RATIONALITY

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HOMO OECONOMICUS VS HOMO SAPIENS

Prototypical economist conception of human behavior:

- People maximize their (discounted, expected) utility
- People are **governed by self-interest**
- People are fully rational





RATIONALITY: INDIVIDUAL DECISION MAKING

Rational preferences:

- **completeness**: for any two options A and B: either $A \ge B$ or $B \ge A$ (or both)
- **transitivity**: for options A,B,C if $A \ge B$ and $B \ge C$, then $A \ge C$

Proposition Completeness and transitivity are necessary conditions for a preference relation over X to be representable by a utility function. [see, e.g., Mas-Colell, Whinston, Green, 1995, Chapter 1]

U: $X \rightarrow \mathbb{R}$ such that $A \ge B$ if and only if $U(A) \ge U(B)$

Finite or countable choice set: sufficient as well as. Otherwise, a continuity axiom needs to be added [see, e.g., Mas-Colell, Whinston, Green, 1995, Chapter 3]





Suppose: cup with three spoons of sugar \geq than cup with zero sugar.

Face 101 cups of tea ordered from zero to three spoons of sugar.



- Increments too small to taste difference between any two adjacent cups.
- Transitivity implies you should be indifferent between any two cups, but you like the cup with three spoons of sugar better than the one with zero.
- "Improve" theory by incorporating a just noticeable difference *ind* (estimated from data):

$x \ge y$ if u(x) > u(y) + jnd

Would just make the theory cumbersome, and maybe not matter much for the kind of choices we're interested in?

EXAMPLE 1: FIRST EXAMINE BOTH DECISIONS, THEN INDICATE YOUR CHOICES.

- **Decision 1**: Choose between (before answering, read Decision 2):
- A. winning 2,400 kr.
- B. a 25% chance of winning 10,000 kr. and a 75% chance of not winning or losing any money.
- **Decision 2**: Choose between:
- C. losing 7,500 kr.
- D. a 75% chance of losing 10,000 kr., and a 25% chance of not winning or losing any money.
- (Probability draws are independent across the two decisions.)





CONSEQUENTIALISM

- **Expected Utility Theory**: The domain of the utility function is **final states**
 - > Doesn't matter how we reached final states, or what we expected before
- Reference dependence: Perceptions of stimuli are not absolute, but relative
- o vision (see picture)
- o temperature (20C in winter feels differently than in summer)
- Same size utility "bump" feels differently depending if it's a loss or a gain (with respect to the reference point)
- Prospect theory





EXAMPLE 1 (TVERSKY & KAHNEMAN 1981; RABIN & WEIZSACKER 2009)

- Typically a very large fraction choose A & D
- Consistent with narrow choice bracketing and prospect theory (risk-averting in gains, risk-seeking in losses, and these preferences applied separately to the decisions)
- Is this a smart choice?



BC equals AD + a sure payment of 100 (first-order stochastic dominance)





EXAMPLE 2

Suppose that you are buying a new camera for the summer. You narrowed down your final choice to

	zoom	price	$\{x, y\}$
Х	7xZoomLens	1599kr.	50%
У	21xZoomLens	2599kr.	50%





EXAMPLE 2

Suppose that you are buying a new camera for the summer. You narrowed down your final choice to

	zoom	price	$\{x, y, z\}$
Х	7xZoomLens	1599kr.	21.5%
У	21xZoomLens	2599kr.	57%
Z	24xZoomLens	4449kr.	21.5%





EXAMPLE 2

Suppose that you are buying a new camera for the summer. You narrowed down your final choice to

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COMPROMISE EFFECT



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COMPROMISE EFFECT

- A **violation** of the independence of irrelevant alternatives (IIA) axiom If the choice from $\{x,y\} = x$, then choice from $\{x,y,z\} \neq y$
- Example:
- A person chooses strawberry from a small ice-cream shop that also has vanilla
- Then that person should not choose vanilla from a large shop that has many more flavors







SOME LESSONS

- Attention is a scarce resource
- Framing of a problem influences choice (even though it should not)
- Reference points matter, not just final consequences
- People tend to focus narrowly on aspects of a problem or decision (narrow bracketing)





REFERENCE DEPENDENCE & ATTENTION

- Important for marketing
- Active research area in behavioral economic theory:
 - 7th Bounded Rationality In Choice conference, 9-10 June 2019, Aarhus University
- My research (with Julia Nafziger and other colleagues):
 - Bracketing of goals & self regulation: theory & evidence
 - Correlates of narrow bracketing
 - Bracketing in choice under uncertainty (money vs effort)
 - Nudging consumers with limited attention: application to food safety





RATIONALITY WHEN INTERACTING WITH OTHERS

What would you choose as player 1?





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RELYING ON OTHERS' RATIONALITY



- Indicates how much player 1 trusts in the rationality of player 2:
- Common interest: (A,A) is the best outcome for both players
- For player 2: B is strictly dominated by A
- Rational player 2 has no reason to "spite" player 1 by playing B
- But player 1 may be uncertain as to whether player 2 will employ the "correct" reasoning and choose the "safe" action B
- What if payoff for A,B was (-100,5) instead of (-100,4)?

RATIONALITY WHEN INTERACTING WITH OTHERS

- Chose a number between 0 and 100
- The winner is the person whose number is closest to 2/3 of the average of all numbers entered.
- The winner gets a prize (we don't have the time to play this for real today)





- Largest possible average is if all guess $100: 2/3 \times 100 = 66.6$.
- Iargest possible winning number is 66.6
- \succ no-one should state a number larger than 66.6 (strictly dominated)
- 2/3 x of 66.6 = 44.4.
- Second round of elimination: all numbers between 44.5 and 66.6 are strictly dominated.
- This process can be continued, and only 0 survives!







EQUIS



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Results with different populations (Nagel 1995, Bosch et al. 2002)





Results with different populations (Nagel 1995, Bosch et al. 2002)

THE DEEP BASES OF BEHAVIOR...

- Our preferences are shaped by evolution
 - Our ancestors were successful at reproducing
 - If we inherited our ancestors' preferences (genetically, culturally), then our preferences should direct us towards maximization of reproductive success
- We have "biases" shaped by evolution
 - Some facets of behavior seem "hard wired" rather than a rational response



WHERE CAN I LEARN MORE ABOUT THIS?

Kahneman, D., 2011, Thinking, Fast and Slow, Farrar, Straus and Giroux

"Micro sequence":

- Game theory (4th semester), Micro 1 (5th semester)
- HA elective (5th semester): Behavioral Finance
- (4425 Micro 2), 6450 Advanced Micro
- 5419 Behavioral Economics and Finance







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