

Do people understand DCE surveys?

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Overview

- What is a DCE?
 - Theories of decision making
 - Debriefing questions
- Our work
 - Frequency & type of debriefing questions used
 - Relationship between demographics & debriefing responses
- What next
- Questions & discussion



Background – Discrete choice experiments

- Discrete choice experiments (DCEs) increasingly common in health
- Quantitative method to identify preferences for care:
 - How people value different aspects of a product or service
 - Identify how people trade-off between these aspects
- Based on the theory that individual's preferences for a product come from its attributes, rather than the product itself
- Assumes people's choices reflect their preferences

Example – travelling Vancouver to Portland

- Departure time
- Journey duration
- Able to move around
- Able to work during journey
- Cost
- Others...?



Attributes and levels

- Chosen based on research question, existing literature, stakeholder engagement, patient perspective, decision making context
- From previous example:
 - Attribute: Journey duration
 - Levels: 2 hours | 6 hours | 8 hours
 - Attribute: Ability to work
 - Levels: Yes | No



Example DCE

Choice set

	Travel option A	Travel option B
Journey duration	3 hours	8 hours
Departure time	10.00 am	6.30 am
Reclining seat	Yes	No
Ability to work	No	Yes
Cost to you	\$277	\$67

Attributes

Levels

Which option would you prefer? ☐ I prefer option A ☐ I prefer option B

How a DCE works

- Each participant answers multiple choice sets
 - attributes and levels are varied systematically
- Use statistics to identify which attributes and/or levels are driving choices
 - Relative value of each attribute
 - The trade offs people are willing to make between attributes
 - The Willingness to Pay for a product with specific attributes
 - The probability that individuals will take up a product / service



A health example

Figure 1: Hypothetical choice question in a DCE

	Treatment A	Treatment B
Treatment type	Oral tablet	Injection
Treatment frequency	3 x per day	1 x per day
Cost	\$50/month	\$100/month
Which treatment would you prefer?	<input type="checkbox"/>	<input type="checkbox"/>

	Treatment A	Treatment B
Treatment type	Oral tablet	Injection
Treatment frequency	6 x per day	1 x per month
Cost	\$50/month	\$200/month
Which treatment would you prefer?	<input type="checkbox"/>	<input type="checkbox"/>



Theories of decision making

- DCEs are designed and analysed based on a set of theories, usually:
 - Consumer theory¹ - goods and services can be valued in terms of their constituent characteristics
 - Random utility theory² or regret minimization³ - respondents are assumed to act in a utility maximizing manner
- Within these theories there are assumptions that people know their preferences (completeness) and make rational choices (eg monotonicity & attribute non-attendance)

¹Lancaster, 1966

²McFadden 1999; Hanemann 1984

³de Bekker Grob 2013; Lancsar 2006

Other concepts or assumptions

- Hypothetical DCE choices reflect similar real world decisions (external validity)¹
- Respondents interpret the information they are given as intended by the researcher (internal validity)²
- Respondents are actively involved in the choice task (task engagement)³

¹ Jacquemet, Luchini, Shogren, & Watson, 2016; Ryan, Mentzakis, Jareinpituk, & Cairns, 2017

² Hensher, 2006; Veldwijk et al., 2016

³ Veldwijk et al., 2016; Vossler, Doyon, & Rondeau, 2012

Testing our assumptions

- Repeated choice set
- Dominated choice set
- Econometric techniques
- Debriefing questions

This section of the survey asks how easy it was to complete the previous section of the survey, where you

	Treatment A	Treatment B
Treatment type	Oral tablet	Injection
Treatment frequency	6 x per day	1 x per month
Cost	\$50/month	\$200/month

Which

Treatm	$P_{njt}(\delta_c) = \frac{\exp[(\beta \circ \delta_c)' x_{njt}]}{\sum_{j \in [1; 3]} \exp[(\beta \circ \delta_c)' x_{njt}]}$	B
Treatm		
Cost		y
Which		h
Which		

☐ Focused on the most important factor

	Treatment A	Treatment B
Treatment type	Oral tablet	Injection
Treatment frequency	6 x per day	1 x per month
Cost	\$50/month	\$200/month
Which treatment would you prefer?	<input type="checkbox"/>	<input type="checkbox"/>

☐ Uncertain

Implications

- Could introduce bias if:
 - Truly non-adherent choices are included¹
 - Choices that appear irrational but actually reflect true preferences are excluded²
 - Some violations are more common in particular groups, such as those with less education, older age or reduced health literacy³
- Ethics of asking people to complete surveys that are too difficult



¹Hensher, 2006; Hole et al., 2012; Kenny, et al., 2003; Veldwijk et al., 2016

²Ryan et al., 2009

³Veldwijk et al., 2016

The gap

- At most, 50% of studies report testing the assumptions of decision making¹
- Limited evidence that debriefing questions (or other tests) capture true violations
- Uncertainty about which debriefing questions should be used, what they are measuring, and how to use the responses within the DCE analysis.



¹Bekker-Grob, Ryan, & Gerard, 2012; Ryan & Gerard, 2003; Clark, Determann, Petrou, Moro, & de Bekker-Grob, 2014

Proposal (UTS BRG 2017)

1. Identify the frequency and type of debriefing questions used by health economists
2. Re-analyse existing data from DCEs to determine if there is a relationship between demographic characteristics and responses to 'debriefing' questions
3. Use qualitative methods to re-analyse the free-text responses included in the DCE surveys to identify if these responses provide additional insights into individuals understanding of, and engagement with, the choice survey



The frequency & type of debriefing questions used in DCEs

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Survey methods

- Survey sent to 168 authors in Clarke (2014) review and Mulhern (in press) review
 - Initial email, followed by 2 reminders
 - 70 responses received (43% response rate), 90% answered at least some q's
- Asked which debriefing question types were included, and how they were used

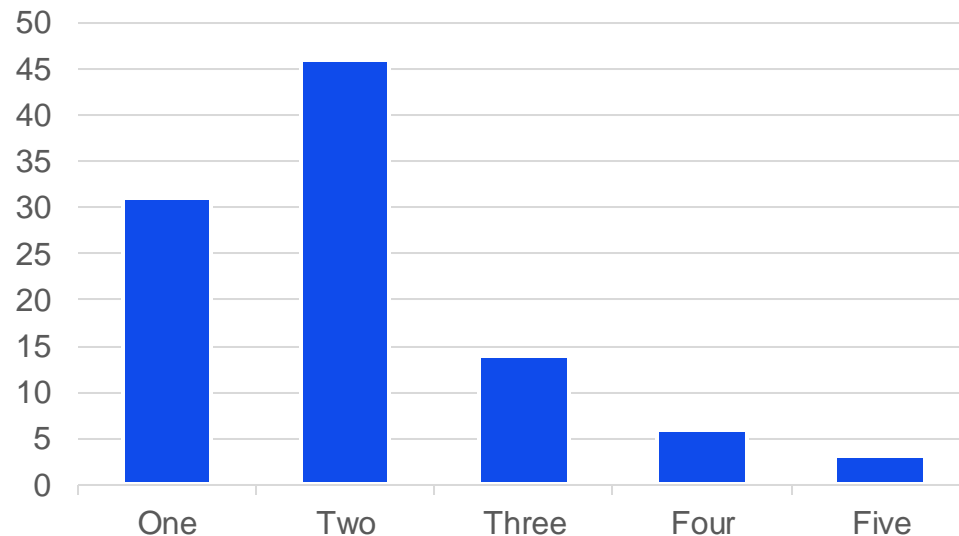
Survey sample

Number of DCEs involved in	Frequency	Percent
1	8	14.04
2 to 5	17	29.82
6 to 10	14	24.56
More than 10	18	31.58
Total = 57		
Frequency Missing = 13		

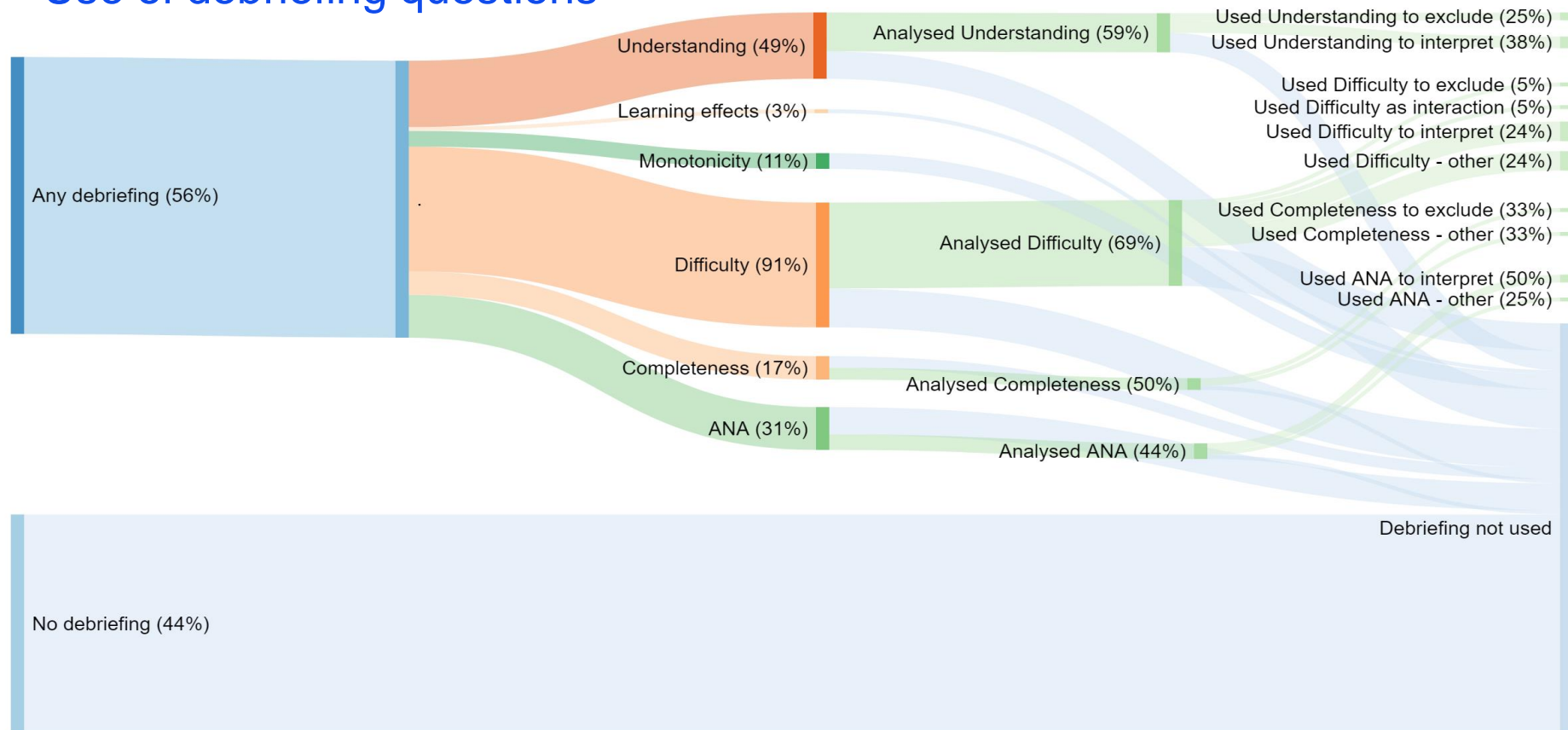
Confidence in design & analysis of DCEs	Frequency	Percent
Slightly confident	6	10.53
Moderately confident	23	40.35
Very confident	25	43.86
Extremely confident	3	5.26
Total = 57		
Frequency Missing = 13		

Use of debriefing questions

- 56% included debriefing questions in their survey
 - No pattern by year, confidence or number of DCEs
- Of those who included debriefing questions in their DCE (n=35)
 - Most addressed only one or two assumptions



Use of debriefing questions



Why debriefing questions weren't analysed

- It wasn't necessary (i.e. participants had not found the survey difficult)
- Used interviewer judgement to assess understanding
- Only used debriefing questions in the pretesting / pilot phase
- Some respondents felt they used the debrief data in other ways:
 - E.g. Subgroup analysis, sensitivity analysis or robustness check

“There was no indication that majority of respondents find it difficult to answer”
(ID001)

“Good question! It didn't occur to me to do so and so wasn't prespecified”
(ID044)

The debriefing questions

- The debriefing questions were reviewed to identify common wording or approaches
- The majority related to difficulty:

The 'action' that was difficult:

Choosing / making choice (n = 8)

Understanding (n = 5)

Distinguishing between choice sets (n = 4)

Responding / answering (n = 3)

Imagining (n = 1)

Reading (n = 1)

The 'component' that was difficult:

The questions (n = 1)

The choices (n = 8)

The survey (n = 2)

The task (n = 2)

The instructions (n=1)

Other tests of decision making

Did you include any other tests of the assumptions of decision making in your DCE?	
Duplicate choice set(s)	50%
Dominated choice set(s)	60%
Attribute non attendance test	5%
Other test	18%
Total = 40 (% do not add to 100 because respondents could select more than one option)	

People who used other validity checks were no more or less likely to include debriefing questions in their survey ($p=0.35$).

Changes in debriefing questions with more recent studies

- 11% no longer include debriefing questions in more recent DCEs
- 15% now include debriefing questions when they previously didn't
- 44% now use more detailed and/or more specific debriefing questions:

Other feedback themes

- Pre-testing is important, and qualitative methods are valuable
- Debriefing questions are important, but may not capture the complex assumptions of decision making and their various violations

So what?

- Over half of people doing DCEs use debriefing questions, but many don't analyse, use or report them
- Experience with DCEs doesn't seem to influence this
- Many health economists think debriefing questions are important, but aren't sure what they are measuring or how to use that information





Relationship between demographics and debriefing responses

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Retrospective analysis of debriefing questions

- 6 DCE datasets were combined, with total sample size of 5,460
 - Patient preferences for contralateral mastectomy (n = 87)
 - General public preferences for pharmacy services (n = 1049)
 - General public preferences for GP services (n = 1208)
 - Two EQ5D valuation studies (n = 1073 and n=1309)
 - SF6D valuation study (n = 1004)
- 34 debriefing question across the 6 studies
 - 6 (paired) concepts identified as 'common' across more than one study

Combined questions

- Realism e.g. “I found the available options made sense”
- Choice e.g. “I found making a choice between different options confusing”
- Task difficulty e.g. “I found the task difficult”
- General difficulty e.g. “How easy or difficult was it to understand the choices”
- Strategy e.g. “Did you have a strategy for choosing between the [options]?”
- Attribute non-attendance e.g. “Did you consider all of the options when you made your choices?”

Sample demographics

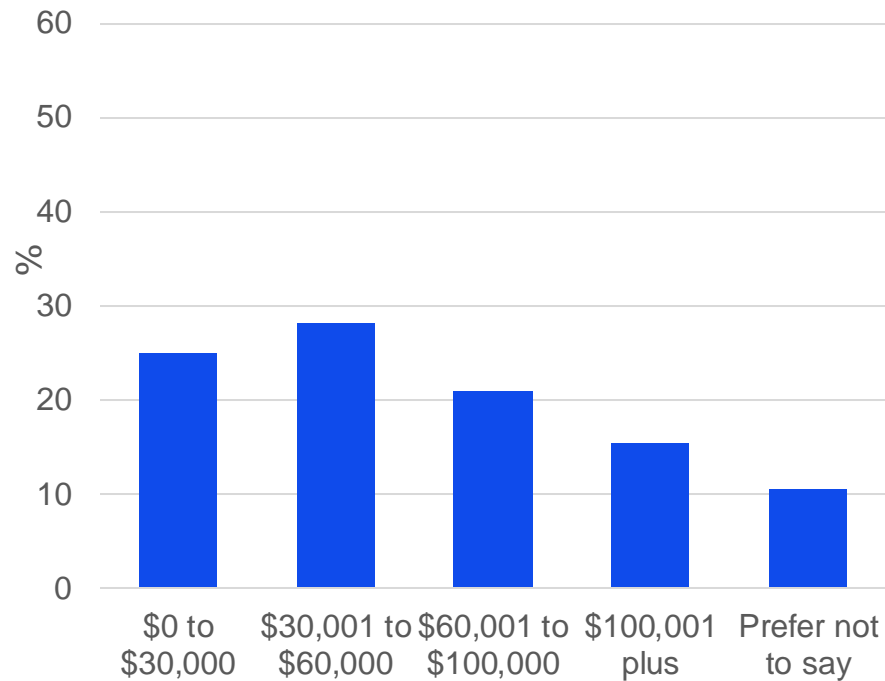
- 46% male, 53% female
- 58% Married / Defacto
- 76% Australia, 7% UK, 17% other

Age	Frequency	Percent
16 to 29	1118	20.53
30 to 44	1345	24.70
45 to 59	1490	27.36
60 to 74	1213	22.28
75+	278	5.11
Frequency Missing = 16		

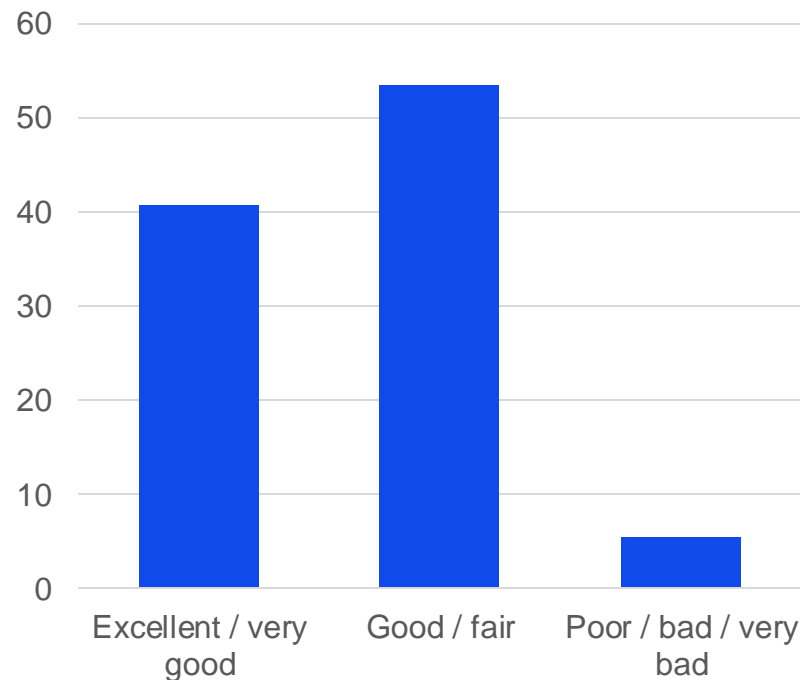
Education	Frequency	Percent
Primary	330	6.05
Secondary	1653	30.29
Trade Cert/Apprentice	1864	34.15
Bachelor or higher	1244	22.79
Other	367	6.72
Frequency Missing = 2		

Sample demographics

Income



Health



Debriefing responses

Consolidated debriefing question	Had trouble (conservative)	Had trouble (inclusive)
Had trouble with realism (n = 2122)	336 (15%)	692 (32%)
Had trouble making a choice (n = 2122)	790 (37%)	1159 (54%)
Had difficulty with the task (n = 1160)	159 (13%)	372 (32%)
Had general difficulty (n = 1160)	672 (15%)	1696 (38%)
Had a strategy for making choices (n=1160)	499 (43%)	499 (43%)
Did not consider all attributes (n = 2209)	1946 (45%)	2036 (48%)

Multivariate regression summary

- Only survey was significant across all debriefing questions
- Older people:
 - Less likely to report trouble with task, but more likely to report general difficulty
 - More likely to use a strategy, but less likely to report attribute non-attendance
- Those with more education:
 - Less likely to report using a strategy
 - More likely to report attribute non-attendance
- Those in good health less likely to use a strategy
- Those in fastest third less likely to report general difficulty

So what?

- It appears different wording of debriefing questions around the same concept can lead to different results
- The significance of survey in the regression suggests debriefing questions are capturing some aspect(s) of decision making,
- We would expect some variation in difficulty by demographics, so questions where there is no variation (eg Realism and Choice) may not be very sensitive



Further analysis

- Examine if there is a relationship between participants' reported attention to the survey and quantitative assessment of their ANA
- Examine if individuals who report different types of difficulty have different preferences





What next?

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What next?

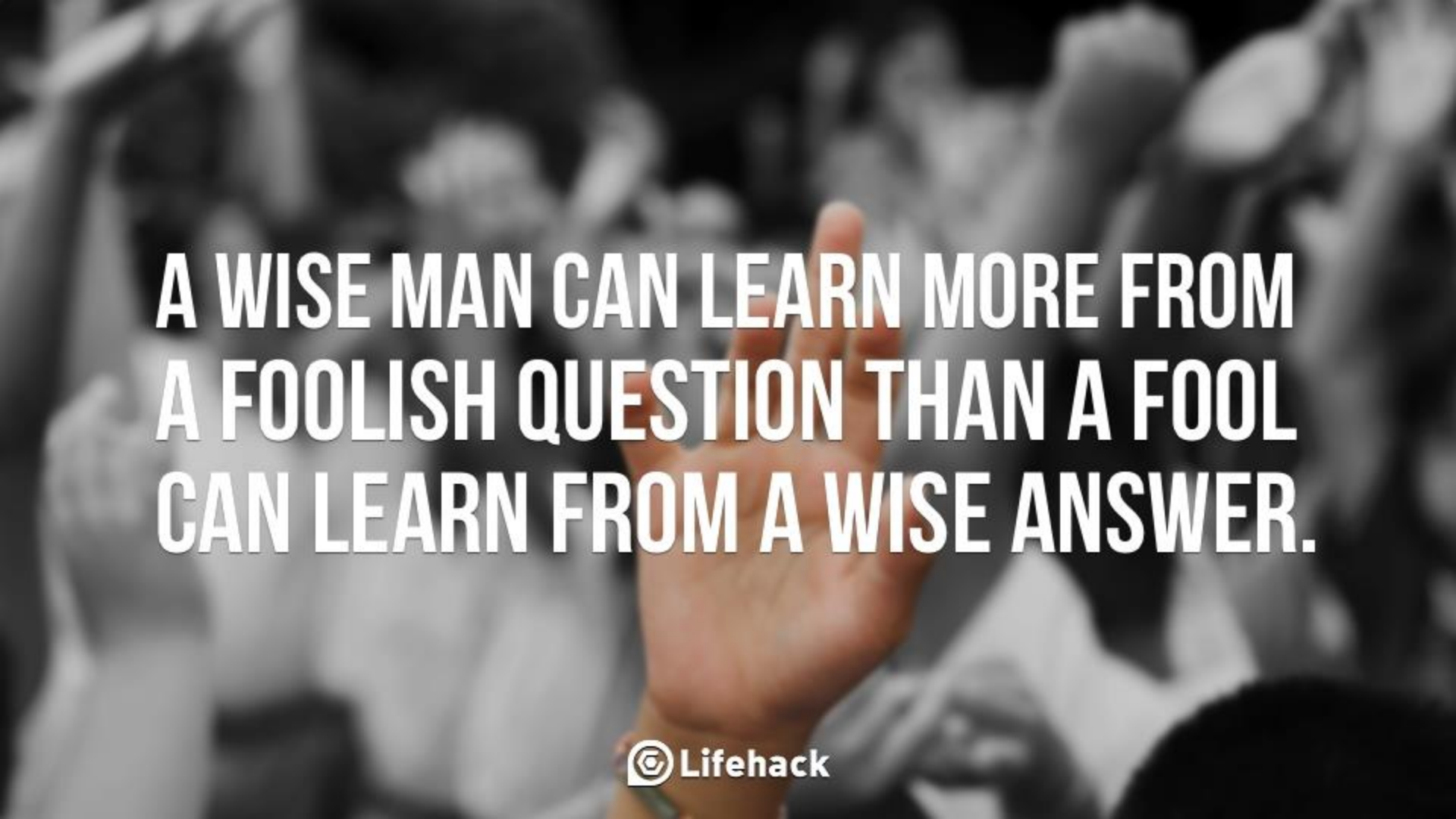
- Identify potential debriefing questions to assess the relevant assumptions of decision making
- Test potential debriefing questions for reliability, validity and usefulness
 - behavior lab
 - think-aloud interviews
 - DCEs
- Establish recommended / standard set of debriefing questions for use in DCEs

Acknowledgements

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Thank you & questions?



A blurred background image of a crowd of people with their hands raised, suggesting a large gathering or a protest. The focus is on the text overlaid on the image.

**A WISE MAN CAN LEARN MORE FROM
A FOOLISH QUESTION THAN A FOOL
CAN LEARN FROM A WISE ANSWER.**