

Public preferences in organ allocation: A discrete choice experiment regarding principles of distributive justice

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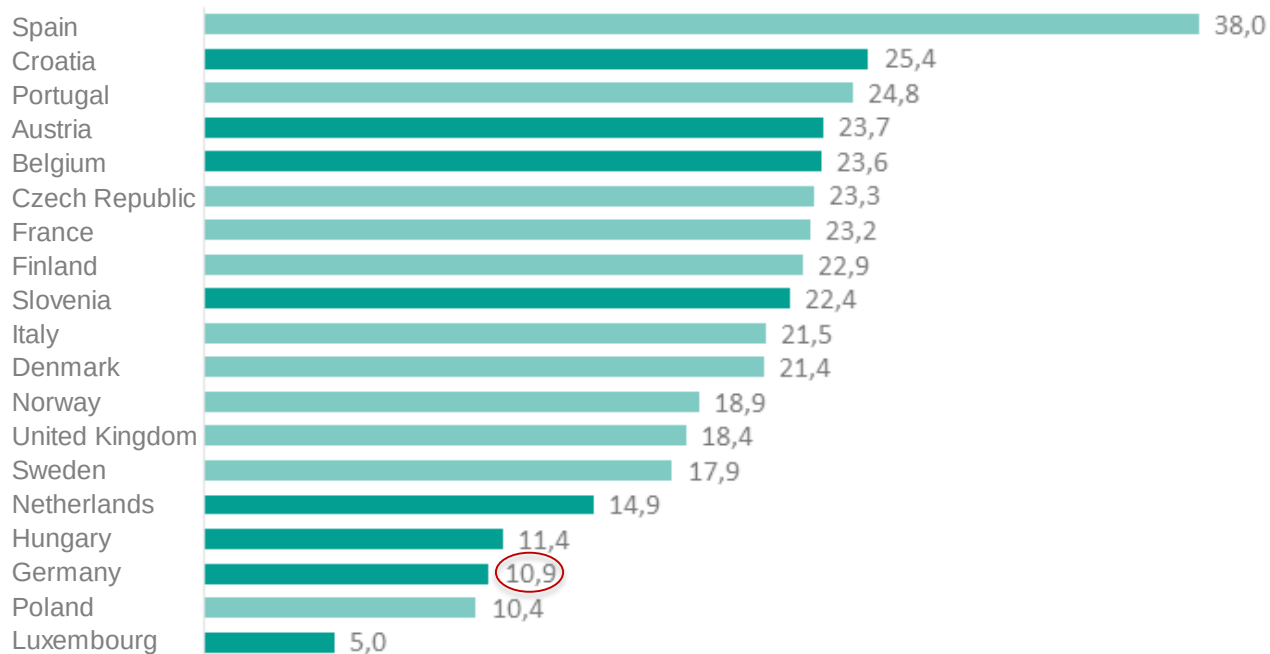
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Deceased organ donors 2020 in Europe per million population



● Eurotransplant members

Mismatch between supply and demand in Germany

	Numbers of deceased donated organs	Numbers of patients on the active waiting list
Organ type	31.12.2021	31.12.2021
Kidney	1,492	6,593
Liver	742	848
Heart	310	727
Lung	299	291
Pancreas	57	271
Small intestine	5	0
Overall	2,905	8,730

How to allocate?

Research question and aims

- *How should scarce deceased donor organs be allocated and which patient should be considered to receive an available organ from a public perspective?*
 - Assess preferences for the allocation of deceased donor organs
 - Trade-offs between different allocation criteria
 - Theoretical framework: Principles of distributive justice
- I. Systematic review (Oedingen et al. 2019)
- II. Focus group discussions (Oedingen et al. 2020)
- III. **Discrete choice experiment (DCE)** (Oedingen et al. 2021)

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Theoretical framework: Principles of distributive justice

<i>Medical and social risk factors for effectiveness/benefit and increased urgency</i>		<i>Principles of distributive justice</i>	Theory-guided groups: Divergence from principle of equality (egalitarianism)	
Medical background		Effectiveness/Benefit (utilitarianism)		
Sociodemographic status		Medical urgency (favouring the worst-off)		
		Own fault		
		Value for society		

Selection of attributes and levels

	Attributes	Levels			
<i>Effectiveness/ Benefit</i>	Life years gained after transplantation	+ 5 years	+ 10 years	+ 15 years	
	Quality of life after transplantation	Bad	Moderate	Good	
<i>Medical urgency</i>	Chance for a further donor organ offer	25 %	50 %	75 %	
<i>Sociodemo- graphic status</i>	Age	25 years old	40 years old	55 years old	70 years old
<i>Value for society</i>	Registered donor	Yes	No		
<i>Own fault</i>	Individual role in causing organ failure	Yes	No		

Choice sets and experimental design

- 2 unlabeled alternatives for each choice set
 - no status-quo or opt-out alternative
 - „forced choice“

- $3^3 * 4^1 * 2^2 = 432$ possible combinations with a „full factorial design“ and $(432 * 431) / 2 = 93.096$ choice sets
 - reduced (fractional factorial) design with overall 104 choice sets (13 blocks with each 8 choice sets) calculated with SAS (Kuhfeld 2010)
 - D-efficiency: 79,5594, D-error: 0,0126
 - balance for all attribute levels

Example of a choice set

If there was only one organ available which of both patients, *patient A* or *patient B*, do you think should receive the donor organ and should therefore be transplanted? Please tick the appropriate box.

Attributes

Life years gained after transplantation

+ 15 years



+ 10 years



Quality of life after transplantation

Bad



Good



Chance for a further donor organ offer

25%



50%



Age

55 years old



70 years old



Registered donor

Yes



No



Individual role in causing organ failure

No



Yes



I choose...



Data collection

- Online self-completed questionnaire
 1. Attitudes towards organ donation
 2. What is important to you in the allocation of deceased donor organs? (DCE)
 3. Attitudes towards organ allocation
 4. Personal information
- Survey period: November 16th to December 3rd, 2020
- Closed online panel maintained by the external market-research company Norstat Germany GmbH
- Quota-representative of the German population on gender, age, education level and federal state
- Minimum sample size calculation based on the rule of thumb proposed by Johnson & Orme (1996) and Orme (1998):

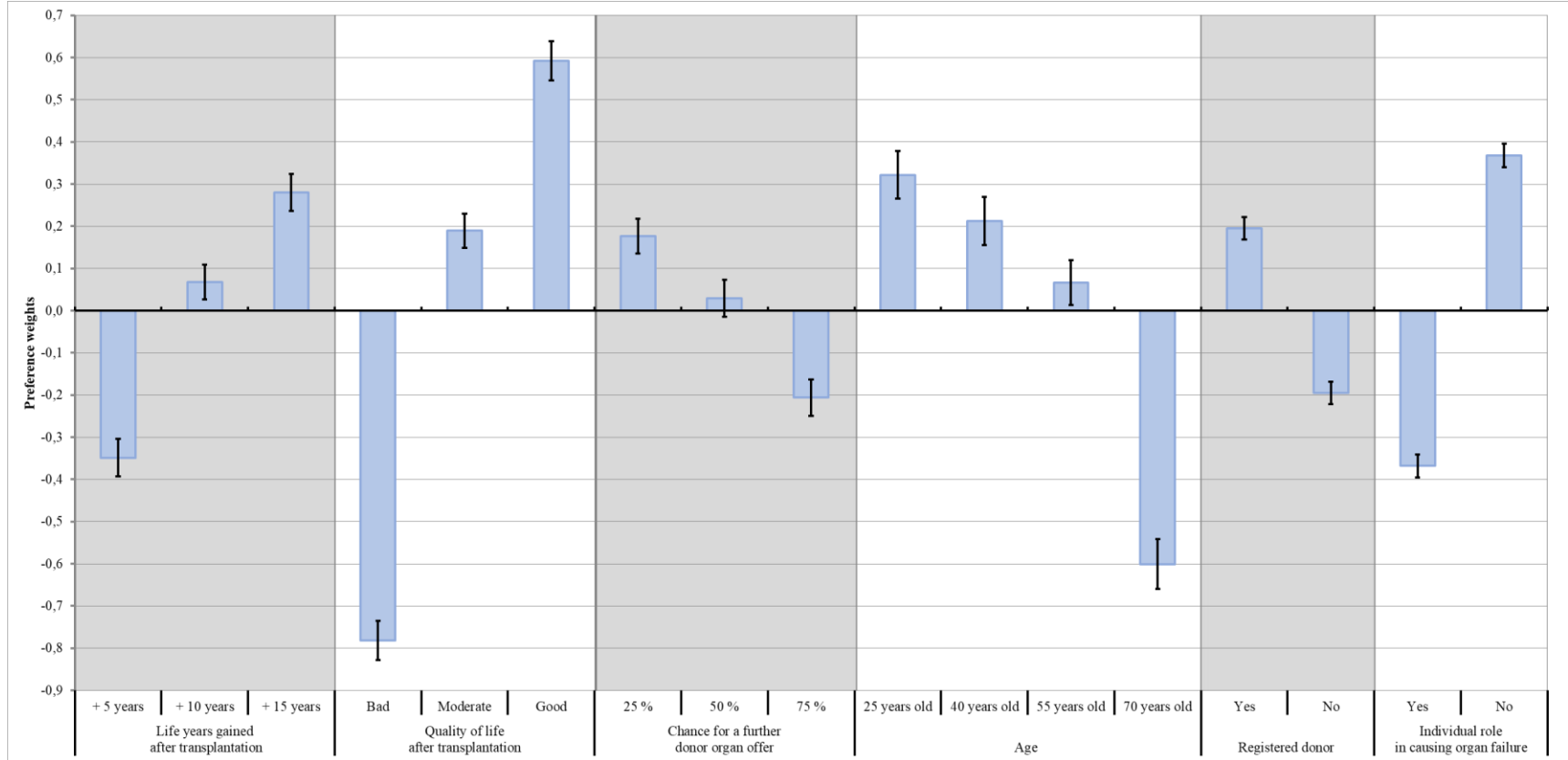
$$\frac{250 * 8 * 2}{4} = 1000$$

Statistical analyses

- Measuring the preferences:
 - Conditional (Fixed-effects) Logit Model
 - Mixed Logit Model
 - (Explorative) Latent Class Analysis

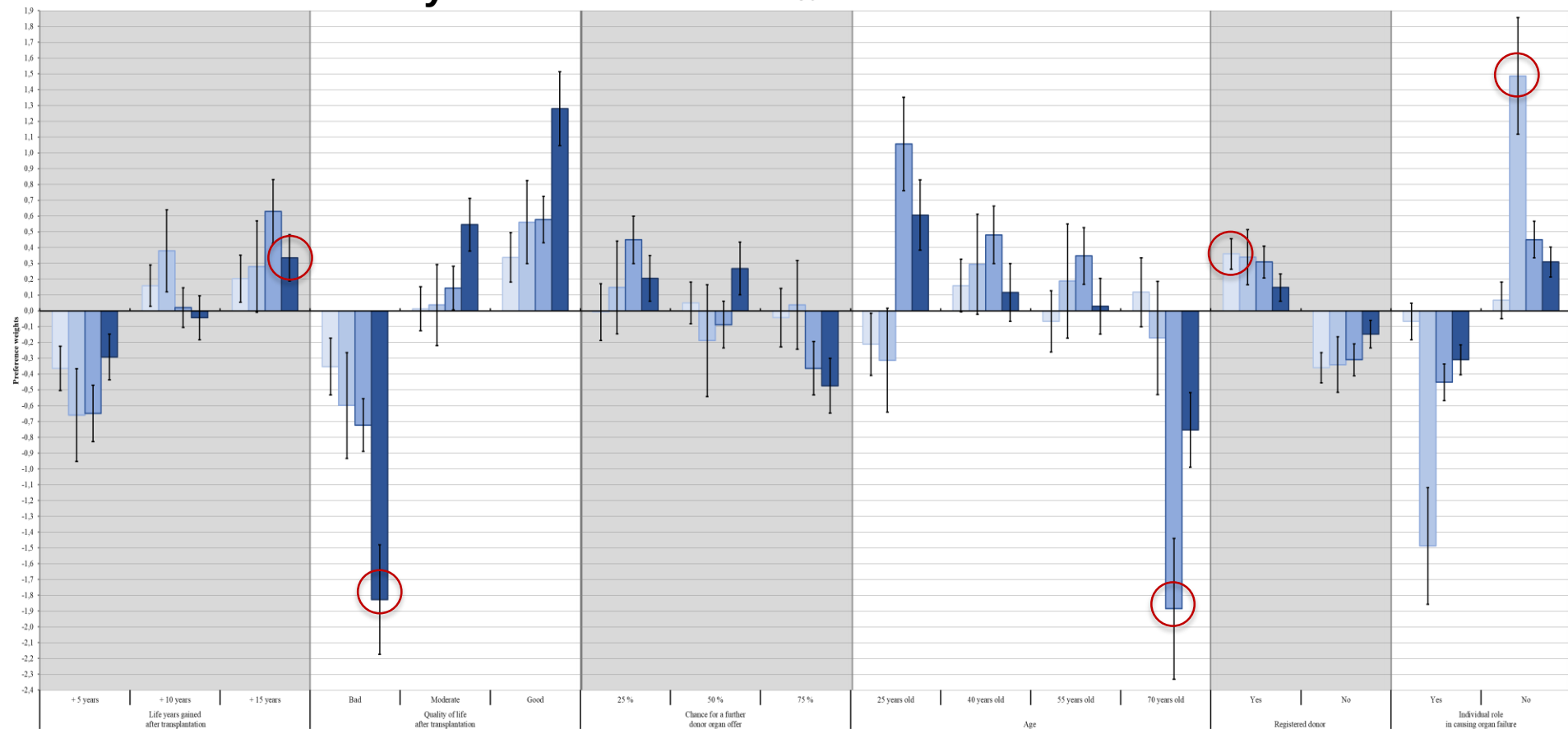
$$\begin{aligned} U_{ik} &= V + \varepsilon \\ &= \beta_0 + \beta_1 \textit{Life years gained with transplantation} + \\ &\quad \beta_2 \textit{Quality of life with transplantation} + \\ &\quad \beta_3 \textit{Chance for a further donor organ offer} + \beta_4 \textit{Age} + \\ &\quad \beta_5 \textit{Registered donor} + \beta_6 \textit{Own fault} + \varepsilon_{ik} \end{aligned}$$

Conditional Logit Model



Latent Class Analysis

Class 1: 'Value for society'
Class 2: 'Disregarding own fault'
Class 3: 'Sociodemographic status'
Class 4: 'Effectiveness/Benefit'



Characteristics of the 4 identified classes

C1: 'Value for Society' (16,8 %)

- More male
- Oldest class
- High agreement towards organ donation
- Know more people who were organ donors



C2: '(Disregarding) own fault' (16,8 %)

- More female
- Good objective knowledge about topic
- Poor self-rated information
- Often know more transplant recipients



C3: 'Sociodemographic status' (30,4 %)

- Youngest class
- High agreement towards organ donation
- Know more wait-listed patients



C4: 'Effectiveness/Benefit' (36,0 %)

- More female
- High agreement towards organ donation
- Bad objective knowledge about topic
- Often know more transplant recipients



Summary

- Public preferences for organ allocation are significantly influenced by the selected attributes and levels except '50 % chance for a further donor organ offer'
- *Quality of life after transplantation* and *Age* were the most important attributes, whereas the *medical urgency* is of minor importance
- Overall attributes regarding transplantation success are more important than medical urgency
- There is no preference to allocate deceased donor organs randomly
- A total of four latent classes could be identified with heterogeneous preferences depending on knowledge of and experiences in organ donation as well as on socio-demographic status

Outlook

- Strong public preferences for the transplantation success are only partially consistent with German organ allocation decisions considering both success and urgency according to the 1997 German Organ Transplantation Act (BÄK 2021)
 - Only possible as long as it does not undermine medical criteria
 - First studies and implementations in U.S. (Stewart et al. 2021)
- Further research on the operationalization of quality of life after transplantation
- Recommended course of action: Registered donor (overall a low influence on choice decisions but still statistical significant in all four latent classes)
- Unclear empirical linkage between individual decision to donate organs and implementation of public preferences in organ allocation
 - Only theoretically postulated

Thank you so much for your attention!

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