Going beyond simple discrete choice

Key concepts & study plan

Experimental design

Data collection & processing

Model specification & estimation

Interpretation & application

Going beyond simple discrete choice

Not all surveys ask respondents to make choices!

- Ranking data
- Rating data
- Best-worst data
- Forced choice data
- Discrete continuous data
- Contingent valuation

Going beyond simple discrete choice

Ranking data

- Ask for full ranking
- Burdensome
- Middle rankings difficult
- Now often replaced by best-worst data

				
access time (minutes)	0	5	15	60
in vehicle time (minutes)	180	240	120	30
cost (£)	30	10	65	95
Preference ranking	3	4	2	1

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Rating data

- Ask for rating for each alternative
- Gives further insights
- But may differ greatly across respondents
- Now used mainly for attitudes and perceptions

				
access time (minutes)	0	5	15	60
in vehicle time (minutes)	180	240	120	30
cost (£)	30	10	65	95
Rating (0-100)	50	20	85	90

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Likert scale data for attitudes

We would finally like you to indicate your level of agreement with the following statements. For each question, please provide your level of agreement on 5 point scale going from strongly disagree to strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am deeply concerned about COVID-19	○	○	○	○	○
I believe the measures put in place by the government to restrict transmission need to be strengthened	○	○	○	○	○
I believe the measures put in place by the government to restrict transmission should be relaxed	○	○	○	○	○
I believe that the risks of vaccination outweigh the benefits	○	○	○	○	○
There are significant risks in rapidly developing a vaccine for COVID-19	○	○	○	○	○
I am concerned about the impact of COVID-19 restrictions on my personal freedoms	○	○	○	○	○

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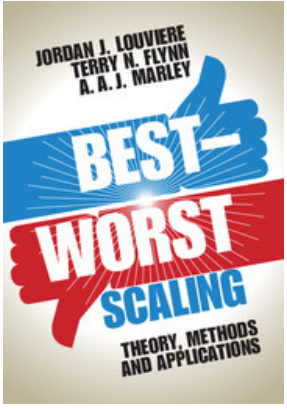
Best-worst data

- Range of different formats
- Especially popular in marketing and health

Key reference: *Louviere, J. Flynn, T.N. & Marley, A.A.J.(2015), 'Best-Worst Scaling: Theory, Methods and Applications', Cambridge University Press.*



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Best-worst case 1: object case

- Popular for selecting attributes for SC
- No information on numeraire of the attributes or ranges of levels
- Link between perceived importance and impact might be weak

Most important	Attribute	Least important
	Access time	✓
	In vehicle time	
✓	Travel cost	

Most		Least
	Pesticides used on crops	
	Hormones given to livestock	
	Irradiation of foods	✓
	Excess salt, fat cholesterol	
✓	Antibiotics given to livestock	

Please consider the food safety issues in the table above and tick which concerns you most and which concerns you least.

Source: Flynn, 2014

Empirical comparison: *Song, F., Hess, S. & Dekker, T. (2021), A joint model for stated choice and best worst scaling data using latent attribute importance: application to high speed rail, Transportmetrica A, 17(4).*

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Best-worst case 2: profile case

- Ask for best and worst feature of alternative
- Can estimate utilities for each attribute level
- Simpler than SC, good for vulnerable respondents
- Can struggle when combining desirable with undesirable attributes

Best		Worst
	Some problems walking about	
✓	No problems with self-care	
	Some problems with performing usual activities	
	No pain or discomfort	
	Moderately anxious or depressed	✓

Imagine you were living in the health state described above. Tick which aspect of this would be best to live with and which would be worst to live with.

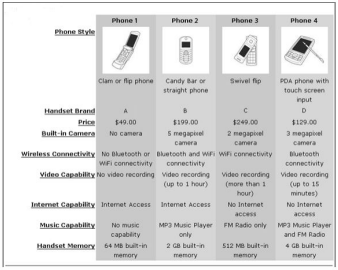
Source: Flynn, 2014

Discussion paper: *V. Soekhai, B. Donkers, B. Levitan & E.W. de Bekker-Grob (2021), 'Case 2 best-worst scaling: For good or for bad but not for both', Journal of Choice Modelling, 41, 100325.*

Going beyond simple discrete choice

Best-worst case 3: multi-profile case

				
access time (minutes)	0	5	15	60
in vehicle time (minutes)	180	240	120	30
cost (£)	30	10	65	95
Most preferred				✓
Least preferred		✓		



	Phone 1	Phone 2	Phone 3	Phone 4
Phone Style				
	Clam or flip phone	Candy Bar or straight phone	Swivel flip	PDA phone with touch screen input
Handset Brand	A	B	C	D
Price	$49.00	$199.00	$249.00	$129.00
Built-in Camera	No camera	5 megapixel camera	2 megapixel camera	3 megapixel camera
Wireless Connectivity	No Bluetooth or WiFi connectivity	Bluetooth and WiFi connectivity	WiFi connectivity	Bluetooth connectivity
Video Capability	No video recording	Video recording (up to 1 hour)	Video recording (more than 1 hour)	Video recording (up to 15 minutes)
Internet Capability	Internet Access	Internet Access	No Internet access	No Internet access
Music Capability	No music capability	MP3 Music Player only	FM Radio only	MP3 Music Player and FM Radio
Handset Memory	64 MB built-in memory	2 GB built-in memory	512 MB built-in memory	4 GB built-in memory

Source: Flynn, 2014

Empirical comparison: *Giergiczny, M., Dekker, T., Hess, S. & Chintakayala, P. (2017), 'Testing the stability of utility parameters in repeated best, repeated best-worst and one-off best-worst studies', European Journal of Transport and Infrastructure Research, 17(4), pp. 457-476.*

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Best-worst case 3 *vs* stated choice

How do we analyse BW?

- Option 1: sequence of two choices, with analyst-assumed order
- Option 2: choice between all possible best-worst outcomes

Advantages and disadvantages

- Possibly smaller standard errors
- But is process to choose worst consistent with process to choose best?
- Is B-W useful when interest is in predicting first preferences?
- Barely used in some fields, potentially useful in others

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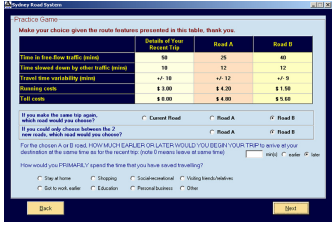
Best-best and forced choice

access time (minutes)	0	5	15	60
in vehicle time (minutes)	180	240	120	30
cost (£)	30	10	65	95
Choice				✓

access time (minutes)	0	5	15
in vehicle time (minutes)	180	240	120
cost (£)	30	10	65
Choice			✓



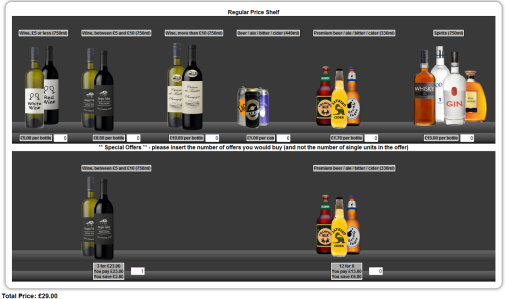
Source: Hess, S., Rose, J.M. & Hensher, D.A. (2008)

Empirical comparison: *Huls, S. P.I., Lancsar, E., Donkers, B. & Ride, J. (2022), 'Two for the price of one: If moving beyond traditional single-best discrete choice experiments, should we use best-worst, best-best or ranking for preference elicitation?' Health Economics, 31(12), 2630-2647*

Going beyond simple discrete choice

Multiple discrete-continuous and discrete-discrete data

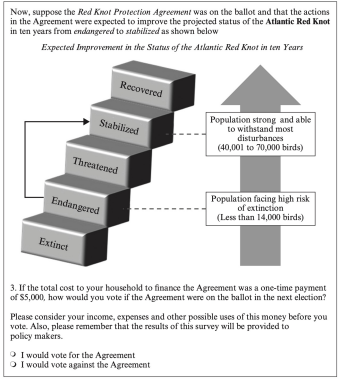
DAY	Sunday						
	Start		End		What were you doing (mode)	Where	
N°	Hour	Min	Hour	Min		Street 1	Street 2
1	10	0	11	20	Wake up, breakfast	Michimalongo 15	NA
2	11	20	14	0	Tidy up at home	Michimalongo 15	NA
3	14	0	14	5	Going to the shop (walk)	NA	NA
4	14	5	14	10	In the shop	Michimalongo central	NA
5	14	10	14	15	Going back home (walk)	NA	NA
6	14	15	15	30	Lunch	Michimalongo 15	NA
7	15	30	15	40	Going to a friend's home (walk)	NA	NA
8	15	40	15	50	At a friend's home	verbas buenas alto	NA
9	15	50	16	0	Going back home (walk)	NA	NA
10	16	0	19	0	Stay at home	Michimalongo 15	NA
11	19	0	19	30	Going to the doctor (walk)	NA	NA
12	19	30	21	30	Staying at the doctor	Salas	O'Higgins
13	21	30	22	0	Going back home (walk)	NA	NA
14	22	0	0	0	Stay at home, sleep	Michimalongo 15	NA



Going beyond simple discrete choice

Contingent valuation (CV), willingness to pay

- Open ended question or dichotomous choice, possibly double bounded
- Criticised as being too direct
- Framing possibly substantially influences answer (especially in terms of *bid levels*)
- CV largely discredited in some cases



George Parsons and Kelley Myers, "Fat tails and truncated bids in contingent valuation: an application to an endangered shorebird species," Ecological Economics, Vol. 129, pp. 210–19, copyright 2016,