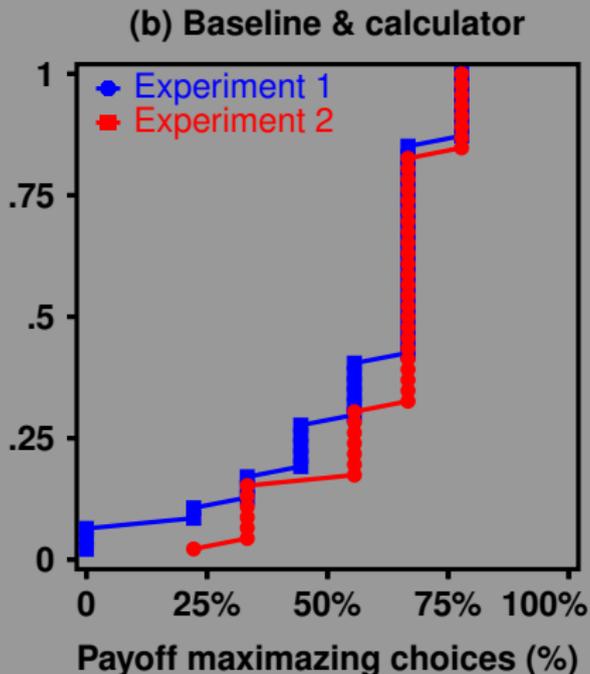
Experiment 2: Use of the calculator
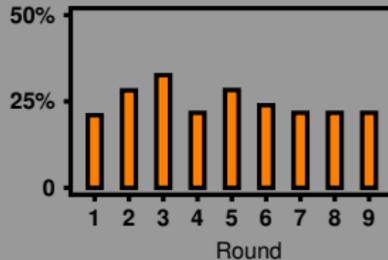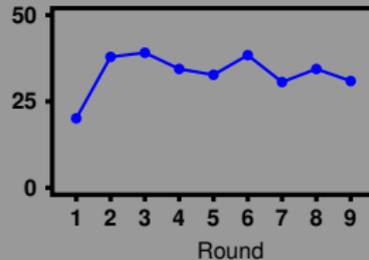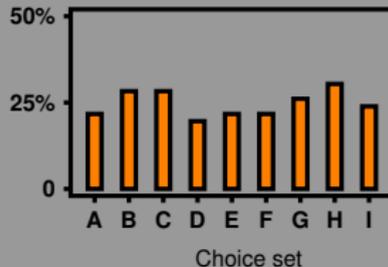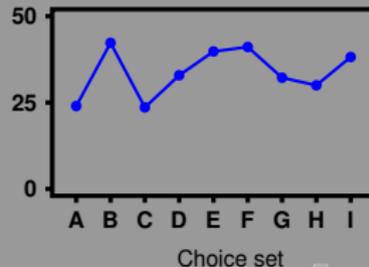
Experiment 3: Monetary incentives

- We pay subjects based on the choices that they make in the experiment (At the end of the experiment, one of the subject's nine choice tasks is selected at random to be binding).
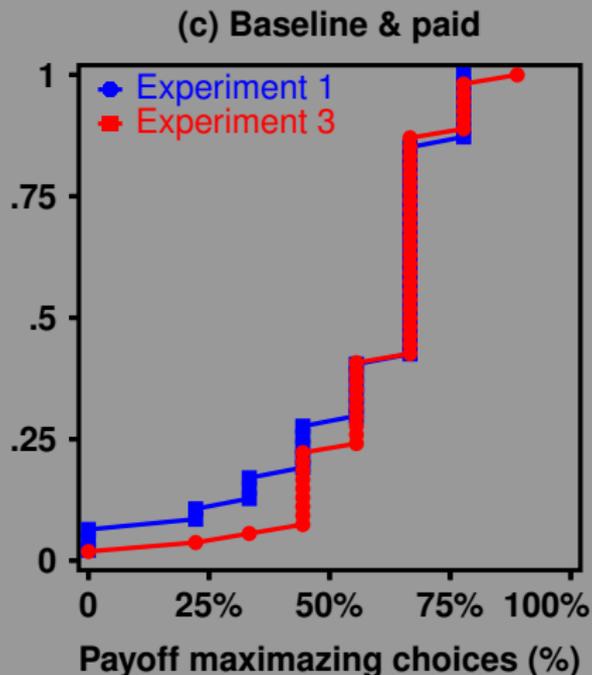- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	Paid $n = 54$ (%)
A	5.5	6.5	1	5
B	2.5	9.5	7	33.3
C	3.5	8	4.5	27.7
D	-0.5	7	7.5	85.2
E	8	3	5	74.1
F	4.5	3	1.5	74.1
G	6	4	2	81.5
H	3	0.5	2.5	79.6
I	8	1	7	74.1
Overall (%)				**59.9%**

Experiment 3 : Proportion of payoff maximizing choices by subject

(c) Baseline & paid

Experiment 1

Experiment 3

Payoff maximazing choices (%)

Experiment 4 (Paid + calc)

- We pay subjects based on the choices that they make in the experiment + we provide a calculator
- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	Paid + calc $n = 54$ (%)
A	5.5	6.5	1	5.2
B	2.5	9.5	7	30.8
C	3.5	8	4.5	10.3
D	-0.5	7	7.5	87.1
E	8	3	5	84.6
F	4.5	3	1.5	89.7
G	6	4	2	94.9
H	3	0.5	2.5	87.2
I	8	1	7	94.9
Overall (%)				**64.9%**

Experiment 4 : Proportion of payoff maximizing choices by subject

(d) Baseline & paid + calc.
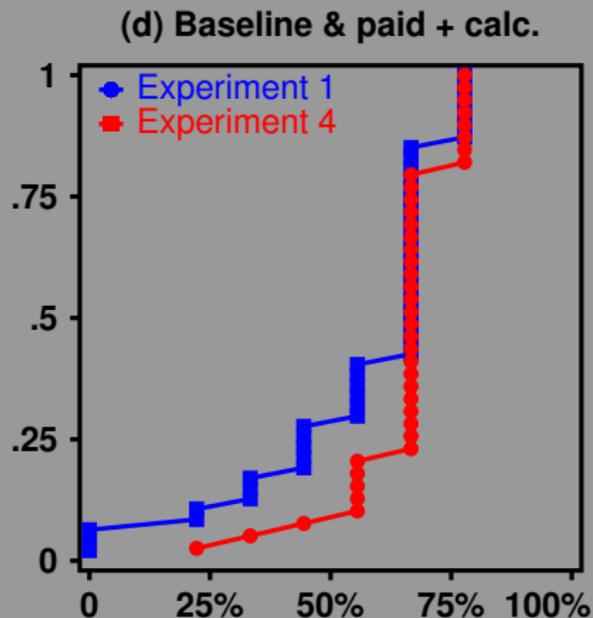
Experiment 5: Truth-telling oath

- We implement a non-priced commitment device - a truth-telling oath - in an hypothetical setting similar to experiment 1.
- Social psychology of commitment (Kiesler, 1971; Beauvois and Joule, 1998):
    - Commitment is the binding of the individual to behavioral acts $\Rightarrow$ behavior induces behavior.
    - Oath is an extreme form of commitment
- Empirical evidence in social psychology on verbal and written engagements (Kulik and Carlino, 1987; Joule et al. 2007a, 2007b) and in economics on promises (Ellingsen and Johannesson, 2004; Charness and Dufwenberg, 2006; Vanberg, 2008)
- Commitment is stronger when done freely, written down and signed.

Oath procedure

- Subjects called one by one to private desk;
- Each subject is proposed to sign a truth-telling oath before entering the lab
- <u>Oath form</u>: entitled "Solemn oath", asks "to swear that, during the whole experiment, she will **tell the truth and always provide honest answers**"
- Subjects are told signing is free, participation and earnings are not conditional on signing;
- Thanked whatever the decision;
- Subject then enters the lab;
- No peer effects: Waiting subjects – in the lab or before their turn – could neither see nor hear what happened at the oath-desk.

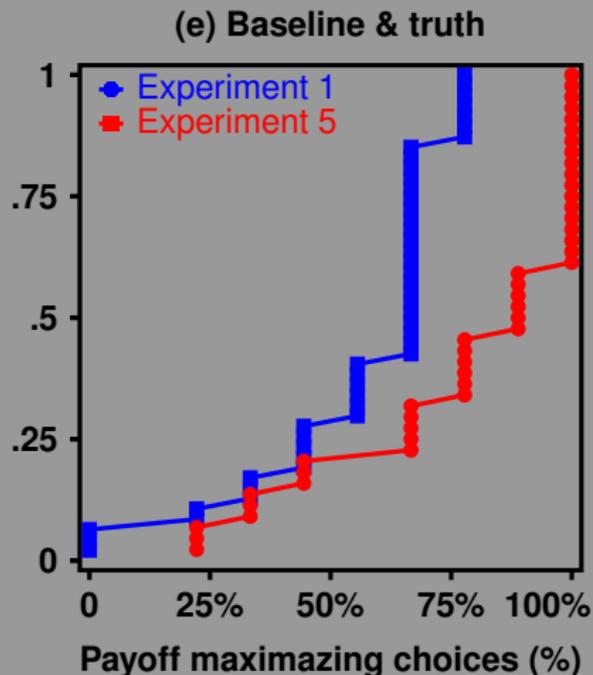# Oath form

Experiment 5 (truth-telling oath)

- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	truth-telling oath $n = 54$ (%)
A	5.5	6.5	1	59.1
B	2.5	9.5	7	86.4
C	3.5	8	4.5	84.1
D	-0.5	7	7.5	90.9
E	8	3	5	77.3
F	4.5	3	1.5	65.9
G	6	4	2	81.8
H	3	0.5	2.5	77.3
I	8	1	7	79.5
Overall (%)				**78.3%**

Experiment 5 : Proportion of payoff maximizing choices by subject

(e) Baseline & truth

Legend: Experiment 1, Experiment 5

Payoff maximazing choices (%)

Experiment 6 (Oath on task)

- We implement a modified oath that targets cognitive effort.

- This allows us to test whether the truth-telling oath works by fostering cognitive reasoning.

- Experiment 6 replicates experiment 5, but with a modified oath form that explicitly targets cognitive effort without referring to truth-telling behavior:

Oath on task:

"I, ..., the undersigned do solemnly swear that during the entire experiment, I will **faithfully and conscientiously fulfil the tasks that I am asked to complete to the best of my skill and knowledge**"
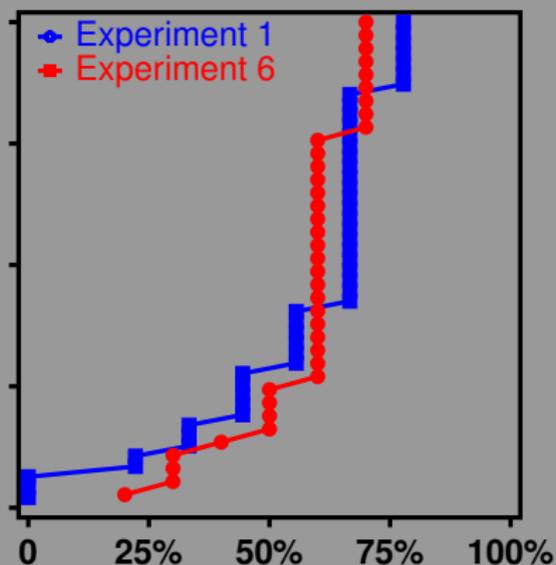
Experiment 6 (Oath on task)

- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	Oath on task $n = 54$ (%)
A	5.5	6.5	1	10.8
B	2.5	9.5	7	35.1
C	3.5	8	4.5	18.9
D	-0.5	7	7.5	89.2
E	8	3	5	83.8
F	4.5	3	1.5	75.7
G	6	4	2	86.5
H	3	0.5	2.5	83.8
I	8	1	7	89.2
Overall (%)				**63.7%**

Experiment 6 : Proportion of payoff maximizing choices by subject

(f) Baseline & task & office

Experiment 7 (Oath on duty)

- We implement a second modified oath that targets cognitive effort with a moral component.

- The oath in experiment 5 had a moral component (truth-telling) and the oath in experiment 6 targeted cognitive effort.

- In experiment 7, we again adapt a real world oath, in this case one that targets effort to perform one's assigned task with the moral reminders that one would encounter in the field if taking an oath before beginning the duties of a public office (*oath of office*):

Oath on duty:

"I, ..., the undersigned do solemnly swear that during the entire experiment, I will **faithfully and conscientiously fulfill my duties to the best of my skill and knowledge.**"

Experiment 7 (Oath on duty)

- Proportion of decisions in which subjects choose the token with the highest induced net value:

Choice	Value A	Value B	Diff	Oath on task $n = 54$ (%)
A	5.5	6.5	1	0.0
B	2.5	9.5	7	24.3
C	3.5	8	4.5	8.1
D	-0.5	7	7.5	91.9
E	8	3	5	94.6
F	4.5	3	1.5	75.7
G	6	4	2	91.9
H	3	0.5	2.5	75.7
I	8	1	7	91.9
Overall (%)				**61.6%**

Experiment 7 : Proportion of payoff maximizing choices by subject

(f) Baseline & task & office

- Experiment 1
- Experiment 7
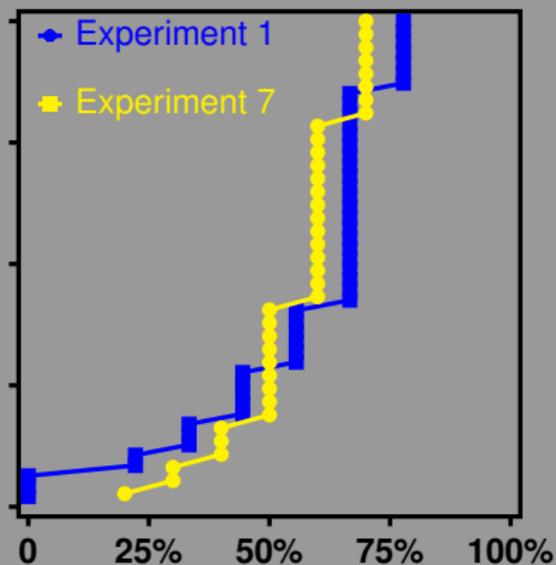
Concluding remark

Would it be a good idea to ask respondents to take an oath prior to being interviewed as we have done in this paper or by implementing weaker forms of commitment like a preliminary pledge or even a simple signed agreement to tell the truth in your survey?