

Estimating the individual discounting function for health profiles with time trade-off follow-up questions

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the views presented here may not be shared)

Agenda

- Background/motivation
 - eliciting health state utilities with time trade-off (TTO)
 - discounting future life years
- Aim
- Methods
 - survey design
 - study logistics
- Preliminary results (disappointing)
- Outlook

Time trade-off (TTO) an illustration

Which is better, Life A, Life B, or are they about the same?



Full health

A

5 years



A & B
are about
the same

10 years

B



Reset

- moderate problems in walking about
- severe problems washing or dressing myself
- slight problems with performing my usual activities
- severe pain or discomfort
- severely anxious or depressed

Is $u=0.5$?
(1 for full health
0 for being dead)

Or $u>0.5$ yet the future
discounted?

Discounting in health technology assessment (HTA) and health preference research (HPR)

- In HTA (cost-utility analysis)
 - future cost and health gains less important than today ones
 - set by the decision maker (the two rates may differ.)
- In HPR
 - many tasks involve duration, e.g. TTO
 - are elicited values contaminated with time preference?
 - the official & individual discount rates may differ
 - how to get decontaminated utility values?

Caveats

- Several functions considered
 - Exponential ($1/(1+r)^t$), standard in economics
 - Hyperbolic ($1/(1+rt)$); best fit in Jonker et al. (2018)
 - Power (total value of t years = t^α), Craig and Rand (2018)
- Large heterogeneity, also various signs (e.g. see Lipman et al., 2022)
- Tricky to measure at the individual level
 - E.g. get-it-over-with effect when comparing changing profiles: (full health \rightarrow disease) vs (disease \rightarrow full health)
 - Unsure which discount function to apply
 - Unsure how consistent within an individual
 - Can be confounded with other issues (e.g. interactions)

Hence, the aim of the study (additional aims omitted here)

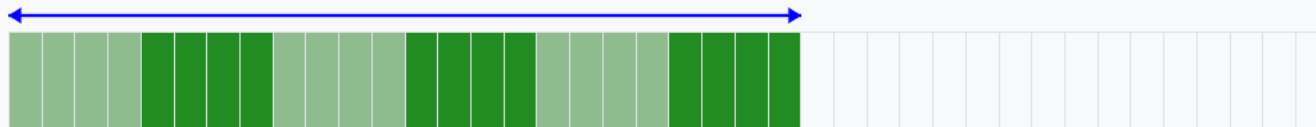
- To identify ...
 - ... at the individual respondent level ...
 - ... the discount function ...
 - ... and the discount rate ...
 - ... and inspect the consistency ...
 - ... while trying to avoid confounders

Time trade-off follow up questions (TTOFU)

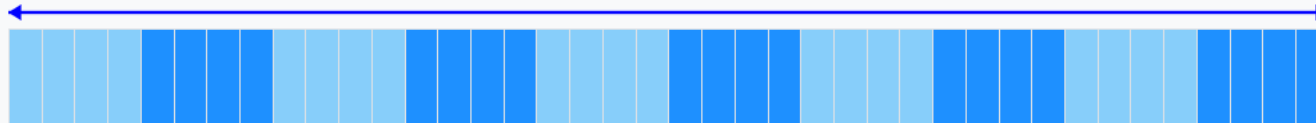
- Additional questions after indifference in TTO
- Three sets of TTOFUs, depending on whether state Q is better, worse, or equivalent to dead
- Here, focus on better than dead TTOFUs (other TTOFUs used for other research questions)
- Next slide for examples

życie w pełnym zdrowiu

6 lat

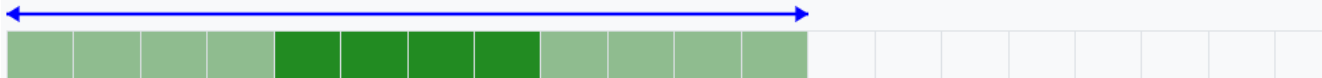


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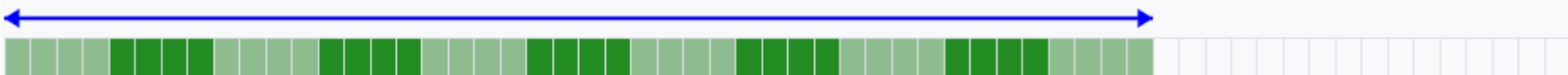


- Nie mam żadnych problemów z chodzeniem
- Nie mam żadnych problemów z myciem i ubieraniem się
- Nie mam żadnych problemów z wykonywaniem moich zwykłych czynności
- Odczuwam niewielki ból lub dyskomfort
- Jestem trochę niespokojny/a lub przygnębiony/a

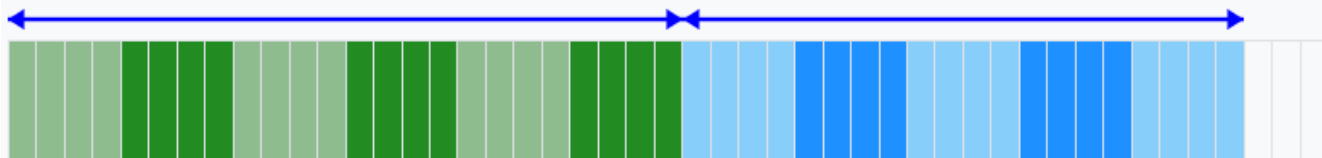
3 lata



11 lat

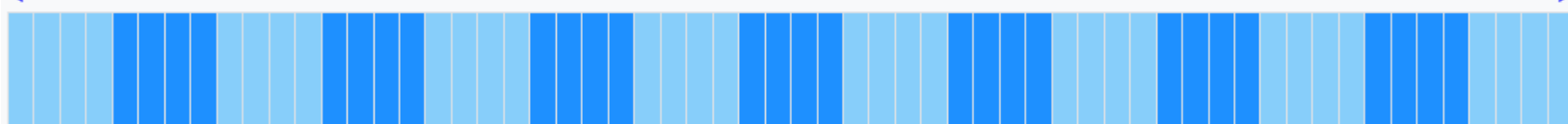


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5 lat

15 lat



What do TTOFUs tell you?

TTOFU	Positive time preference			No pref.	Negative time pref.	
	Exp	Hyp	Power		Exp	Power
1	Blue	Blue	~	~	Green	~
2	~	Mixed	Mixed	~	~	Green
3	Mixed	Mixed	Mixed	~	Blue	Blue

TTOFU1 and TTOFU2 allow distinguishing between all considered situations

TTOFU3 indicates the direction of discounting (irrespectively of the function)

Study design

- 150 respondents (reimbursed)
- Online interviews, 6 interviewers
- Demographics + own health + warm-up + TTO & TTOFU + debriefing
- 3 warm-up states + 6 actual states (3 blocks)
- Ethical approval obtained from SGH
- Sponsored by the EuroQol Research Foundation
- Data collected Nov 2022 – March 2023

Face validity of results

EQ-5D-5L health state	Present study, mean (SD)	Reference study, mean
11122	0.86 (0.15)	0.952
11212	0.82 (0.32)	0.959
11221	0.82 (0.32)	0.947
12121	0.86 (0.15)	0.939
21112	0.83 (0.17)	0.957
21334	0.51 (0.41)	0.777
22211	0.80 (0.18)	0.921
22434	0.31 (0.43)	0.689
24553	-0.27 (0.55)	0.055
31514	0.21 (0.49)	0.653
32314	0.43 (0.47)	0.787
32443	0.07 (0.59)	0.548
42321	0.48 (0.49)	0.773
52455	-0.30 (0.59)	-0.249
55225	-0.19 (0.57)	0.137
55555	-0.52 (0.51)	-0.590

Preliminary results

- TTOFU3:
 - mixed for 64% (suggesting positive time preference)
 - blue for 11% (negative preference scarce)
- But TTOFU2 = green for 57% (suggesting negative)
- Very poor consistency within respondents (not shown here)

TTOFU	Positive time preference			No pref.	Negative time pref.		Other
	Exp	Hyp	Power		Exp	Power	
1	Blue	Blue	~	~	Green	~	
2	~	Mixed	Mixed	~	~	Green	
3	Mixed	Mixed	Mixed	~	Blue	Blue	
% obs.	2%	4%	2%	12%	0%	1%	79%

Very preliminary conclusions

- Other aspects (than QALY model with discounting) impact answers very strongly
- The discounting motif not that strong (when threshold used), are standard results on discounting caused by other effects?

Limitations (selected)

- Preferences change over time (over the experiment)
- Granularity of answers (1/2-year steps)
- Additivity does not hold for mixed profiles
- Respondents did not care
- Other, unknown factors impact answers

Next steps

- Verify the regular TTO part data quality
- Dig deeper in the discounting
 - e.g. estimate the rate
- The other two research questions
 - quantify the fear of death (avoidance of immediate death)
 - quantify the maximal-endurable-time hypothesis

Thank you!

