Maastricht UMC+

Welkom bij de KEMTA masterclass

Iedere maand organiseert de afdeling KEMTA een masterclass voor iedereen die geïnteresseerd is in het opzetten en uitvoeren van wetenschappelijk onderzoek.

Data en andere toekomstige onderwerpen voor masterclasses in 2025 vind je op: https://www.mumc.nl/research/kemta/masterclasses

Maastricht UMC+

Wat wil de patient?

“Zin en onzin van patientenvoorkeuren”

Afdeling KEMTA

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Inhoud

1. Wanneer is het relevant om voorkeuren te meten?

2. Welke fasen zijn er voordat een vragenlijst m.b.t. voorkeuren kan worden ontwikkeld?

3. Korte uitleg design DCE(keuze-experiment) vragenlijst

4. Voorbeeld verschillende typen keuzes/vragen

Classification system for different outcomes

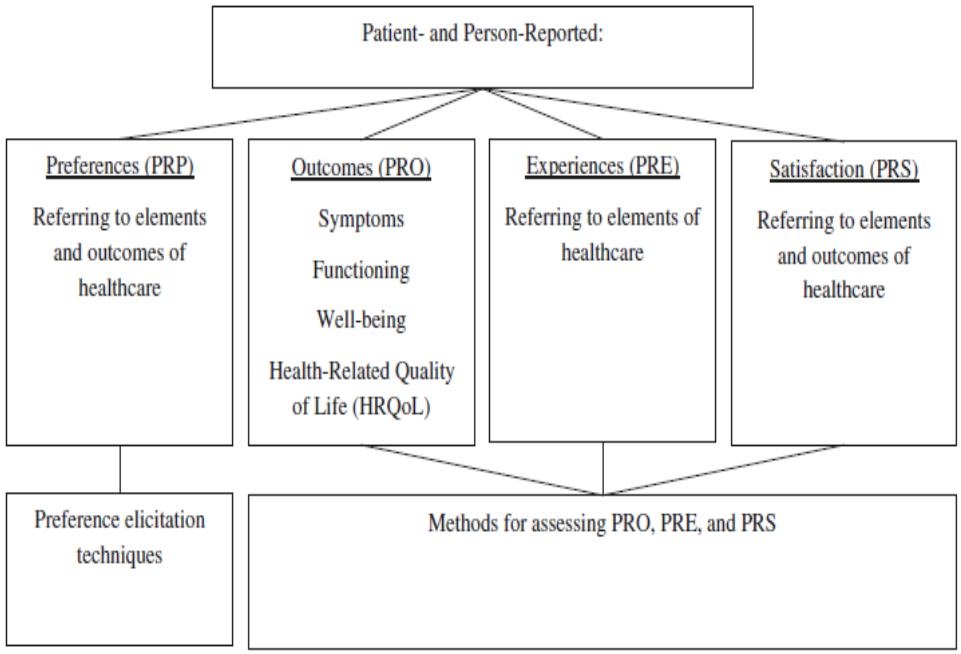


Fig. 1 Classification of patient- and person-reports about health and healthcare

Klose K, Kreimeier S et al. Patient and peron reports on healthcare: preferences, outcomes, experiences and satisfaction-an essay. Health economics. 2016 6:18

Why and when measure preferences?

Increased focus on shared decision making and patient centered care:

1) Multiple treatment options exist that are distinctly different with regard to their characteristics like ease of administration, location, waiting time, side-effects.

   What do patients consider important?

2) To identify heterogeneity in clinical practice: patients with the same condition might have different preferences when it concerns treatment characteristics.

3) Benefit/risk as perceived by patients. How much risk (chance of side-effects) are patients willing to take in order to have a higher chance of improvement of their condition/effectiveness.

Why and when measure preferences?

5) Early drug development: identification of relevant endpoints for patients.

6) When non-health outcomes (process, administration of treatment, location) might be influential in choosing one treatment above the other.

In summary: before starting a preference study, think about how the information will be used in decision-making.

However: if one treatment is clearly superior in all aspects, then measuring patient preferences will not add any value.

How can we measure preferences?

1) Revealed preferences

→ what people actually do in real life: choosing a drink→ direct method

- High external validity
- Not always possible in health care.

How can we measure preferences?

2) STATED-PREFERENCES →

Observe hypothetical choices

Ask consumers about their preferences by providing them with choices→ derive preferences from these choices→ indirect method

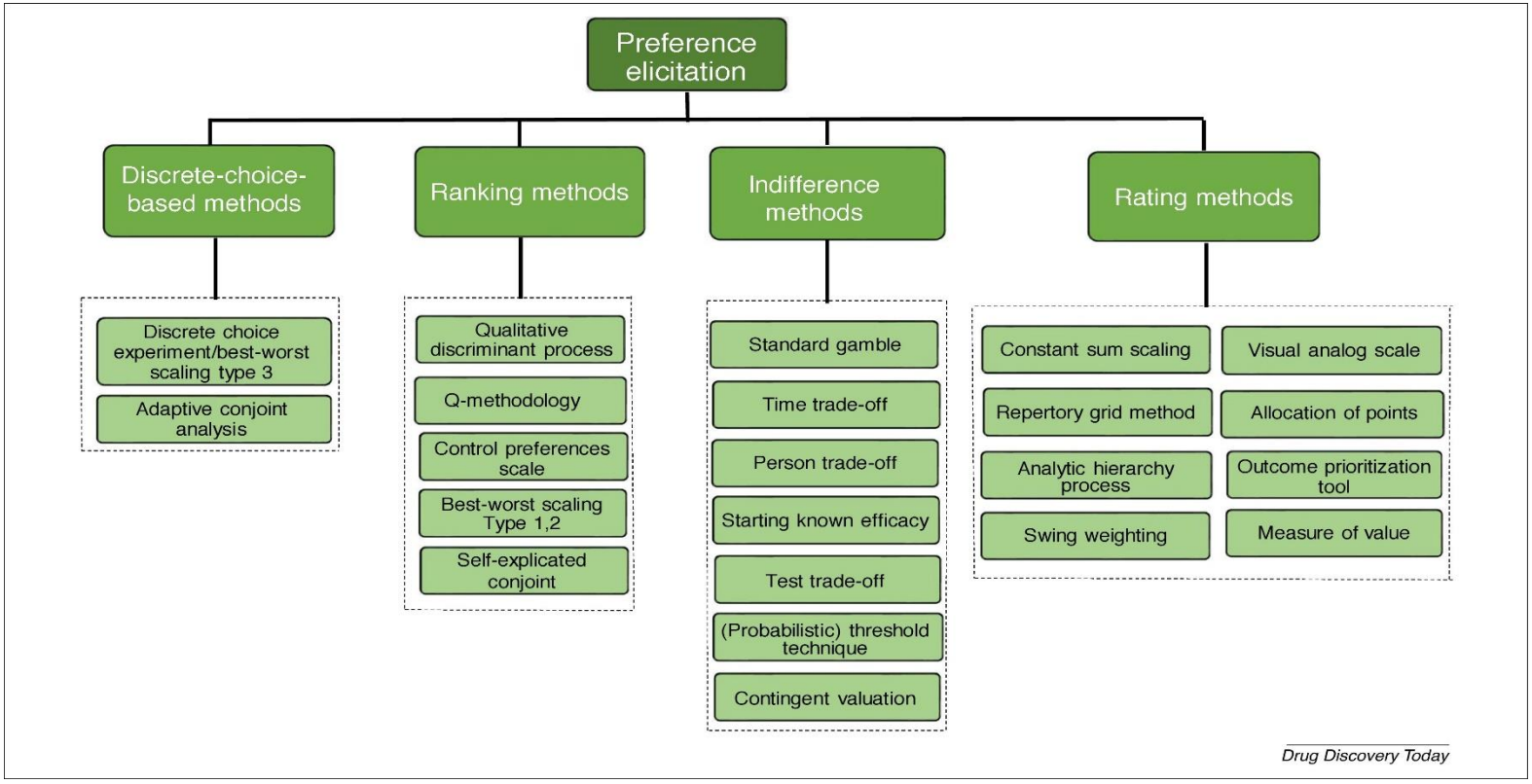
Stated preference methods

1. Methods using ranking, rating, or choice designs to quantify preferences for various attributes of an intervention (often referred to as conjoint analysis, discrete-choice experiments, or stated-choice methods)

2. Methods using direct elicitation of monetary values of an intervention (including contingent valuation or willingness-to-pay methods)

Bridges et al. (2011) Value Health 14 403-413

Overview of quantitative preference methods



Soekhai V, Wichello C,Levitan B et al. Methods for exploring and eliciting patient preferences in the medical product lifecycle: a literature review. Drug Discov Today. 2019 24(7):1324-1331.

Discrete-choice experiments

- Origin in marketing (1960s)
- Attributes-based survey
- Increasingly used to elicit preferences in health care

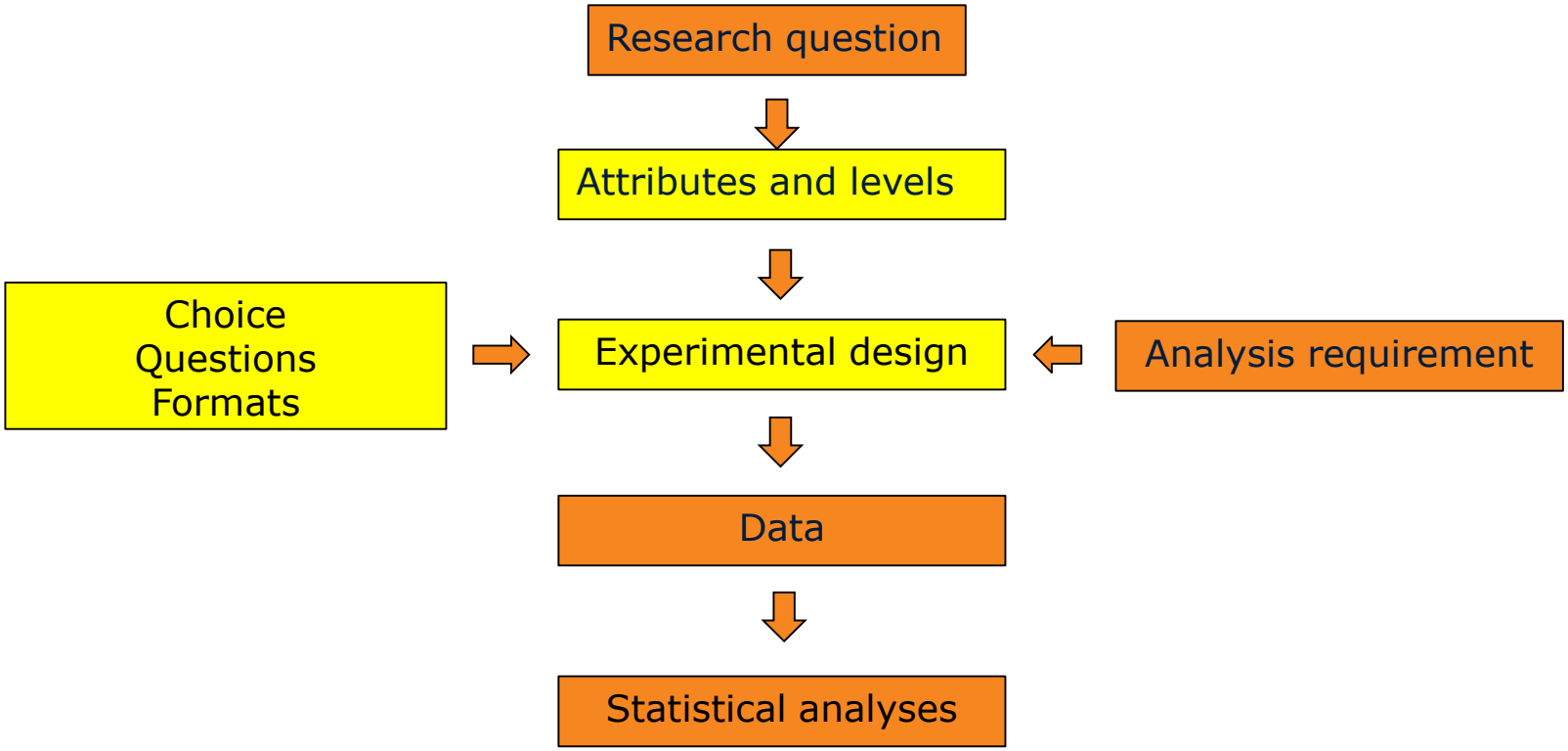
Main assumption (Mc Fadden)

- Utility is derived from the underlying attributes of the good

Attributes

- Service characteristics that consumers used to evaluate
- Attributes have levels, or values

A checklist for conducting stated preference research



Conjoint Analysis Applications in Health—a Checklist: A Report of the ISPOR Good Research Practices for Conjoint Analysis Task Force John F. P. Bridges, PhD,*, A. Brett Hauber, PhD, Deborah Marshall, PhD, Andrew Lloyd et al. Value in health 14 (2011)

Identification of attributes and levels

Attributes:

- Health related outcomes like effectiveness, side-effects, pain etc.

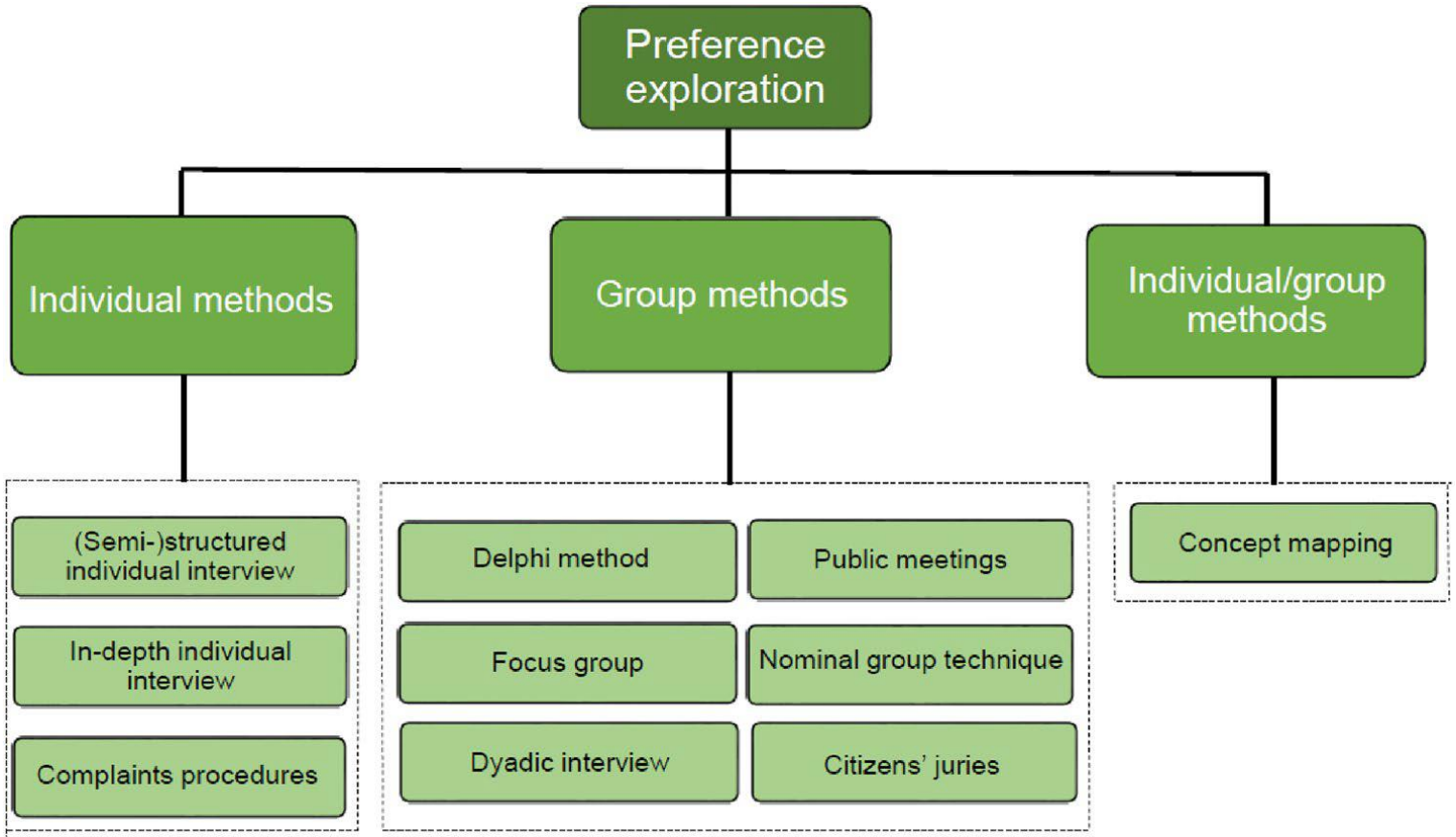
- Process related outcomes like duration of the treatment, frequency, waiting time etc.

Sources of evidence:

- Professional guidelines
- Literature: systematic reviews, scoping reviews
- Qualitative research

Ref: **Reporting Formative Qualitative Research to Support the Development of Quantitative Preference Study Protocols and Corresponding Survey Instruments: Guidelines for Authors and Reviewers. Ilene L. Hollin, Benjamin M. Craig et al. Patient 2020, 13:121-136**

Qualitative methods for exploring preferences, attributes, levels



Soekhai V, Wichello C,Levitan B et al. Methods for exploring and eliciting patient preferences in the medical product lifecycle: a literature review. Drug Discov Today. 2019 24(7):1324-1331.

Which attributes of a surgical treatment for primary BCC do people prefer?

literature

Attribute	Definition
CHANCE OF RECURRENCE	The possibility that a tumour recurs at the same site after initially successfully been removed (%)
SURGICAL TIME	Time between start and end of surgery
TRAVEL TIME	Time it takes to travel a single trip from home till arrival in hospital
WAITING TIME	The length of time one has to wait before results of surgery are available
CHANCE OF RE-EXCISION	The possibility of having a second excision if results of the first excision show that the tumour is not completely removed

RCT

RCT

focusgroup

Literature + RCT

HOW MANY ATTRIBUTES?

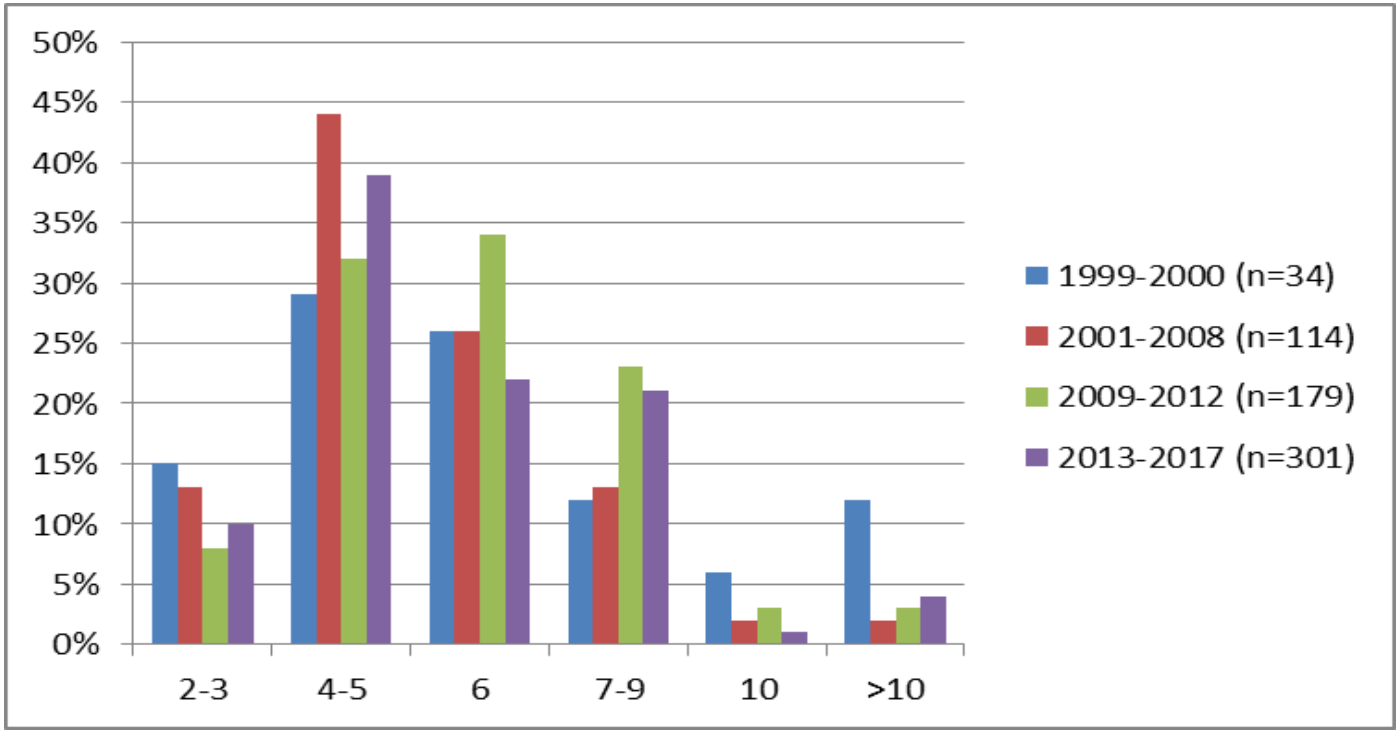
More attributes increase task complexity

Stimulate heuristic behavior:

- *simple and fast heuristics: rule of thumb*
- *lexicographic preferences*

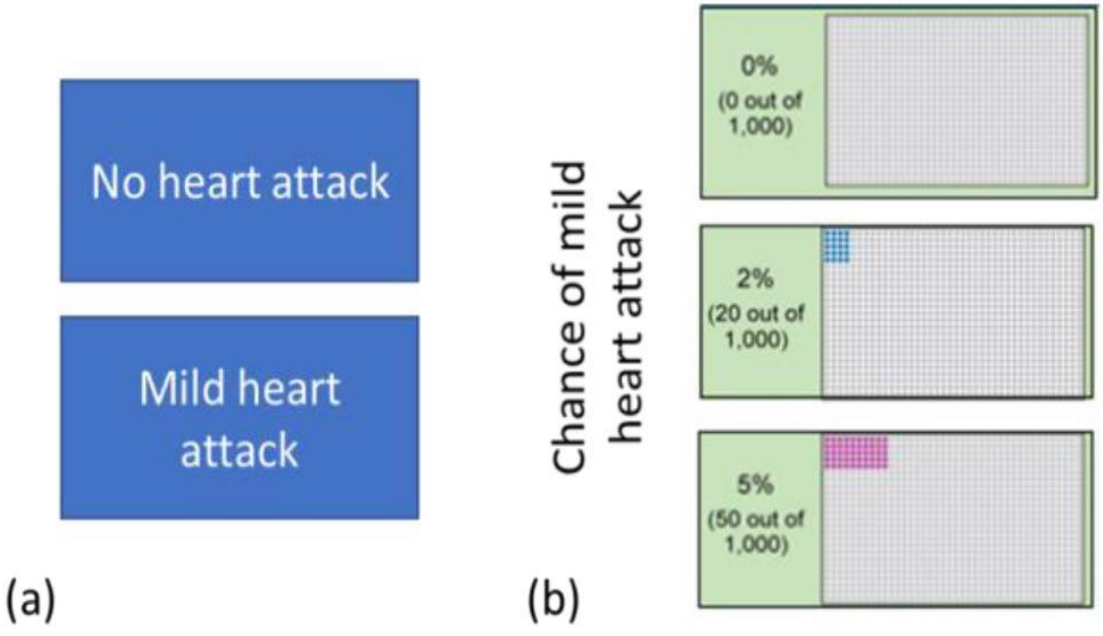
Lexicographic behavior occurs when individuals rank attributes in perceived importance. A decision is based only on the attribute that is considered the most important.

How many attributes ?



SOEKHAI V, DE BEKKER-GROB E, ELLIS R & VASS CM. DISCRETE CHOICE EXPERIMENTS IN HEALTH ECONOMICS: PAST, PRESENT AND FUTURE.PHARMACOECONOMICS 2019

Identification attribute levels



Deterministic

Probabilistic

Muhlbacher AC, de Bekker-Grob E.W et al. How to present a decision object in health preference research: attributes and levels, the decision model and the descriptive framework. The patient, february 2024.

Identification of levels

Levels:

- nominal: no natural ordering like outpatient or hospital
- ordinal like asymptomatic, symptomatic, disabling
- continuous like weight, costs

Identification of levels

Levels:

- Preferably not too many levels (3 to 4)
- Avoid extreme values

The level range of an attribute should be plausible and realistic/ clinically relevant.

Still, a currently unavailable but in the future possible level range might be included.

The range and values of levels should be discussed with clinicians in preliminary interviews and pretesting of the questionnaires.

Identification of levels

Level range

Type of attribute effects to be estimated:

- Two level attribute: *linear relationschip*

- If a non-linear relationship is assumed for certain attributes, then including more than 2 levels is necessary!

- Evenly spaced levels: can make interpretation of the estimated effect of numerical attributes easier

Example non-linearity waiting time

Number format and visual AID

1. Natural frequencies (1 in 10 people) or percentages

2. Visual aid like graphics.

	Choice A				Choice B			
Number of shots needed in order to be fully vaccinated	2 months 4 shots	4 months 4 shots	6 months 4 shots	**Total** **12 shots**	2 months 2 shots	4 months 2 shots	6 months 2 shots	**Total** **6 shots**
Extra dose of hepatitis B vaccine given	**No**				**No**			
Proportion of children fully vaccinated by age 2 years in your community	 **8** out of 10 children will be fully vaccinated by age 2 years				 **9** out of 10 children will be fully vaccinated by age 2 years			
Risk that the child will have fever of 100.4 or higher after each set of vaccinations	 **1** out of 10 children will have fever of 100.4 or higher				 **1** out of 10 children will have fever of 100.4 or higher			
Out-of-pocket cost in dollars for vaccines from 2 through 6 months	2 months $20	4 months $20	6 months $20	**Total cost** **$60**	2 months $40	4 months $40	6 months $40	**Total cost** **$120**
If you had to choose one scenario, which would you prefer?	☐				☐			

Fig. 1. Sample discrete choice experiment question.

Number format and visual AID

Visual aid like graphics.

	Medication	Diet	Psychotherapy
Symptom reduction			
Time until response	8 weeks	12 weeks	4 weeks
Period of time after symptoms return after completing therapy			
Side effects	None	None	None
Frequency of healthcare appointments			
Time required	No/barely effort	1-hour weekly	1-hour weekly

Which treatment would you prefer?

- o Medication
- o Diet
- o Psychotherapy

Sturkenboom R, Kesthelyi D, Masclee A, Essers B. Discrete Choice Experiment Reveals Strong Preference for Dietary Treatment Among Patients With Irritable Bowel Syndrome. Clincal Gastroenterology and Hepatology. 2022.

Topics in choice question format

1. Binary or multiple choice models

2. Forced choice or “escape” possibility (opt-out/status quo/reference condition)

3. Labelled or unlabelled experiments: options with names or labels or just “option 1” and “option 2”)

Binary forced choice (unlabelled)

	Treatment A	Treatment B
Health Care provider	Medical specialist	Specialized nurse
Contact mode	In hospital	Telephone
Frequency of contacts	Every 6 months	Every 3 months
Waiting time	60 minutes	50 minutes

Which treatment do you prefer?

Forced choice or opt-out?

- Design choice as closely as possible to the "real" choice
- Beware, no or little information is captured in terms of attribute-level trade-offs
- Define opt-out (if possible as attributes and levels) to reduce measurement error

Multiple choice including opt-out (unlabelled)

Question 1

	Treatment A	Treatment B
Efficacy (their effect) in reducing the risk of future fractures	30%	40%
Possible side effects (affecting 1 in 50 patients)	Flu-like symptoms	Skin reactions
Mode of administration	Subcutaneous	Intravenous
Frequency of administration	3-month	Yearly
Cost to you	€15 (per month)	€25 (per month)

Which treatment would you choose? Treatment A ☐ Treatment B ☐ No treatment ☐

(Tick one box only)

Figure 1 Example of a choice set.

Hiligsmann et al. Arthritis Research & Therapy 2014, 16:R36

Labelled or unlabelled?

- Labelled when alternatives have different attributes and/or levels like choice between surgery and medication
- Labelled if objective is to predict market shares (i.e. expected uptake) for particular alternatives (e.g. blood test, stool test, combination test in colorectal cancer screening)
- Labelled may add realism to choice task

Choice set (labelled)

Question 1

Attribute	Imiquimod *option 1*	Imiquimod *option 2*		LLETZ
Chance of successful treatment	**55%** *55 of 100 women*	**95%** *95 of 100 women*		**95%** *95 of 100 women*
Risk of premature birth	**12%** *12 of 100 women*	**6%** *6 of 100 women*		**12%** *12 of 100 women*
Risk of subfertility	**8%** *8 of 100 women*	**16%** *16 of 100 women*		**16%** *16 of 100 women*
Risk of side effects:				
Vaginal pruritus or pain	**10%** *10 of 100 women*	**25%** *25 of 100 women*		-
Abdominal pain	-	-		**15%** *15 of 100 women*
Vaginal discharge	**10%** *10 of 100 women*	**30%** *30 of 100 women*		**20%** *20 of 100 women*
Vaginal bleeding	-	-		**25%** *25 of 100 women*
Flu-like symptoms	**10%** *10 of 100 women*	**25%** *25 of 100 women*		-
Which treatment do you prefer?	Imiquimod *option 1* ☐	Imiquimod *option 2* ☐		LLETZ ☐

Treatment of Cervical Intraepithelial Neoplasia: Patients Preferences for Surgery or Immunotherapy with Imiquimod. *Koeneman M, Essers B et al.*

Properties of an experimental design

Construction of choice sets

1. Profiles represent combinations of attribute levels (alternatives, scenarios, options)
2. A number of profiles has to be selected
3. They must be placed into a choice set
4. In a statistically and respondent efficient way

Full factorial

All possible combinations

Possible profiles = L^A

- 2 attributes (A) at 2 levels (L) = $2^2 = 4$
- 4 attributes (A) at 4 levels (L) = $4^4 = 256$

E.g. with 2 attributes at 4 levels and 3 attributes at 2 levels:
$4^2 \times 2^3 = 16 \times 8 = 128$ possible combinations

Example full factorial: screening program for colorectal cancer

3 attributes with 2 levels each

- Screening test: Blood sample / Stool sample
- Frequency: every 2 years / every 5 years
- Relative mortality reduction: 5% / 10%

All possible combinations each describe a unique screening programme

Number of profiles: $L^A = 2^3 = 2 \times 2 \times 2 = 8$

Example full factorial design

Choice set number	Screening test	Frequency	Relative mortality risk reduction	Would you participate in this screening program?	
1	Blood sample	Every 2 yr	5%	yes	no
2	Blood sample	Every 2 yr	10%	yes	no
3	Blood sample	Every 5 yr	5%	yes	no
4	Blood sample	Every 5 yr	10%	yes	no
5	Stool sample	Every 2 yr	5%	yes	no
6	Stool sample	Every 2 yr	10%	yes	no
7	Stool sample	Every 5 yr	5%	yes	no
8	Stool sample	Every 5 yr	10%	yes	no

Full factorial design

Allows all possible profiles to be tested

May include implausible combinations (e.g. extreme pain and no ADL restrictions)

Almost never possible due to complex decision contexts (i.e. more attributes & more levels)

Fractional factorial design

Fractions means including fraction (= a part) of all possible profiles

Lesser limit on number of attributes and levels compared to full factorial

Properties of an experimental design

Orthogonality

Level balance

No/minimum overlap

Utility balance & efficient designs

Orthogonality

Orthogonality: the levels of each attribute vary independently of each other. In short, they are not correlated.

→ Not orthogonal: e.g. lower (higher) levels of the attribute ‘waiting time’ more frequently occurs with a higher (lower) level of ‘costs to you’.

Level balance

Within each attribute, levels occur with equal frequency in the choice experiment

Ensures that respondent does not see e.g. only low levels for an attribute

Most experimental designs are balanced

Level balance

Attribute	Level	No. Of Appearances in Experiment
Referral Time	6	***4***
Referral Time	12	***4***
Referral Time	19	***4***
Referral Time	28	***4***
Time with DR	15	***4***
Time with DR	30	***4***
Time with DR	45	***4***
Time with DR	60	***4***
Pain	Yes	***8***
Pain	No	***8***
Cost	£60	***4***
Cost	£120	***4***
Cost	£180	***4***
Cost	£250	***4***

No or minimum overlap

No overlap: attributes do not appear at the same level within a choice set

Maximum trade-off information from each choice set

Beware: no overlap at all may be cognitively too demanding

Example choice set

	Treatment A	Treatment B
Effectiveness	75%	70%
Cosmetic result	good	excellent
Side-effects mild (itching)	45% (45 in 100 patients)	45% (45 in 100 patients)
Treatment process	Twice within 2 weeks by an expert at the hospital	Daily during 4 to 6 weeks at home by yourself

Which treatment do you prefer?

Utility balance

One of the alternatives in a choice should have a probability of being chosen of about 60-80% (other 1-P).

Probability around 50%: not efficient, may evoke random choices, increases measurement error

Probability around 100%: not efficient, dominant alternative

Example utility dis-balance

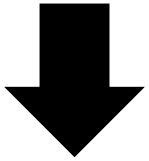
	Treatment A	Treatment B
Effectiveness	20%	30%
Risk of side-effects	10%	5%
Cost	50 €	25 €

Why utility disbalance here?

Utility balance

Orthogonal designs do **not** accommodate this

Information on priors (parameter values) necessary to take account of this in designing choice experiment!



Efficient designs

Efficient design (..if interested)

Information on priors of parameters necessary

Conduct a pilot, analyse en use the parameter values (priors)

- Fixed priors
- Bayesian efficient design (e.g. Bayesian D-efficient)

May involve sacrificing design principles to some extent (orthogonality, level balance)

Dedicated software for this (e.g. **Ngene, R, STATA)**

QUALITY OF RESPONSES

Internal validity

1) Repeat the same question (for example: at beginning and end of questionnaire)

2) Alternative in which all the levels are better

3) Respondents who always choose the alternative with the best level of one attribute

RESPONDENT'S CHARACTERISTICS

1) Report respondent's characteristics against the known characteristics of the population whose preferences researchers may want to generalize

2) When available: examine differences between respondents and non-respondents

QUESTIONS ?

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