Methodological Dualism
- Its Philosophical and Behavioral Perspective -

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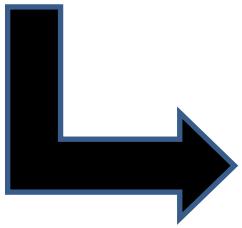
1. On methodological dualism
2. Consequentialistic bounded rationality
   a) A stochastic decision experiment
   b) A stochastic ultimatum experiment
3. A general process framework
4. Finally

1. On methodological dualism

Common to all social sciences

Philisophical tasks: how should we decide when

- wanting to decide rationally (orthodox decision theory),
- in case of interacting with others who also decide rationally (orthodox game theory)?



No set solution resolves uncertainty completely: one has to determine unique optima and select among equilibria

Purely philosophical exercises (complementing the philosophy of rationality)

- Usually based on totally convincing, often formal axioms
- No restrictions due to human cognition and psychology
- Rejection only by philosophical discourse, not by empirical data
- May require even what is cognitively impossible

From this rational choice perspective it seems dubious

- To question expected utility theory in view of empirical data (as expected prospect theory)
- To neglect equilibrium selection theory which so far is preliminary except for narrow game classes (unanimity or 2 x 2-bimatrix games with multiple equilibria; Harsanyi/Selten, 1988)

The other tasks:

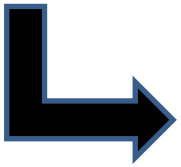
how do we (explanatory/descriptive task) or should we (semi-normative task) behave when

- cognitively constrained
- emotionally affected
- facing an uncertain environment?

requires empirical research (nomological knowledge) also about human cognitive potential and psychology

but also asks how human behavior may be improved by

- learning
- teaching and advising
- employing human artefacts like analytical/computing devices



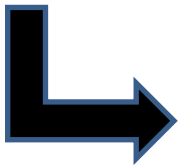
has to be suitable for homo sapiens
who is at best only boundedly rational!

Behavioral perspective

only focus on consequentialistic, i.e. forward looking decision making

behavioral toolbox may include ideas of individual, resp. common(ly known) rationality theory like intra-personal payoff aggregation and its solution ideas

but must be open for psychological ideas like "multiple selves ", " satisficing " etc. and be guided by empirical findings rather than by axioms



bounded rationality theory: consequentialistic approach respecting human cognition and psychology

In my view,

- rationalizability via repeated elimination of dominated or inferior strategies,
- k-level reasoning,
- common(ly known) optimality and rational expectations

can lead us astray when accounting for empirically observed behavior &
provides no sound basis to improve human decision making by teaching, learning, (policy) advice

Looking back

Early psychology: no need to justify bounded rationality.

Core ideas like

- Aspiration formation
- Search for satisficing choice behavior
- Aspiration adaptation

Can be found in

Lewin (1926)

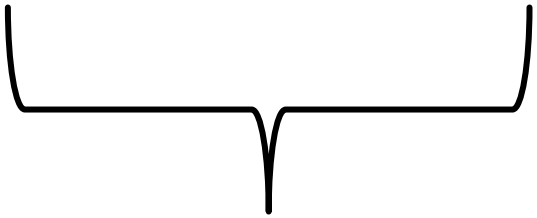
Hoppe (1930)

Lewin & Dembo (1931)

Heckhausen (1955)

In economics satisficing (Simon, 1955) complements rational choice approach

„Bounded rationality“ respects our cognitive and emotional constraints and should be absorbable by homo sapiens



theory absorption needs both: (Morgenstern)

- absorbability
- surviving ist common acceptance

Behavioral Economics?

- empirical comparison of learning theories (e.g. reinforcement/imitation learning, best-reply dynamics)
- often too mechanically applied, e.g. we may begin with reinforcement learning when completely uncertain but change to consequentialistic deliberation when better informed
- dominance of as-if rationality (the revealed preference / motive approach)
- can be inspiring and informative but "explanandum rather than explanans"
- no basis for semi-normative task (how can human decision making be improved?)

2. Consequentialistic Bounded Rationality

one develops

- goals / ends
- choice alternatives / means
- means $\longrightarrow$ ends-causality
- circumstances beyond own control (scenarios composed of random events & choices by others) possibly
- without intra-personal payoff aggregation
- without generating(objective or subjective) numerical probabilities

A stochastic decision experiment (Di Cagno et al., three papers):

- controls:
  - no other regarding concerns
  - experimentally induced risk neutrality via binary-lottery incentives
  - expected utility maximum focal as corner maximum
  - (set) optimality: irrelevance of probability (transformation)

- two scenarios:
  - boom with objective probability p
  - doom with complementary probability 1 – p
- choice: how much of positive endowment e, i.e. which i with $0 \leq i \leq e$, to invest in risky project?
- e-i: invested safely yielding the same constant return rate in boom and doom

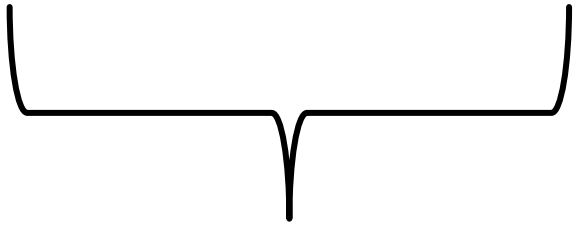
Optimality only requires

- more money is better
- correctly computing the probability of more money

In spite of focal optimality (corner maximum)

- nearly no (set) optimality but
- reduction of sub-optimality by:
  - learning (36, respectively 45 successive decision tasks of which only one is paid)
  - intermediate advice alerting to possible non(set) optimality

Binary lottery incentives $(u(€14) = 1, u(€4) = 0)$;
Variable return rate of risky investment:



Expected utility: probability of higher prize

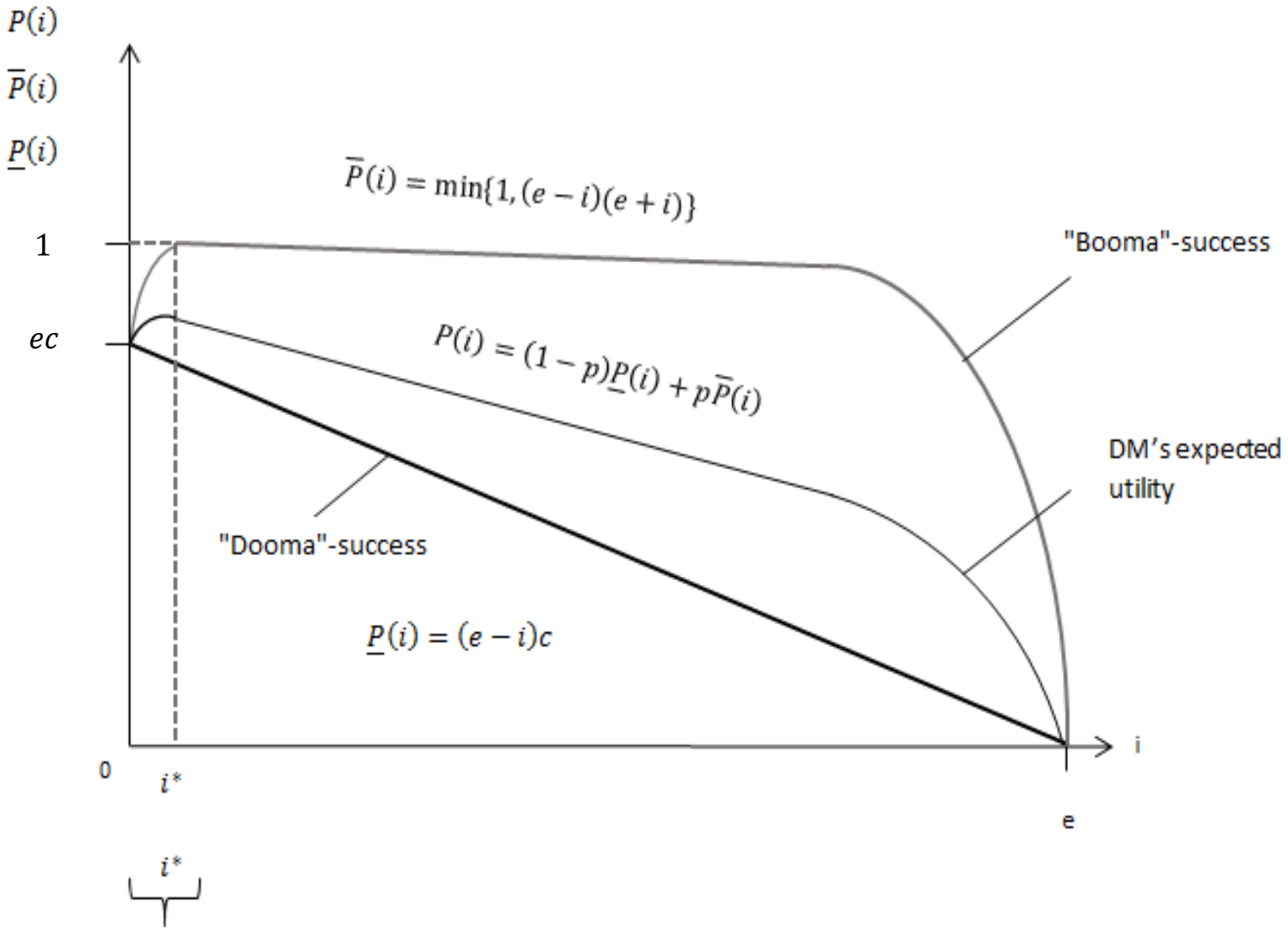
Selves:

„Dooma“ earns higher prize with probability
$\underline{P}(i) = \min\{1, c(e-i)\} = c(e-i)$ due to $ce < 1$

„Booma“ earns higher prize with probability
$\overline{P}(i) = \min\{1, (c+i)(e-i)\}$

Where (c+i)(e-i) > 1 for some generic i-interval

otherwise one earns low prize



not depending on p ((lower i-root with (c + i)(e-i) = 1)

Aspiration elicitation

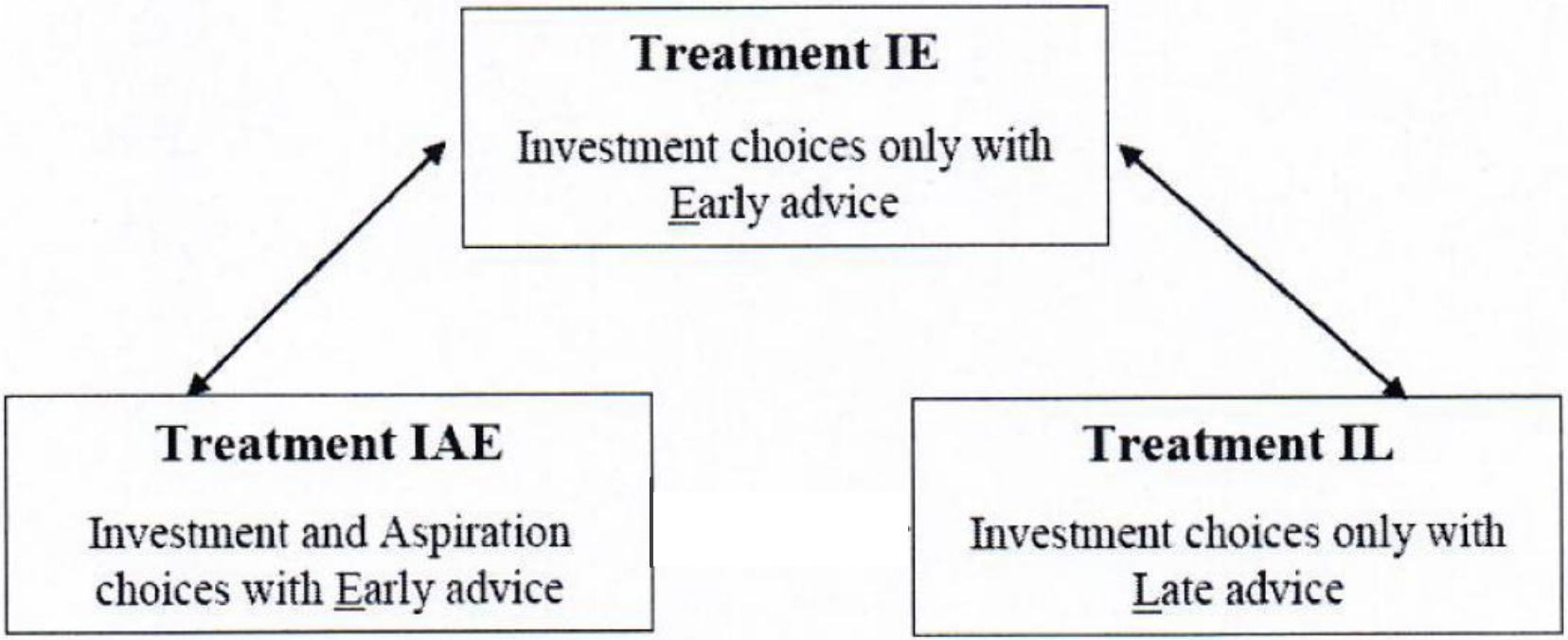
"Dooma" : states $\underline{A}$
satisfices if $\underline{P}(i) \geq \underline{A}(\geq 0)$

"Booma" : states $\overline{A}$ $(\geq \underline{A})$
satisfices if $\overline{P}(i) \geq \overline{A}$

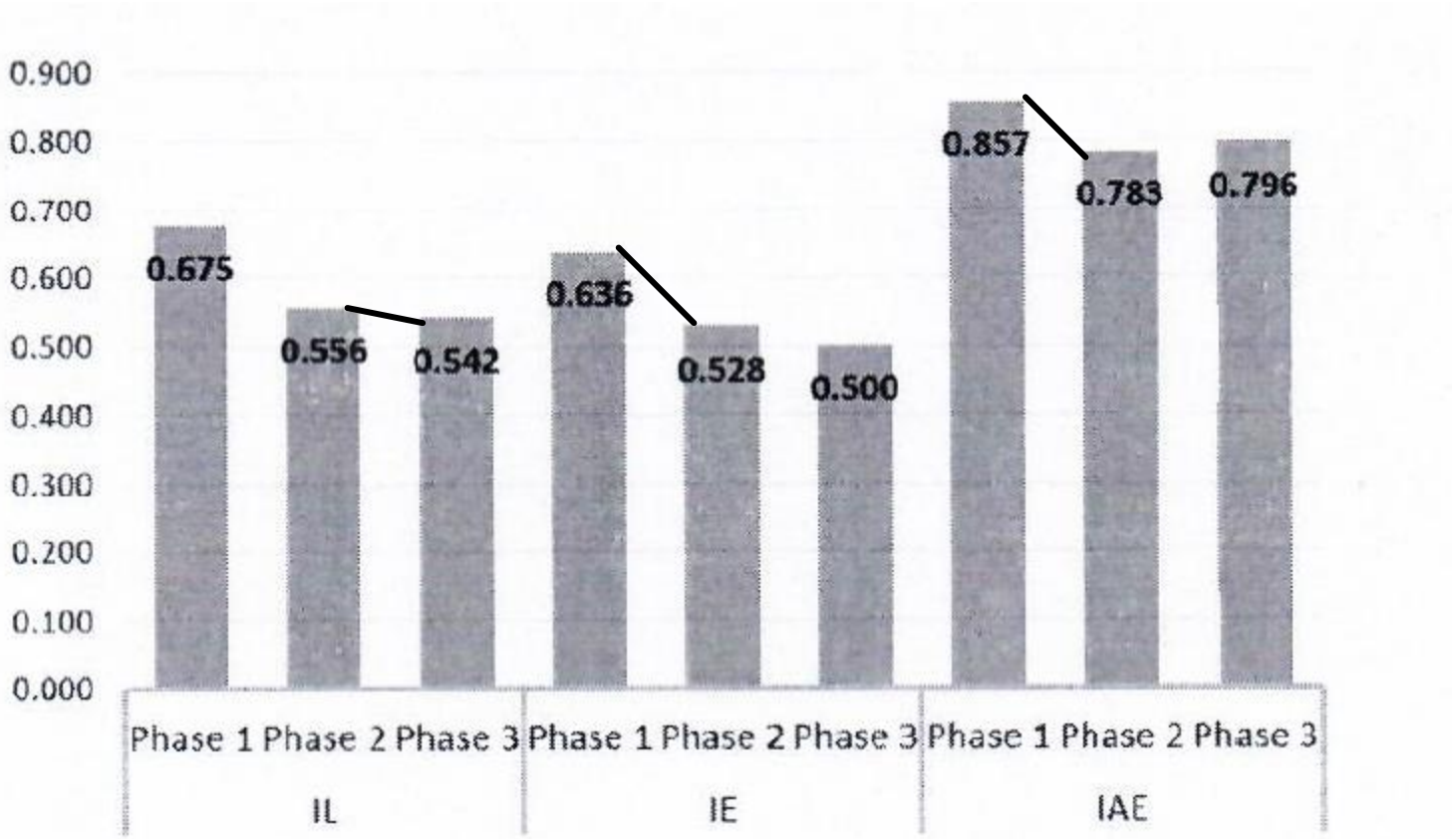
Incentivized via:

- one earns aspiration if satisficing
- otherwise 0-probability of high prize
- (set) optimal satisficing: $\underline{A} = \underline{P}(i) \,\&\, \overline{A} = \overline{P}(i)$
  $0 \leq i \leq i^*$

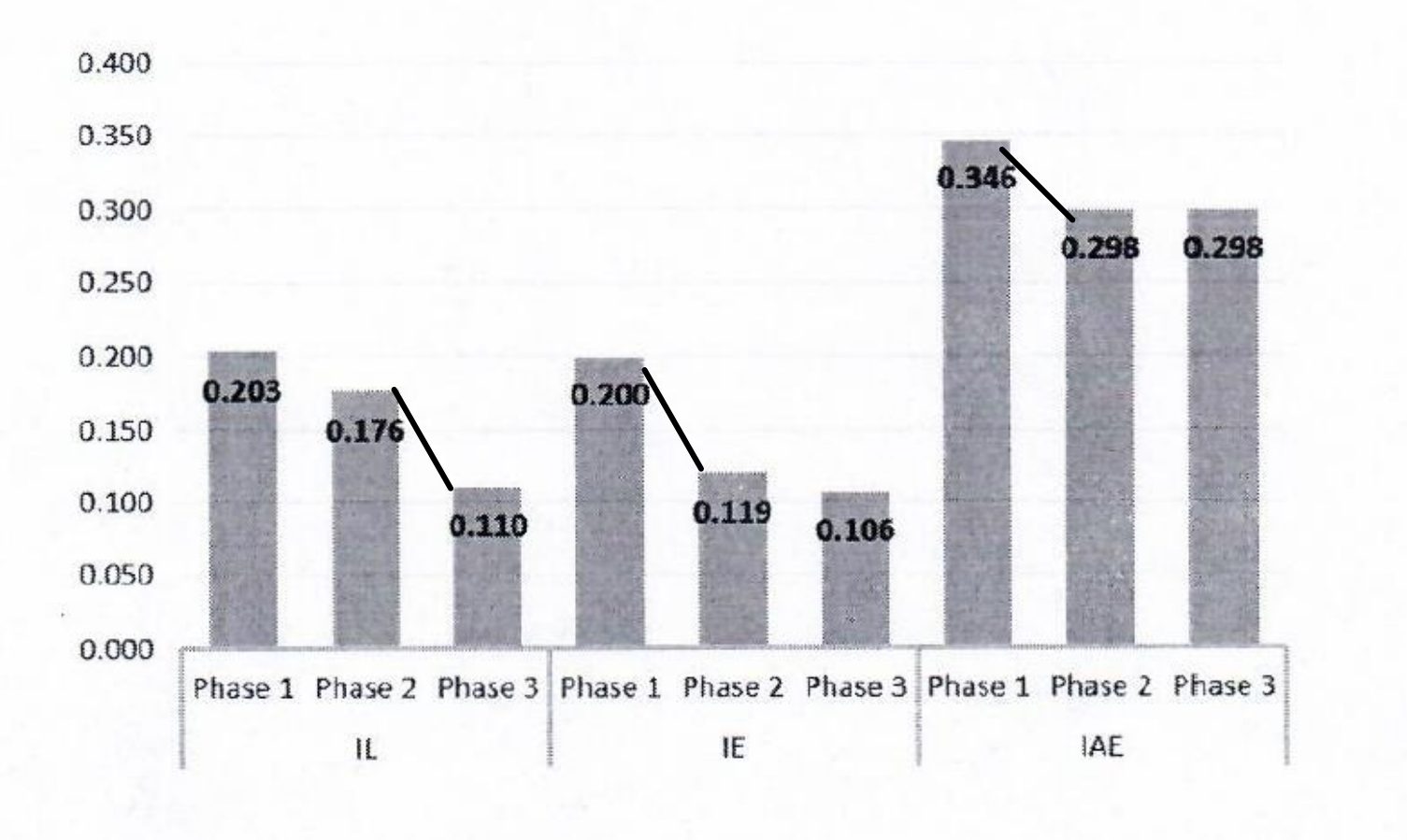
Some glance at data (Di Cagno/Güth/Pace):



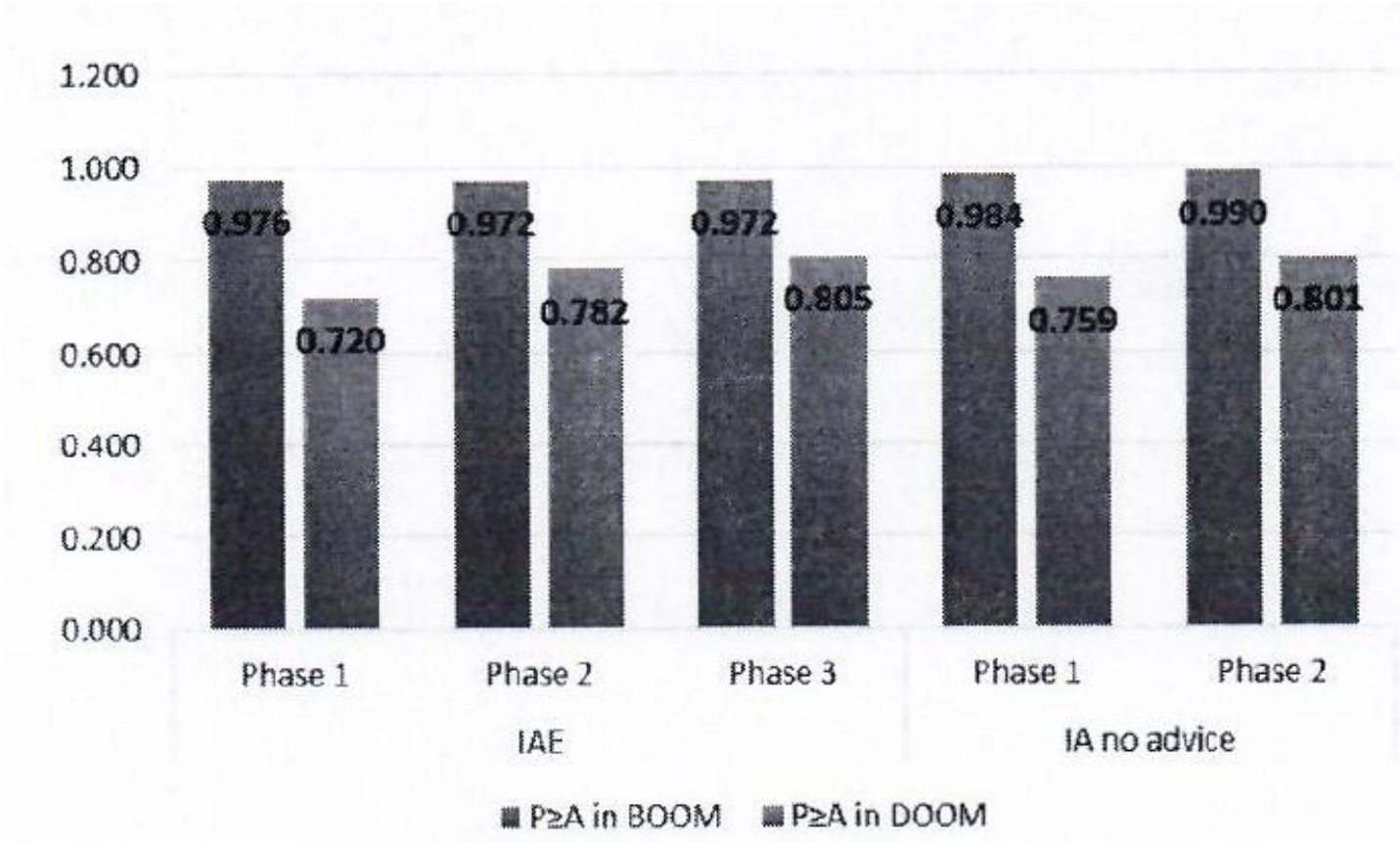
Non-(set) optimality decreases: mainly from phase 1 to 2



Decreasing distance from non-(set) optimality after advice

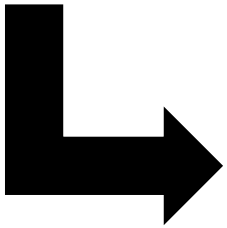


Minor increases of satisficing shares only for Doom



Conclusion:

- we are no born optimizers but able to learn and follow (intermediate) advice
- need of business schools and professional advice institutions although



far from offering absorbable behavioral decision theory

Stochastic ultimatum experiment

- special case of game class (theoretically analyzed by Güth, Ritzberger, Van Damme, 2004)
- experiment (Güth, Marazzi, Panaccione, mimeo)
- based on common(ly known) risk neutrality via employing binary-lottery incentives

Process:

(i) proposer X demands x with $0 \leq x \leq 1$
(ii) random, U(0,1), selection of pie size π with $0 \leq \pi \leq 1$
(iii) responder Y learns x and π and chooses between

- $\delta = \delta(x, \pi) = 1$

or

- $\delta = \delta(x, \pi) = 0$

Payoffs: X earns $\delta \cdot x$
Y earns $\delta(\pi - x)$

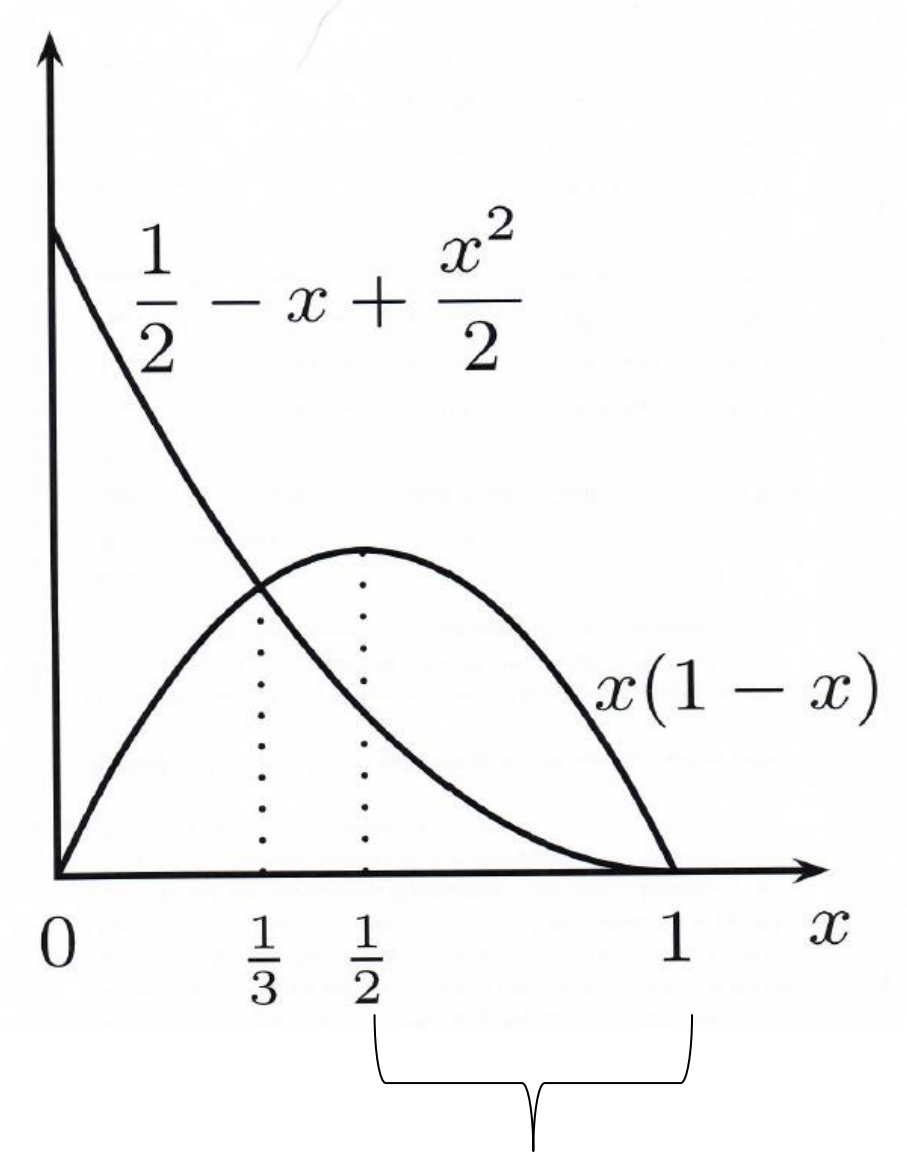
Backward induction:

$\delta^* = \delta^*(x, \pi) = 1$ if $x \leq \pi$,
$\delta^* = \delta^*(x, \pi) = 0$ otherwise

X‘s expected utility: $x \cdot (1 - x)$

optimality: $x^* = \frac{1}{2}$

Expected utilities implied by $\delta^*(\cdot)$



Three framing treatments (between subjects):

- market (M): player 1 is "seller ", player 2 is " buyer ", demand is "price"
- bargaining (B): player 1 is "proposer", player 2 is "responder", demand is "proposal "
- market with joint ownership (M^{+}): same as (M) but joint ownership

Market Framing Hypothesis (Hoffmann et al., 1994 and 2000)
market frames trigger more opportunistic behavior by first player: demands are on average highest in (M), second highest in(M^+), lowest in (B)

Stochasticity Hypothesis
Second-mover behavior generally opportunistic in stochastic interaction which renders payoff comparisons cognitively demanding (weak and across rounds decreasing framing effects)

- 20 rounds
- randomly assigned role (maintained across rounds)
- randomly changing partner at each round
- 216 students
- show-up fee 4€

Common(ly known) risk neutrality

- binary lottery incentives

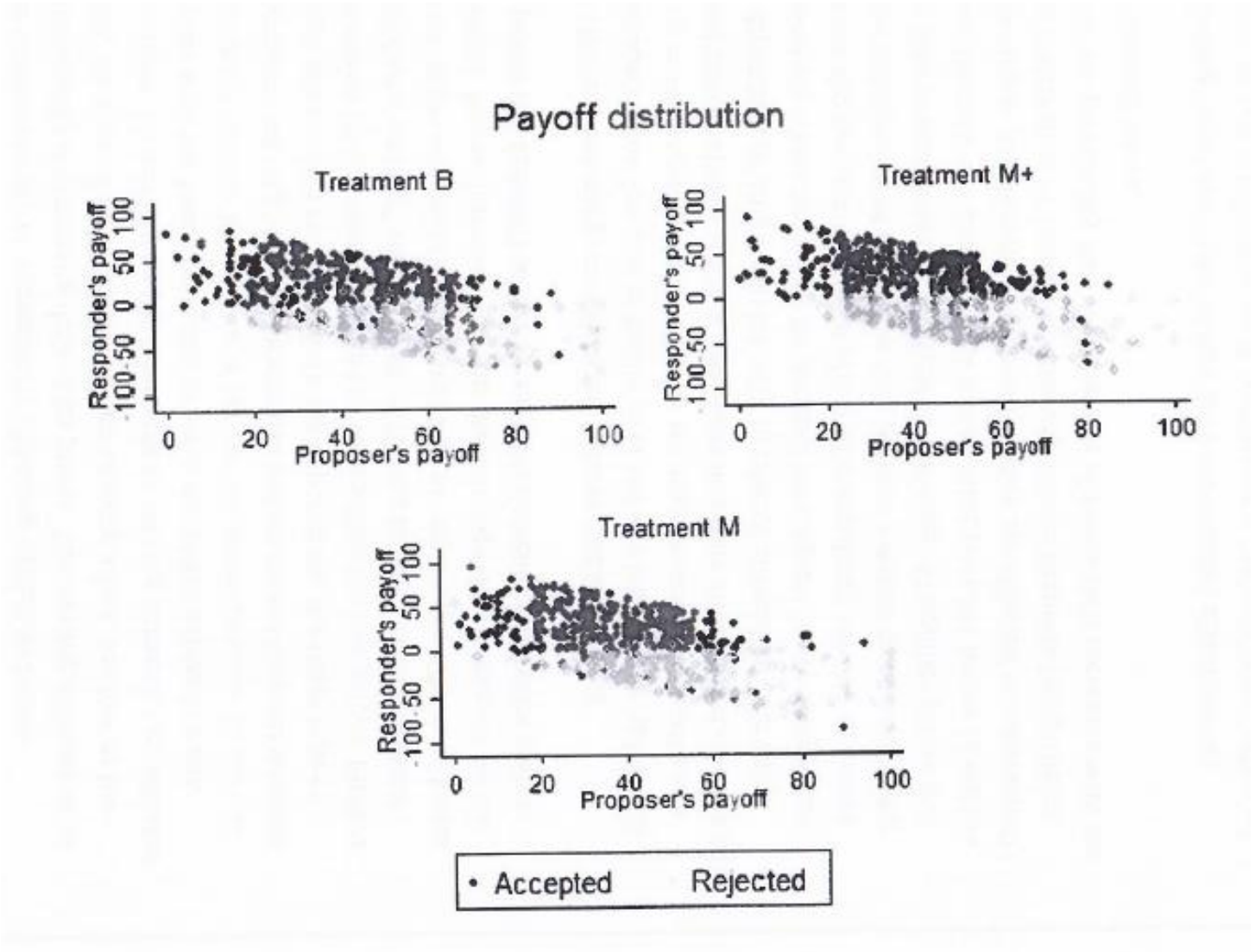
- high prize 14€, low prize 4€

- only one randomly selected round is paid

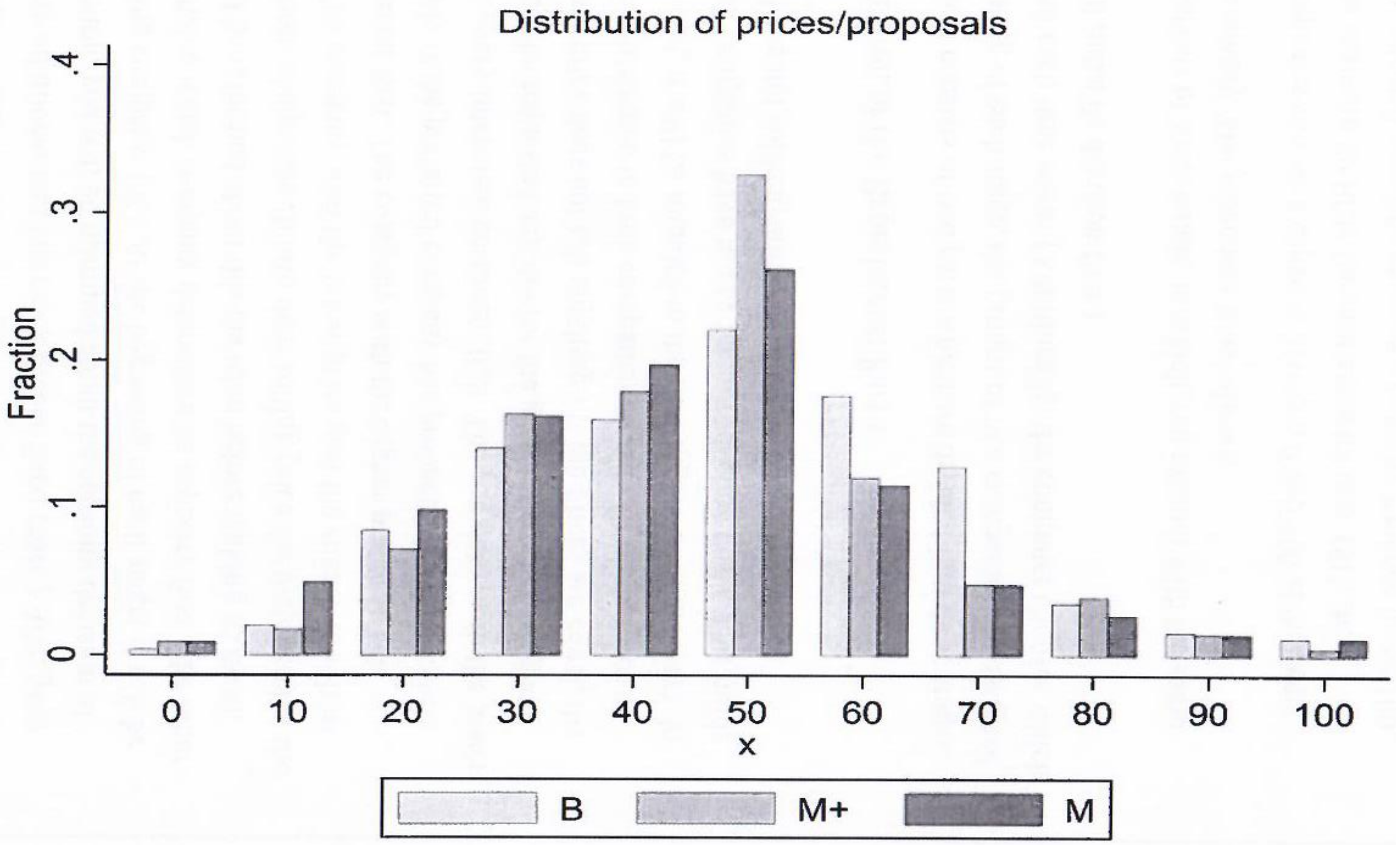
- in all treatments, second movers nearly always reject (accept) proposals whenever acceptance would imply a loss (gain), i.e. are opportunistic

- crucially stochastic environment crowds out altruistic sanctioning and rewarding

- In line with early results of Acquiring-a-Company experiment (Bazerman/Samuelson, 1983 and 1985)


Payoff distribution
Treatment B
Treatment M+
Treatment M
Responder's payoff
-100 -50 0 50 100
Proposer's payoff
0 20 40 60 80 100
• Accepted
Rejected

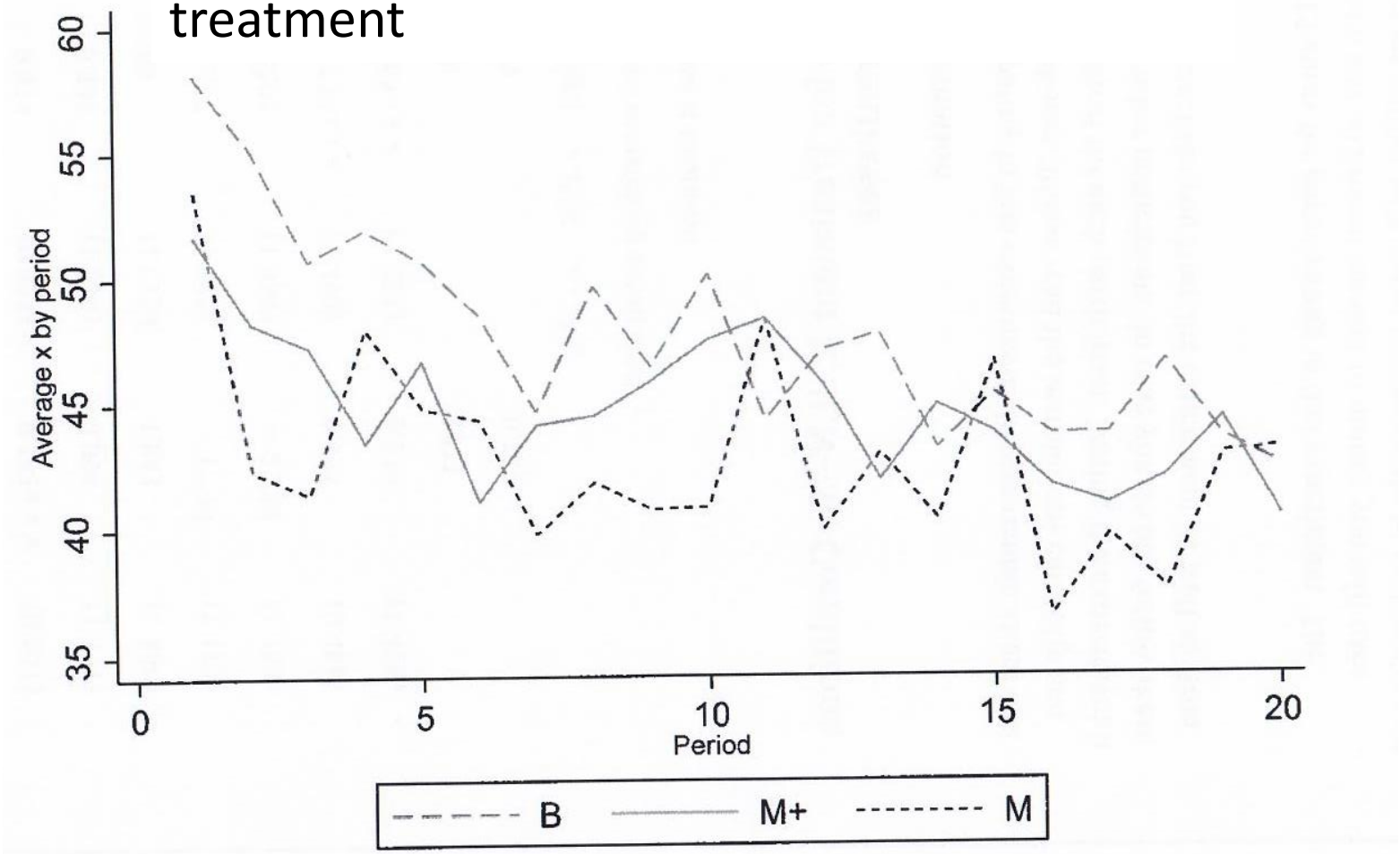
Results/1


Distribution of prices/proposals
Fraction
0
.1
.2
.3
.4
0
10
20
30
40
50
60
70
80
90
100
x
B
M+
M

- modal demand is 50 (sequentially rational or naively focal), stronger in (M) but unexpectedly largest in M^+

- surprising substantial and symmetric heterogeneity of demands

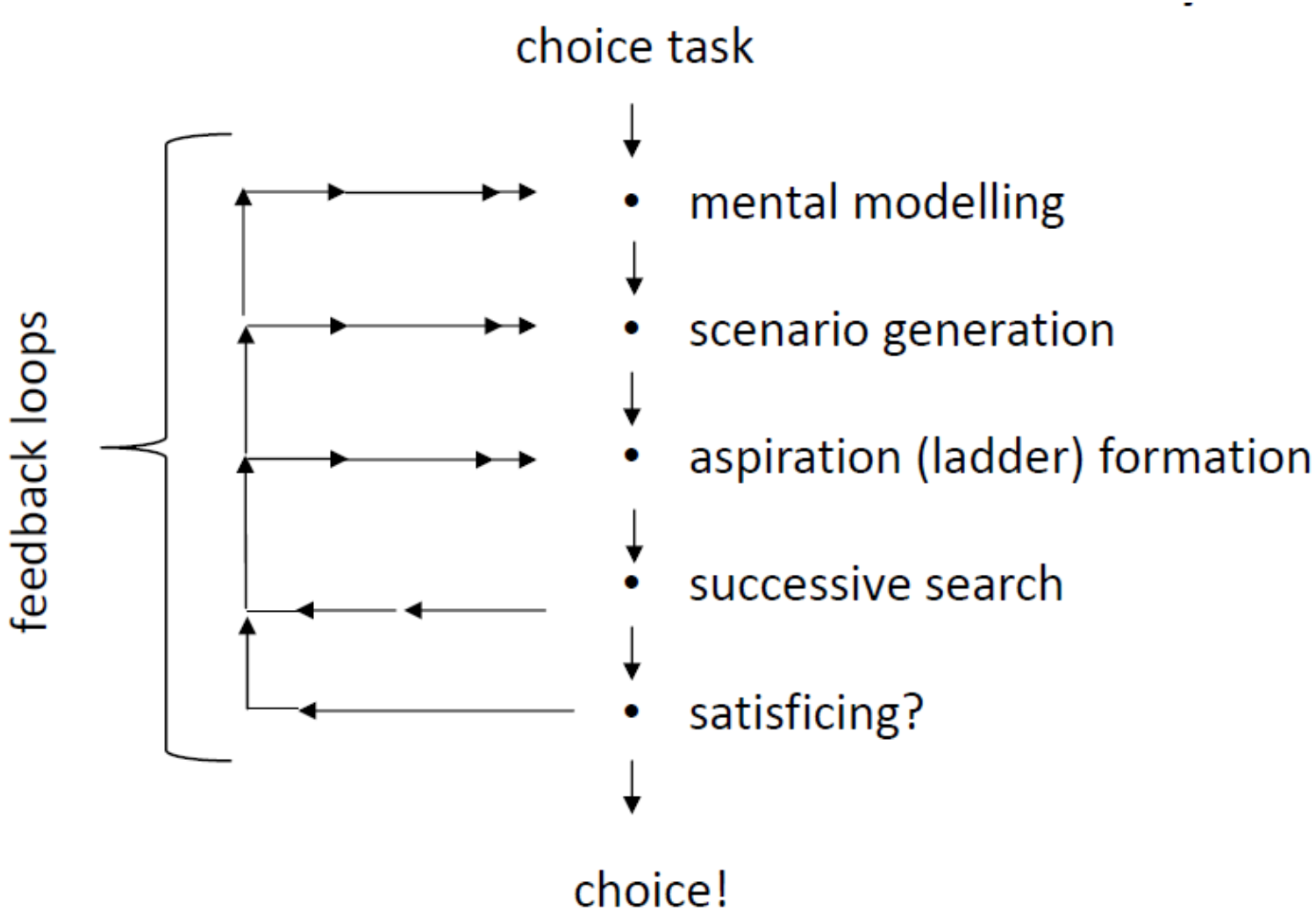
Dynamics of average proposal/price by treatment



Reduction of non-set optimality!

3. Process of Boundedly Rational Deliberation

discussed in Güth and Ploner (2016)



Requires theories of:

- mental modelling
- scenario generation
- aspiration formation
- search behavior in action space
- use of feedback loops

Our shortcut so far is to elicit and incentivize

(i) scenario generation:

which circumstances beyond your own control do you not dare to neglect?

(ii) aspiration formation:

scenario-specific aspiration formation for self-generated scenarios

(iii) observing action attempts and use of feedback loops

when participants have to proceed via (i), (ii), (iii) before finally confirming a(non-)satisficing choice

4. Finally

- rational explanations are often inspiring
- less useful when its deliberations not in line with human cognition and psychology
- as-if rationality is informative when rationalizing empirical behavior across paradigms
- but without psychological validity: "explanandum rather than explanans"

intra-personal payoff aggregation is behaviorally only a possibility which is often avoided by applying instead

multiple selves approach due to

- no readily available (objective or subjective) probabilities
- reluctance to engage not only in inter-personal but also in intra-personal payoff comparisons