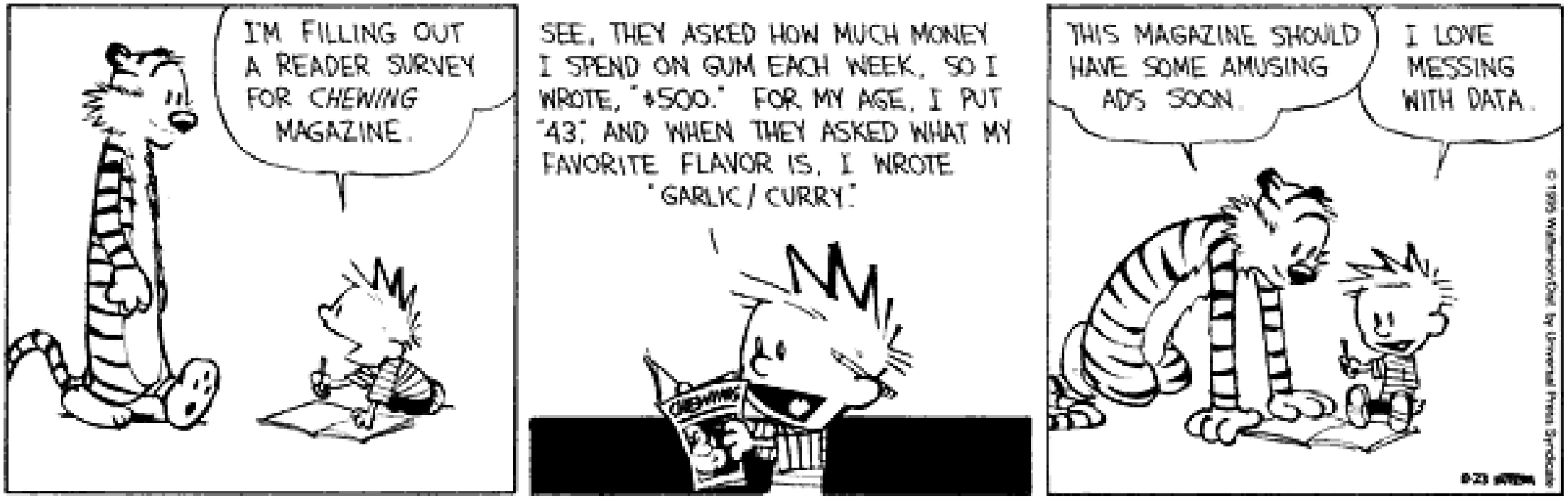
THE ROLE OF CONSEQUENTIALITY. EVIDENCE FROM A FIELD DISCRETE CHOICE EXPERIMENT

Ewa Zawojska, Wiktor Budziński,
Mikołaj Czajkowski, Aleksandra Wiśniewska

University of Warsaw, Faculty of Economic Sciences
ezawojska@wne.uw.edu.pl



Do people ever reveal their preferences truthfully in surveys?

Stated preference method

- Surveys are commonly used to determine public's preferences
- They are aimed at effective allocation and management of goods
- Stated – people say what they would do
- Respondents are directly asked about their preferences, willingness to pay for a certain good/service
- A flexible method – allows to valuate goods in hypothetical situations

A crucial question:

Do people answer truthfully in stated preference surveys?

Conditions for incentive compatibility

(Carson and Groves, 2007)

Incentive compatibility = truthful preference revelation is respondent's optimal strategy

1. Respondents understand and answer the question being asked.
2. The payment mechanism is coercive.
   (imposes payment on all agents)
3. The survey is seen as a take-it-or-leave-it offer.
   (choices do not influence any other offers that may be made)
4. Respondents view the survey as consequential, which means:
   - their responses are seen as influencing agency's actions,
   - they care about the outcomes.
5. The survey has the format of a single binary choice question.
   (follows from the Gibbard-Satterthwaite theorem)

Two approaches to testing the role of consequentiality

1. Objective consequentiality – defined in a survey script by a researcher

2. Subjective consequentiality – individual perceptions on survey consequentiality

   - Measured through self-reports to a direct question,
     e.g., „Do you believe that your votes will be taken into account by policy makers?"
   - Response scale
     - Binary – yes/no (Broadbent, 2012)
     - Likert scale – several degrees representing the strength of the belief (Herriges et al., 2010; Vossler et al., 2012; Vossler et al., 2013)

Objective consequentiality

- Laboratory experiments using induced values
  analysis of the number of deviations from induced values (Collins and Vossler, 2009; Mitani and Flores, 2012; Polomé, 2003)
- Laboratory experiments using home-grown values towards a public good
  treatments with different probabilities of a referendum being binding (Cummings and Taylor, 1998)
  various weights assigned to respondents' votes (Vossler and Evans, 2009)
- Field experiments with private goods
  various probabilistic referenda (Carson, Groves, List and Machina, 2004; Landry and List, 2007)
- Field study of a naturally occurring referendum (Johnston, 2006)
- **General conclusion: the consequential context fosters truthful preference revelation**

Subjective consequentiality

- Laboratory experiments using home-grown values towards a public good
  Broadbent (2012) – respondents perceiving an advisory survey as consequential do not reveal actual preferences; the only evidence contradicting the expectations

- Field studies using pubic goods
  Herriges et al. (2010); Vossler et al. (2012); Vossler and Watson (2013) – respondents believing in survey consequentiality answer truthfully

Our goals

- Examine whether consequentiality perceptions can be influenced by survey scripts
- Investigate the role of consequentiality in an actual (field) stated preference survey

Research hypotheses

- Hypothesis 1: Emphasising consequentiality in a survey script strengthens the respondent's perception of consequentiality.
- Hypothesis 2: Consequentiality lowers the probability of choosing alternatives associated with high costs.
- Hypothesis 3: As the level of perceived consequentiality increases, respondents are more likely to choose a status quo (no cost) alternative.

Study design

- Discrete Choice Experiment
- Hypothetical scenario: A program of cheap tickets to Warsaw theatres

	Alternative A	**Alternative B** Continuation of the current policy
Entertainment theatres	No change	No change
Drama repertory theatres	Tickets for 5 PLN	No change
Children's theatres	No change	No change
Experimental theatres	Tickets for 5 PLN	No change
Annual cost for you	100 PLN	0 PLN
Your choice	□	□

- 12 choice sets per respondent
- Online survey
- A representative sample of 1,700 inhabitants of Warsaw

Study design

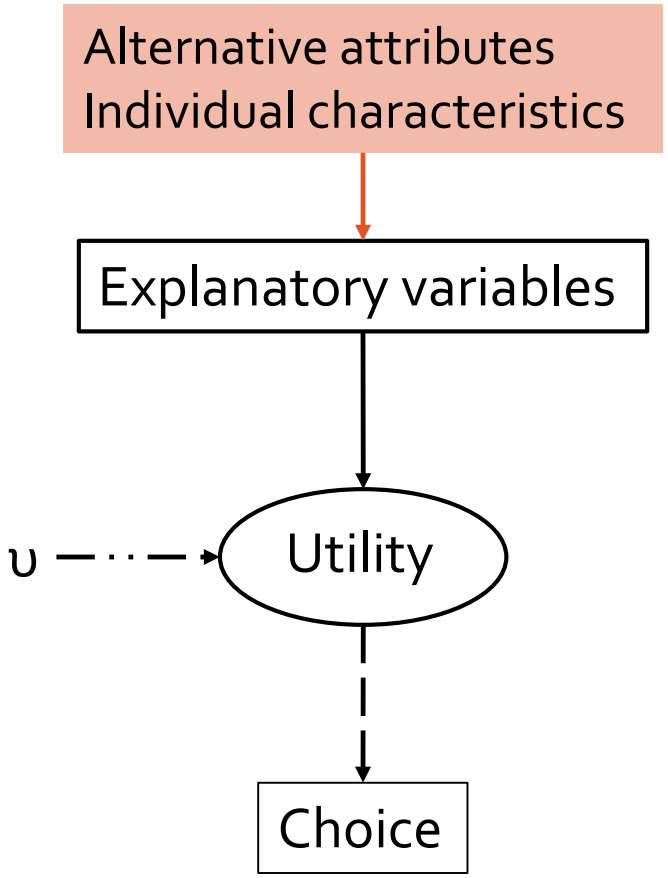
- Objective consequentiality
  - 4 treatments with survey scripts differing in the emphasis put on consequentiality
  - Split-sample
  - 1 – the weakest, 4 – the strongest consequentiality
- Subjective consequentiality
  - Measured through a follow-up question: "Do you think that the choices made by you in this survey will have an impact on future decisions on financing of theatres in Warsaw?"
  - A five-degree Likert scale response
  - 1 – definitely no, 5 – definitely yes

Econometric approach

Hybrid Choice Model

- Standard random utility model (McFadden, 1974)

- Hybrid choice models
  - Incorporate attitudes and perceptions
  - Improve the representation of the decision process
  - Allow more flexibility and realism



Notation:

Observed variable

Latent variable

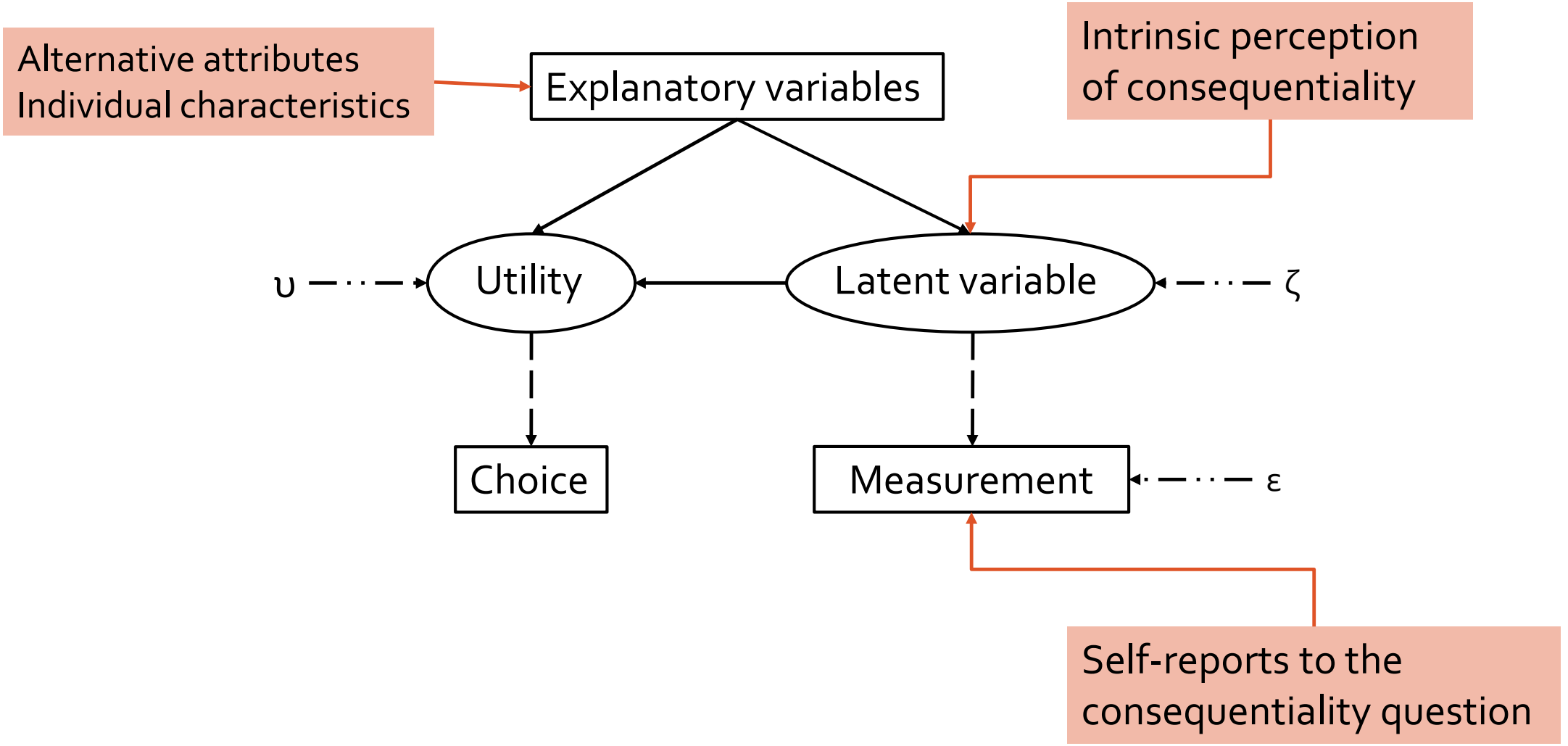
Structural relation:

Measurement:

Error:

Econometric approach

Hybrid Choice Model



Econometric approach

Formally, the standard random utility model:

- Structural equation

$$U_{in} = X_{in}\beta + \upsilon_{in} \qquad (1)$$

- Measurement equation

$$y_{in} = \begin{cases} 1 & \text{if } U_{in} \geq U_{jn}, \forall j \in C_n, j \neq i \\ 0 & \text{otherwise} \end{cases} \qquad (2)$$

U_{in} – utility of individual n from alternative i

X_{in} – a vector of explanatory variables (attributes) specific to individual n and alternative i

β – a vector of coefficients

υ_{in} – an error term

y_{in} – an indicator whether alternative i is chosen by individual n

C_n – a set of available alternatives to individual n

Econometric approach

Hybrid Choice Model

- Structural equations

$$z_n^* = \Pi z_n^* + Bw_n + \zeta_n = (I_L - \Pi)^{-1} Bw_n + (I_L - \Pi)^{-1}\zeta_n, \quad \zeta_n \sim N(0, \Psi) \tag{3}$$

$$U_n = X_n\beta + \Gamma z_n^* + \upsilon_n \tag{4}$$

z_n* – a vector of latent variables,

B, Γ – vectors of coefficients

w_n – a vector of explanatory variables,

ζ_n – an error term

- Measurement equations

$$I_n = \alpha + \Lambda z_n^* + \varepsilon_n, \quad \varepsilon_n \sim N(0, \Theta) \tag{5}$$

$$y_{in} = \begin{cases} 1 & \text{if } U_{in} \geq U_{jn}, \forall j \in C_n, j \neq i \\ 0 & \text{otherwise} \end{cases} \tag{6}$$

I_n – a vector of indicators of latent variables,

Λ – a vector of coefficients

α – a vector of constants,

ε_n – an error term

Our model

Hybrid Mixed Logit

- Hybrid choice model with random parameters, in willingness-to-pay (WTP) space
- Incorporate heterogeneity into consumers' utility coefficients

$$U_n = X_n \beta_n \delta_n + \delta_n c_n + \upsilon_n$$

X_n – a vector of non-monetary attributes; c_n – a monetary attribute

β_n – individual specific (random) parameters, normally distributed in the population (marginal money-metric utilities);
δ_n – individual specific (random) cost parameters, log-normally distributed;
β_n and δ_n – means of the distributions accept latent variables as explanatory variables

- Measurement equation modelled as ordered probit
- Maximum simulated likelihood estimation; 1,000 shuffled Halton draws

Structural equation

Dependent variable:
Intrinsic consequentiality perception (latent variable, LV)

	Coeff.	St. Error	
Objective conseq.	**0.0576**	[0.0221]	***
Female	0.1605	[0.0227]	***
Age	-0.0348	[0.0222]	
High school degree	0.0614	[0.0327]	*
University degree	-0.0057	[0.0332]	
Individual income	-0.1316	[0.0324]	***
Household income	0.1352	[0.0321]	***
Household size	0.0561	[0.0239]	**
Children	0.0237	[0.0227]	
Have a job	0.0820	[0.0231]	***

***, **, * - Significance at the 1%, 5% and 10% level, respectively.

Measurement equation

Dependent variable:
Indicators of consequentiality perception (self-reports)

	Coeff.	St. Error	
Latent variable	**0.1648**	[0.0355]	***
Threshold 1	-1.6167	[0.0511]	***
Threshold 2	-0.7373	[0.0720]	***
Threshold 3	0.6170	[0.0717]	***
Threshold 4	1.5907	[0.0752]	***

$LL_{constant}$	-16,153.3
LL_{model}	-11,319.1
Pseudo-R^2	0.2993
AIC/n	1.1130
Observations	20,400

Structural equation

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Hypothesis 1:
Emphasising consequentiality in a survey script strengthens the respondent's perception of consequentiality.

Discrete Choice Experiment (WTP-space)

	Means			Standard Deviations			Interaction with LV		
	Coeff.	St. Error		Coeff.	St. Error		Coeff.	St. Error	
Status Quo	0.0130	[0.0127]		0.4185	[0.0112]	***	**-0.0589**	[0.0156]	***
Entertainment theatres	0.3271	[0.0109]	***	0.0965	[0.0157]	***	**0.3139**	[0.0146]	***
Drama repertory theatres	0.2138	[0.0097]	***	0.1452	[0.0114]	***	**0.1964**	[0.0138]	***
Children's theatres	0.1019	[0.0092]	***	0.1536	[0.0109]	***	**0.0648**	[0.0132]	***
Experimental theatres	0.1025	[0.0089]	***	0.1513	[0.0105]	***	**0.1163**	[0.0133]	***
Cost	2.1810	[0.0603]	***	1.0920	[0.0676]	***	**-0.6235**	[0.0752]	***

*** - Significance at the 1% level.

Discrete Choice Experiment (WTP-space)

	Means		Standard Deviations		Interaction with LV		
	Coeff.	St. Error	Coeff.	St. Error	Coeff.	St. Error	
Status Quo					**-0.0589**	[0.0156]	***
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Experimental theatres					**0.1163**	[0.0133]	***
Cost					**-0.6235**	[0.0752]	***

Hypothesis 2: Consequentiality lowers the probability of choosing alternatives associated with high costs. ☒

Hypothesis 3: As the level of perceived consequentiality increases, respondents are more likely to choose a status quo (no cost) alternative. ☒

*** - Significance at the 1% level.

Conclusions

- Consequentiality matters – decreases the probability of choosing status quo, increases WTP values
- Consequentiality should not be ignored in stated preference surveys.
- Survey scripts may serve as a tool to influence consequentiality perceptions.

Remaining questions

- Why is the influence of perceived consequentiality reverse to what is expected?
- To what extent do survey scripts influence consequentiality perceptions?

Thank you for attention

Ewa Zawojska

University of Warsaw, Faculty of Economic Sciences

ezawojska@wne.uw.edu.pl