Behavioural risk management approaches: Using psychology and behavioural science to inform our understanding and management of risk

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Risk analytics

- Behavioural economics, statistical modelling, data science and **risk communication**
- Integrate administrative data and subjective-belief data
- Find indirect and cost-effective ways to measure what seems elusive or unobservable
- Help business owners and policy makers better understand, measure and positively influence how people make high-stakes decisions

Risk analytics

- Evidence-based decision support *focused on out-of-sample predictive accuracy*:
  - asymmetric loss functions reflecting what matters to your organisation (e.g. below- versus above-target deviations weighted differently)
  - nonlinear econometric modelling, random forests threshold-rule decision trees
  - experimental economics
  - graph-theoretic network economics
  - survey design

Risk analytics

- In-house randomised control trials to evaluate:
  - pricing
  - marketing campaigns
  - staff compensation
  - location-specific risk/opportunity profiles
  - innovation strategy
  - how to incentivise staff to follow risk-management policies


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- 1. What does psychology and behavioural science tell us about risk tolerance and how people experience and interpret risk - how can these be applied in the creation of effective risk systems and controls
- 2. Exploring cognitive and neuroscientific approaches to understanding risk behaviour
- 3. Exploring how Behavioural Economics can provide insights into effective risk management
- 4. Recognising the increasing risk that conspiracy theories and associated fringe beliefs including anti-vax place on society and businesses – what does the evidence say about how best to counter these?
- 5. How can we best understand perception and bias and the risks they present?

Outline

i. Define ‘bias’ with caution, because biased minds sometimes perform better than unbiased minds do
ii. Match risk-management policy to the way**s** that human minds work (*ecological rationality*)
iii. Utilise diversity of staff/consumer mindsets so that there are *multiple* ways your staff can contribute to risk-management objectives or consumer benefits
iv. Autonomy and intrinsic motivation versus coercion: manage outcomes rather than beliefs/processes

(i) Bias = actual − optimal?

- Statistical bias = E[estimation] − true
- Bias in everyday English means something else
- In behavioural economics:

  bias = actual − **optimal**

- Claims about biased behaviour depend crucially on assumptions about the optimal way to decide
- Optical illusions are a poor analogy for describing how people choose equity/bond portfolio weights

- There is an objective unit of measure for physical distances
- Is there an objective measure for how to rationally choose...
  - a retirement portfolio?
  - how much insurance to purchase?
- Mistakes can be evaluated only after committing to an explicit normative or prescriptive measure of performance (i.e. what ‘good’ or ‘rational’ means)
- From non-economists’ point of view, utility theory (which rests on axiomatic definitions of rationality) is both too strong and too weak
- Axiomatic rationality’s sole requirement is internal consistency -- not wealth, health, happiness (not to mention innovativeness or adaptive capacity)

Bias can be beneficial

- Berg, N. (2003), Normative behavioral economics. *Journal of Socio-Economics* 32, 411-427.
- Berg, N. and Lien, D. (2005), Does society benefit from investor **overconfidence in the ability of financial market experts**?. *Journal of Economic Behavior and Organization* 58, 95-116.

Paternalism and coercion often unneeded

- Berg, N. and Gigerenzer, G. (2007), Psychology implies paternalism?: **Bounded rationality may reduce the rationale to regulate risk-taking**. *Social Choice and Welfare* 28(2), 337-359.

Information economics and risk

- Transmission of information is embedded in social networks
- Beliefs about the other's intention/quality/type are key
- Trust (not quality of information) is often the fundamental issue
  - Berg, N. and Kim, J.Y. (2019), A good advisor. *Bulletin of Economic Research* 71(3), 558-572.
  - Berg, N., Prakhya, S., and Ranganathan, K. (2017), A **satisficing** approach to eliciting risk preferences. *Journal of Business Research 82,* 127-140
  - Berg, N., Kim, J.Y. and Park, J. (2022), **Optimal online-payment security system and the role of liability sharing**. *Economic Modelling* 110. 10.1016/j.econmod.2022.105805

Entrepreneurship, innovation & risk

- Berg, N., Boyle, Z., Clink, R., Cummings, S., Pirini J. (2020), Entrepreneurship Nurturing Organisations (ENOs) foster business growth and well-being [with foreword by the Minister of Economic Development]. *NZ Entrepreneur* (Sept. 11, 2020). https://nzentrepreneur.co.nz/entrepreneurship-nurturing-organisations-enos-foster-business-growth-and-well-being/
- Berg, N., Kim, J.Y., Seon, I. (2021), A performance-based payment: Signaling the quality of a credence good, *Managerial and Decision Economics*. https://doi.org/10.1002/mde.3295
- Trinh, Khoa A., Berg, N., Garces-Ozanne, A. and Knowles, S. (forthcoming), Why did they not borrow?: Debt-averse farmers in rural Vietnam. *Developing Economies*.

Measuring risk preferences

- Expected utility theory
  - Holt-Laury (11 incentivised gamble tasks)
  - Eckel-Grossman (single incentivised choice from menu of 6 gambles)
  - Bomb Risk Elicitation Task (BRET)
  - Satisficing/threshold/goal-specific elicitation
- Prospect Theory with loss-aversion
- Dohmen et al. (Likert item[s])
- **Uncertainty** (ambiguity) versus risk

Expected Utility Theory (EUT) is broken but still the most widely used

- Other commonly used measures not based on EUT:
  - Domain-specific risk taking (DOSPERT)
    - financial decisions (separately for investing versus gambling), health/safety, recreational, ethical, and social decisions
  - Balloon Analogue Risk Task (BART)

Applications of risk preference measures

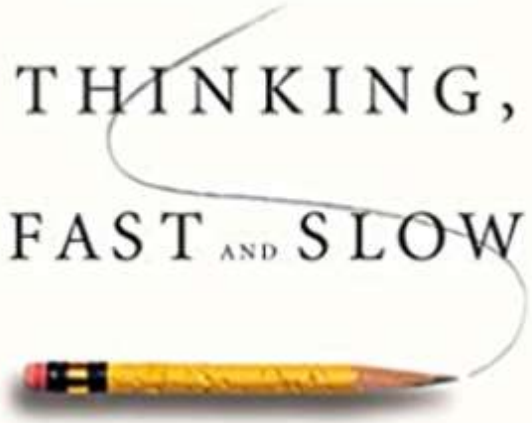
- Financial decision making
- Insurance
- Health decision making
- Macroeconomic modelling
- Climate adaptation
- Entrepreneurial behaviour
  - Individual behaviour
  - Policy design

Take-aways from academic literature on measurement of risk attitudes

- Expected utility theory is descriptively false
- These two are not the same:
  - Controlling the probability of an adverse outcome
  - Minimising variance
- Benefits of risk, uncertainty and a pro-experimentation organisational culture are under-appreciated
- Few models work well across all domains of risk; smart risk managers understand this

THE *NEW YORK TIMES* BESTSELLER

THINKING, FAST AND SLOW



DANIEL KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS

"[A] masterpiece . . . This is one of the greatest and most engaging collections of insights into the human mind I have read." —WILLIAM EASTERLY, *Financial Times*

Is biased risk perception a problem?

- `Difficult to predict' is *not* the same problem as biased thinking
- Precise measurement and modelling of low-probability risks is an important and formidable challenge
- Biased risk perceptions in particular contexts may be worth analysing and dealing with for some organisations
- EU violations made famous by BE may not matter:
  - EUT requires consistency but does not prescribe any particular level of risk tolerance
  - Uncertainty is better to focus on; precautionary principle; not one-size-fits all prescriptions
  - Behavioural and orthodox economics' definitions of rationality

Bias compared to what?

- 1000s of papers showing that people's choice data contradict the axioms of:
  - Expected utility theory
  - Bayesian updating
  - Kolmogorov axioms
  - Time-consistency (additive separable utility function)
  - Invariance w.r.t. logically equivalent re-description of the choice set

Do individuals with behavioural bias perform worse than the unbiased do?

Example study (N=881)

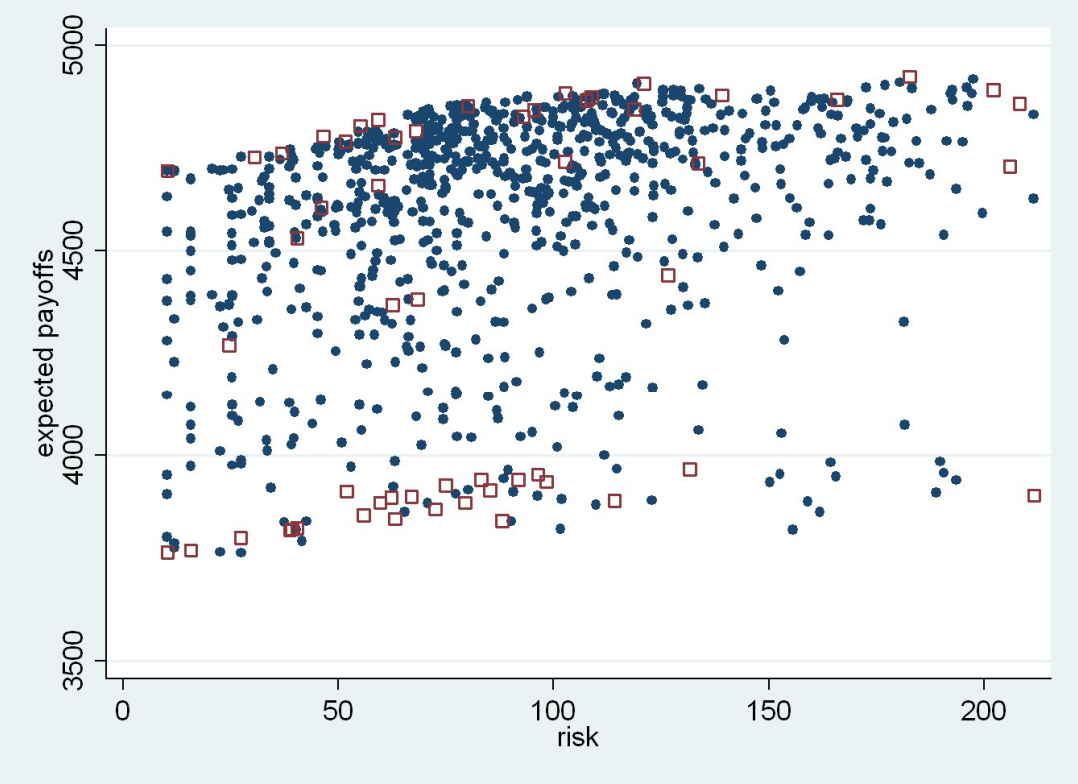
- 72 incentivized experimental tasks
  - 52 choices over risky gambles
  - 20 time trade-off tasks (sooner-smaller versus later-larger)
- 37% made risk trade-offs in a way that was consistent with expected utility theory
- 14% generated choice data that were time-consistent

total expected payoffs among so-called biased versus un-biased individuals

*summary statistics in **levels** among the entire sample*					*unconditional **difference** in mean payoffs: inconsistent versus consistent subsamples*		
payoff measure	min	mean	max	size of range		time-inconsistent v. time-consistent	EU-violators v. non-violators
total payoff	3764.3	4573.8	4923.4	1159.1	Δ E[total payoff]	213.5	112.3
					p-value*	0.0000	0.0000
individual σ	10.3	89.7	211.5	201.3	Δσ	4.7	22.5
					p-value	0.2807	0.0000
time payoffs	2566.4	3246.9	3496.5	930.2	Δ time payoffs	199.0	93.1
					p-value	0.0000	0.0000
1-month time payoff	1283.2	1329.2	1357.9	74.7	Δ 1-month payoffs	11.4	6.7
					p-value	0.0000	0.0001
1-year time payoff	1283.2	1917.7	2138.6	855.5	Δ 1-year payoffs	187.5	86.4
					p-value	0.0000	0.0000
risky payoffs	1165.4	1326.9	1427.9	262.5	Δ risky payoffs	14.5	19.3
					p-value	0.0162	0.0000

Risk-Reward Envelope

(consistent subjects represented by squares perform worse on average)



Non-Bayesian beliefs associated with inaccurate beliefs?

- 11,700 results on Google Scholar
- Subjective beliefs
  - Bruno de Finetti (1937)
  - Leonard Jimmie Savage

- The following are different:
  - Objective accuracy of beliefs
  - Internal logical consistency of probabilistic beliefs

Accuracy of economists' beliefs about prostate cancer risks

Berg, N., Biele, G. and Gigerenzer, G. (2016), **Consistent Bayesians are no more accurate than non-Bayesians**: Economists surveyed about PSA. *Review of Behavioral Economics (ROBE)* 3(2), 189-219.

Prostate cancer risk

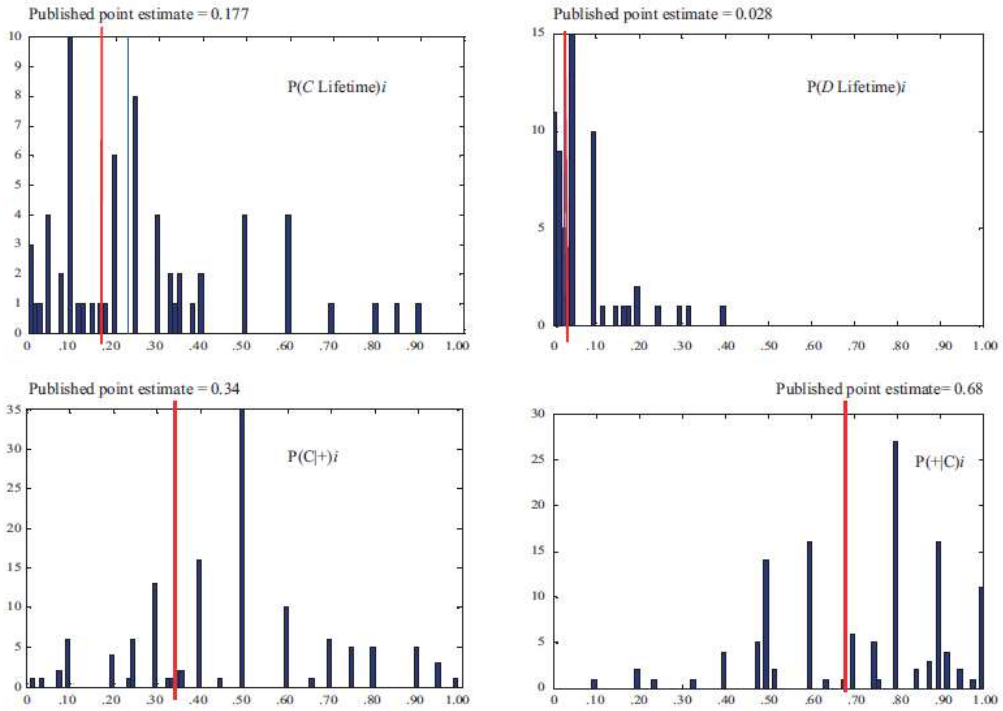
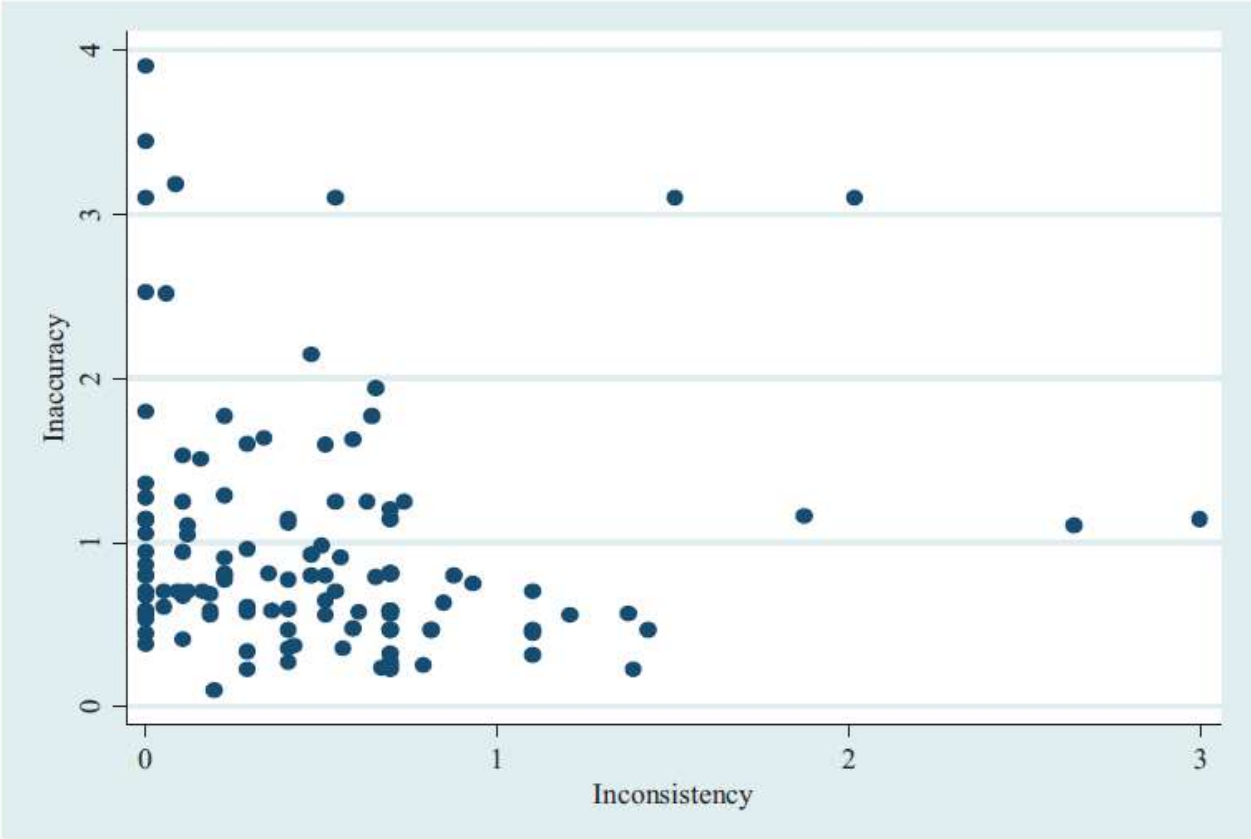


Figure 1: Elicited belief distributions.

Bayesian (i.e. logically consistent) beliefs negatively correlated with accuracy



Doctors too

- `Natural frequency' treatment:
  - 2 in 10,000 asymptomatic men in their 40s have cancer
  - Conditional on testing positive using an imperfect screening device, the risk of cancer increases to 8 in 10,000
- `Relative risk' treatment:
  - Base rate is 0.0002. Conditional on testing positive, risk of cancer is 300% higher

Natural frequencies and absolute risk are essential for high-quality risk communication

- Hoffrage and Gigerenzer 2005
  - https://pubmed.ncbi.nlm.nih.gov/9609869/
- U Hoffrage, S Lindsey, R Hertwig, G Gigerenzer (2000) Communicating statistical information. *Science.*
- Gigerenzer 2011
  - https://www.bmj.com/content/343/bmj.d6386.full

Risk communication strategies in epidemiology

- Absolute risk should always be included
- Don’t rely on relative risk communication

- Dubious ethics and effectiveness of deliberately trying to scare people with ‘fear framing’ and relative risk communication (without absolute risk in the messaging)

Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine

- **CONCLUSIONS**
- A two-dose regimen of BNT162b2 conferred 95% protection against Covid-19 in persons 16 years of age or older. Safety over a median of 2 months was similar to that of other viral vaccines.
- https://www.nejm.org/doi/full/10.1056/nejmoa2034577

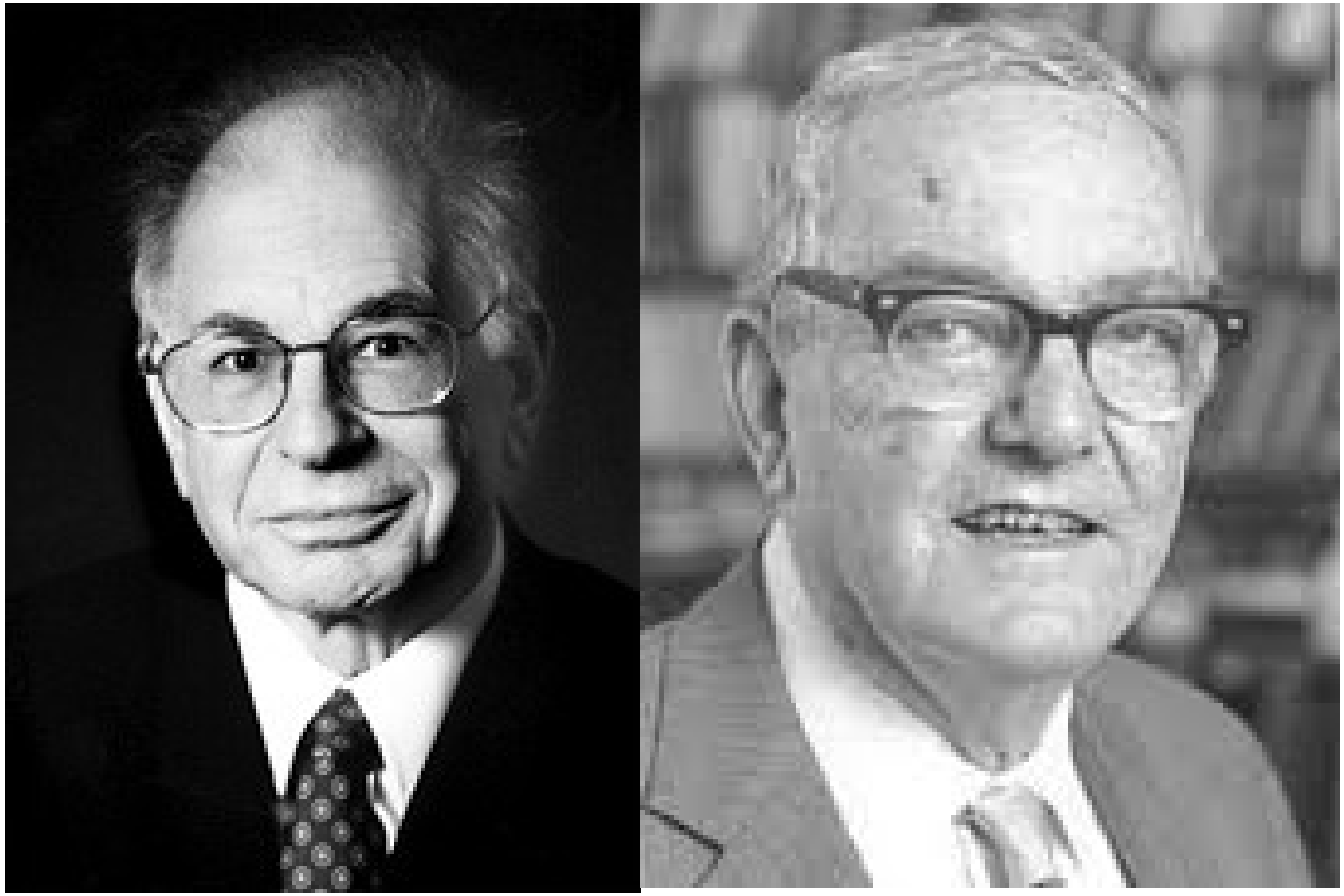
- “21,720 with BNT162b2 and 21,728 with placebo.
- There were 8 cases of Covid-19 with onset at least 7 days after the second dose among participants assigned to receive BNT162b2 and 162 cases among those assigned to placebo.”
- Placebo group absolute risk: 162/21,728= 0.0075
- Treatment group absolute risk: 8/ 21,720=0.0004
- Relative percentage change in risk: (75-4)/75= 0.9466

Greatest hits of BE (sold as instances of 'bias' or 'irrationality') can outperform

- Framing effect (1% survival v. 99% failure)
- Endowment effect (coffee mugs)
- Loss aversion
- Time-inconsistency

...Performance of any decision procedure depends on the reward-generating environment in which it's used.

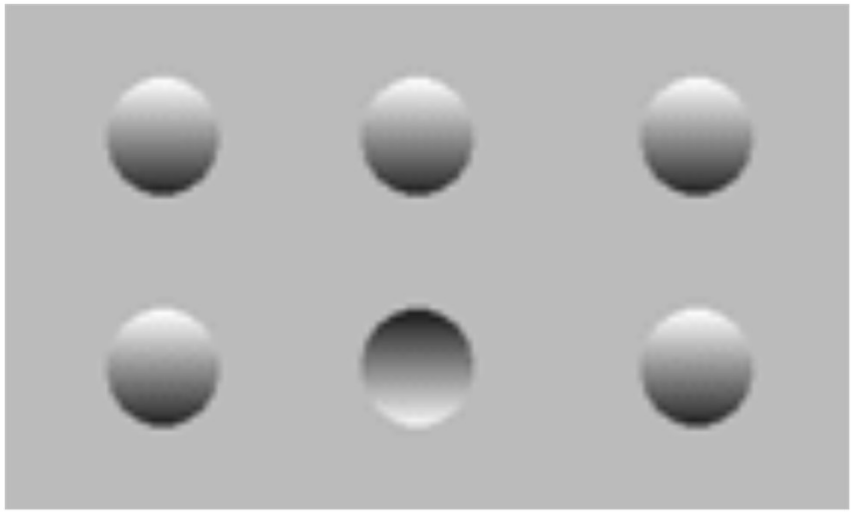
Two contrasting interpretations and research programmes in risk

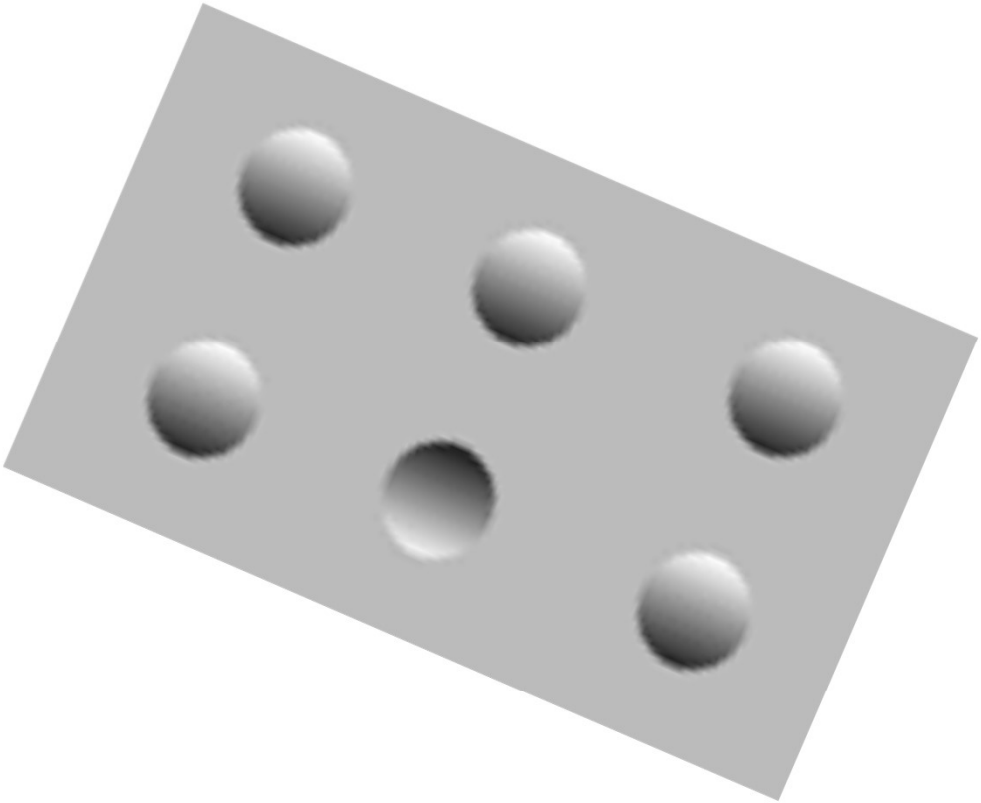


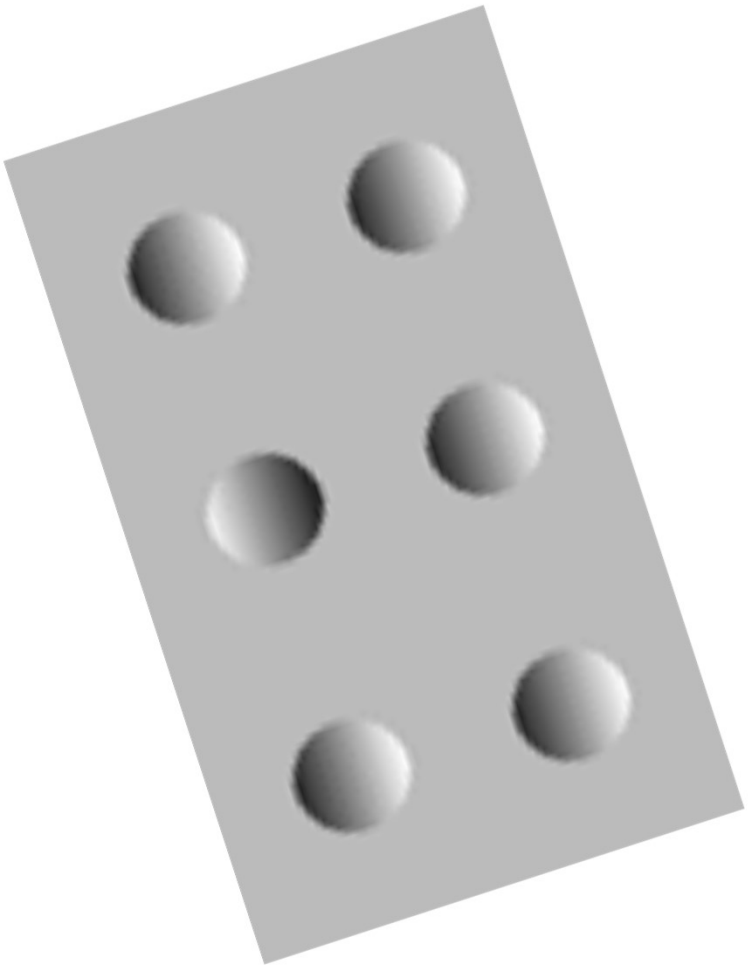
Normative question

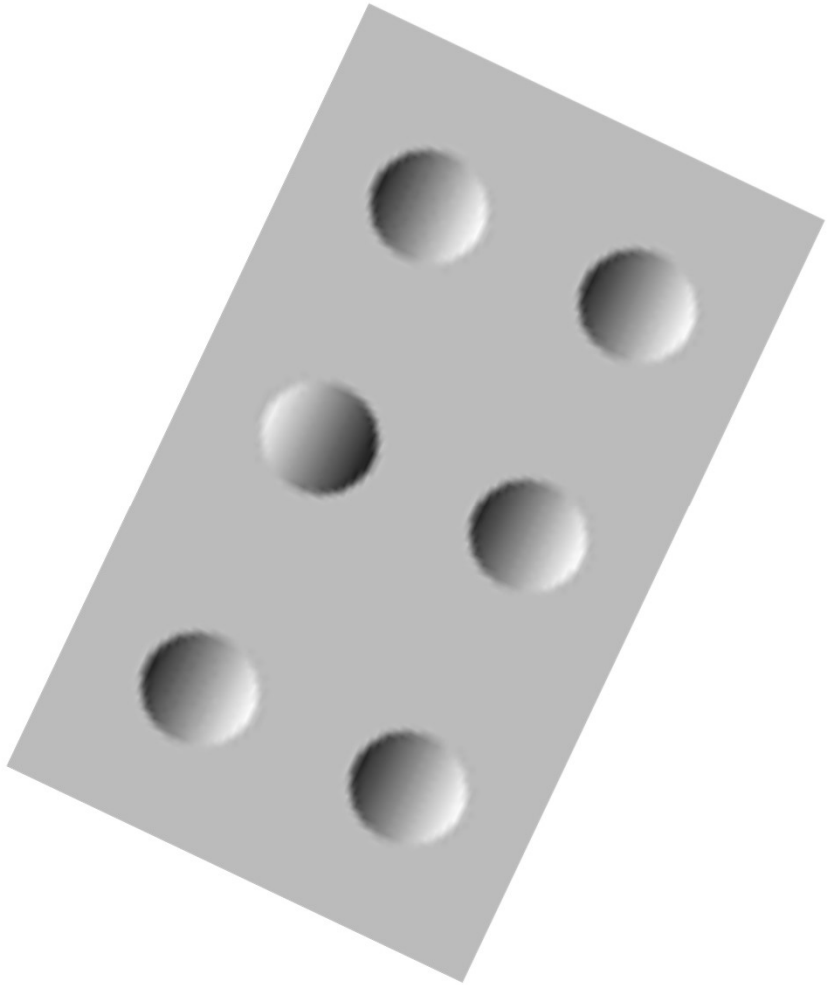
- When observed behaviour and rationality axioms (requiring only deductive but not inductive logic) come into conflict, which requires revision?

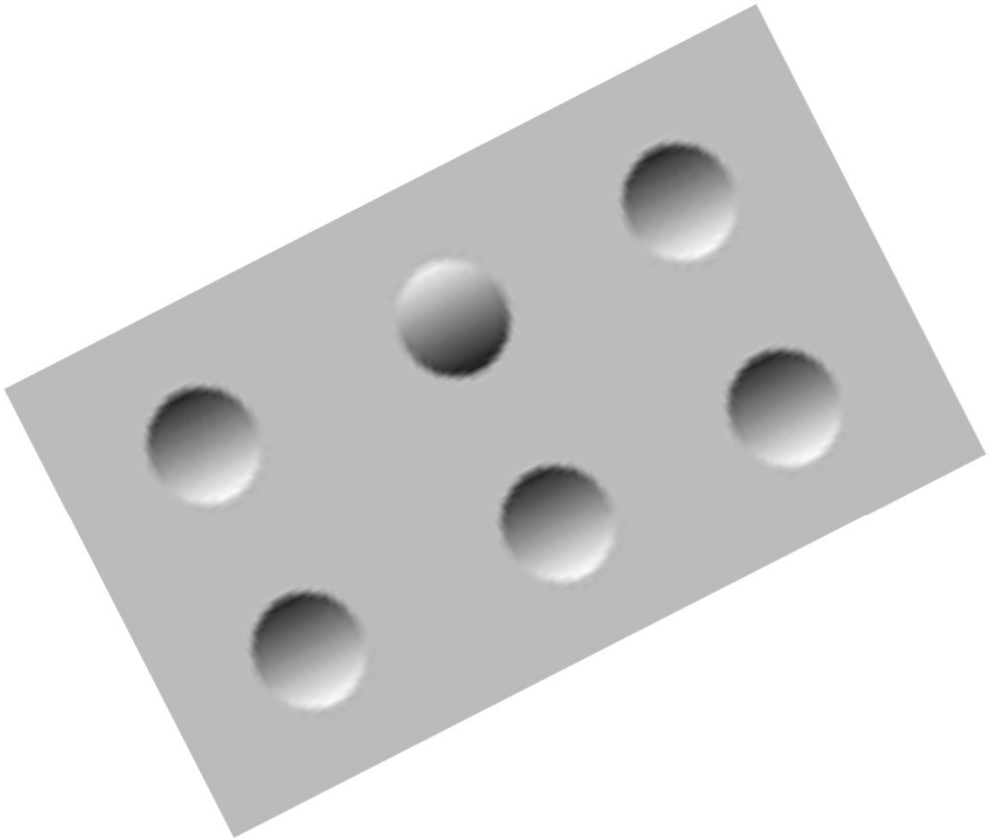
How many dots are sticking outward (toward you) versus inward (away from you)?

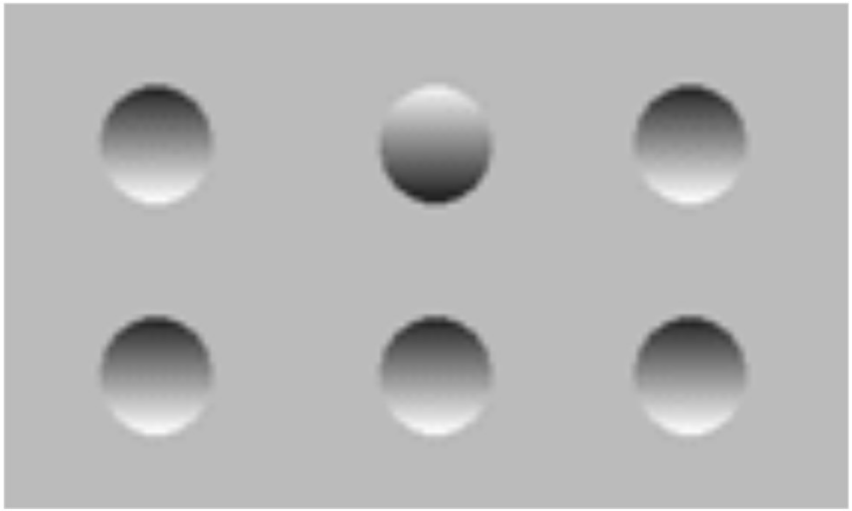




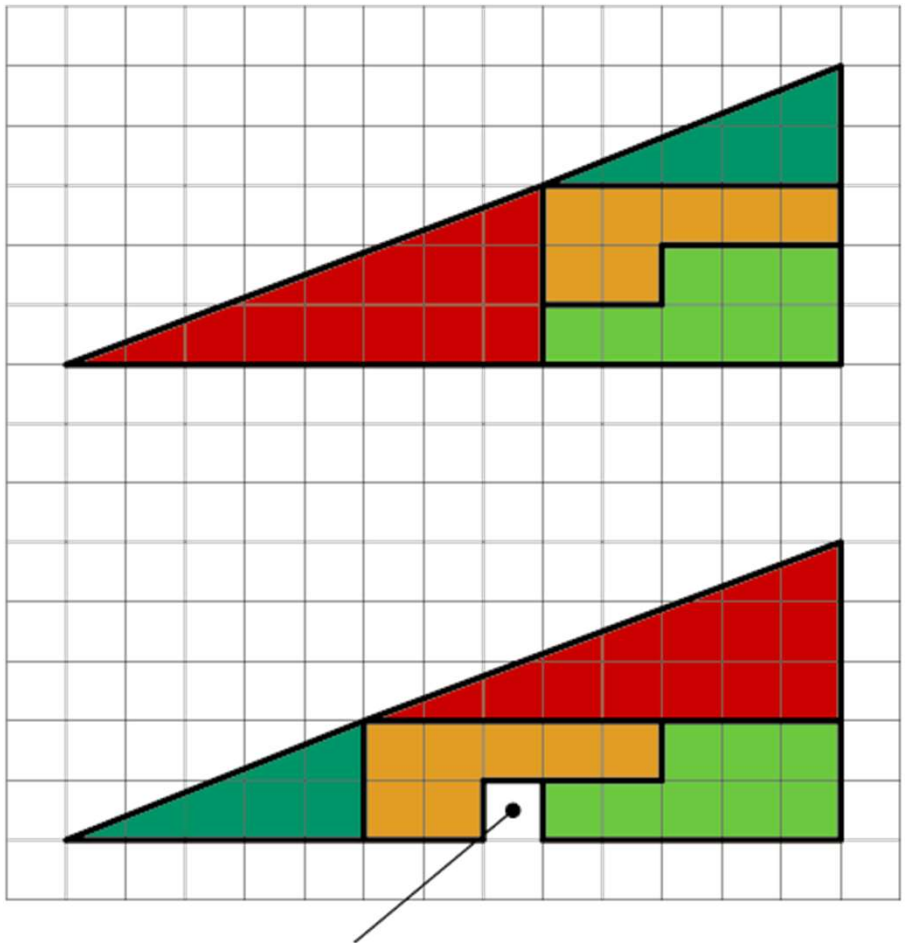








What is the definition of triangle?



- Are we worse off as human decision makers because our brain automatically assumes light shines from above, giving rise to internally inconsistent views about the world?
- Are we worse off because our mental hardware forms fuzzy equivalence classes identifying a large set of **near-triangular objects** that are in fact non-triangles with the word "**triangle**"?

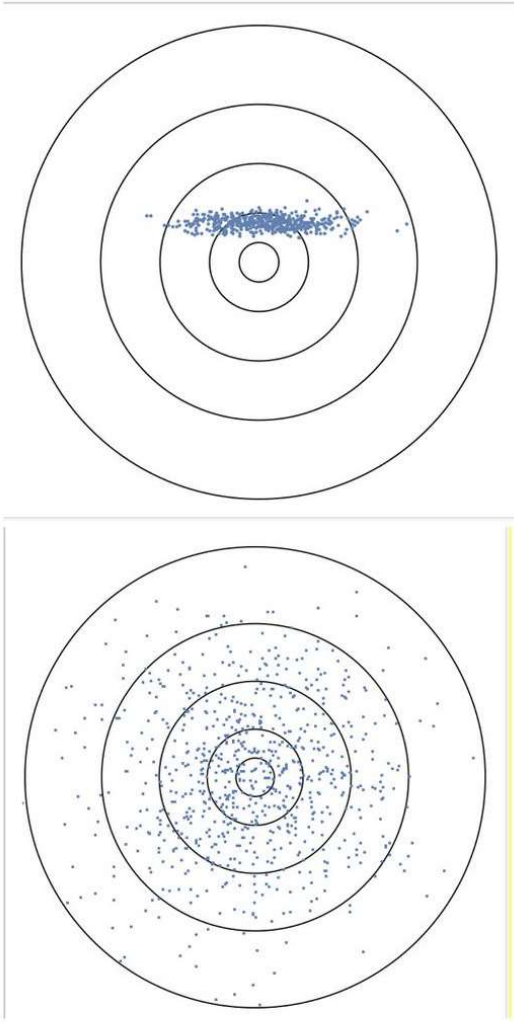


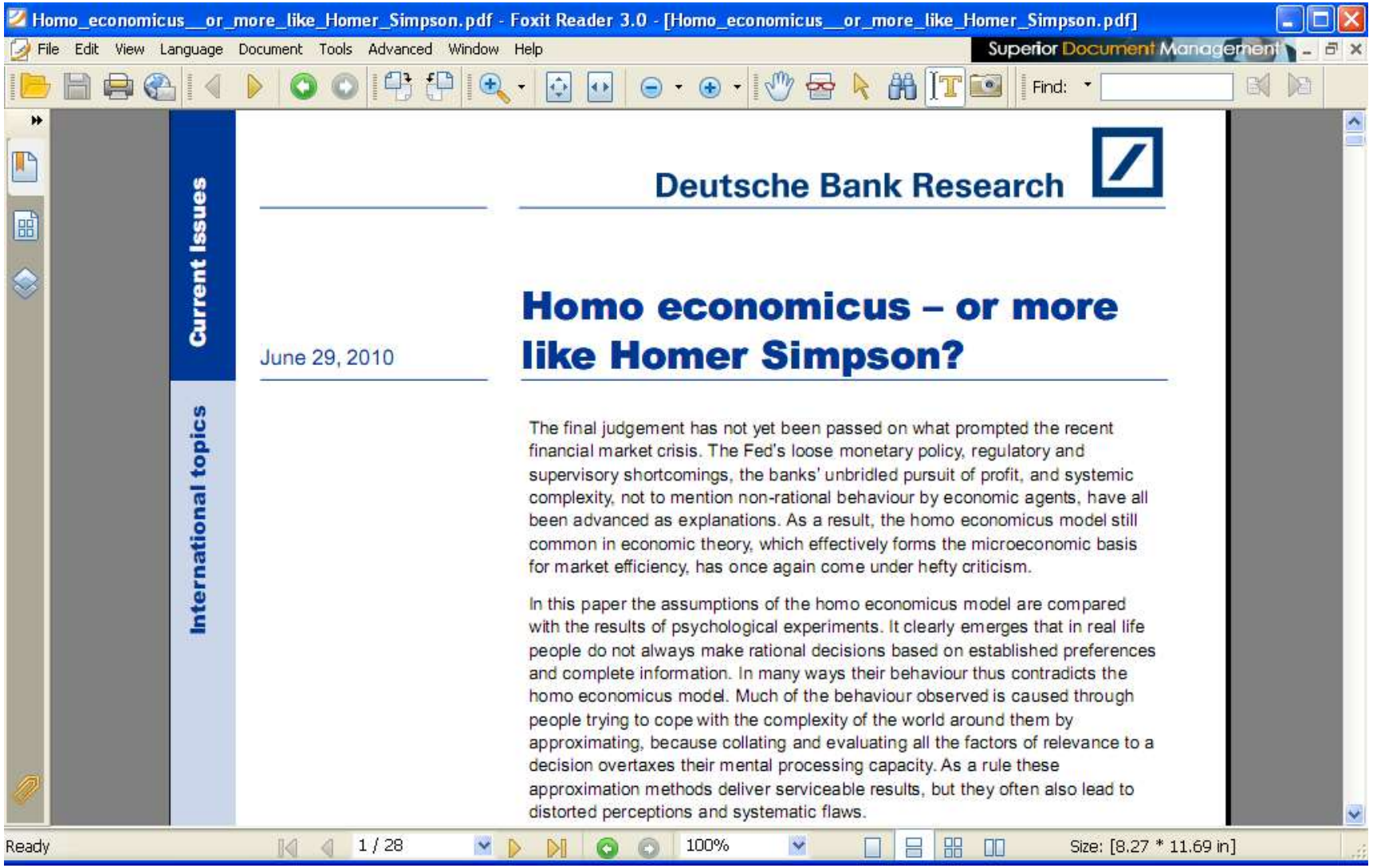
Figure 6 An illustration of the Bias-Variance tradeoff. Assume two people (sober) shooting at a target in, say, Texas. The top shooter has a bias, a systematic "error", but on balance gets closer to target than the bottom shooter who has no systematic bias but a high variance.

I think, therefore I err

- Gigerenzer, G. (2005). “I think, therefore I err.” *Social Research,* 72(1), 1-24.
- Bias-variance tradeoff
- Benefits of biased decision procedures
- Pro-mistake organisational culture

An assumption we can profitably abandon: that all decisions should be made using a single unchanging decision procedure

... I have argued that individuals who are known to be fully rational in the conventional sense may be less successful in reaching their objectives than they would have been, had they been (and been known to be) less rational. – Sugden (1991, p. 782)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June 29, 2010
Homo economicus – or more like Homer Simpson?
The final judgement has not yet been passed on what prompted the recent financial market crisis. The Fed's loose monetary policy, regulatory and supervisory shortcomings, the banks' unbridled pursuit of profit, and systemic complexity, not to mention non-rational behaviour by economic agents, have all been advanced as explanations. As a result, the homo economicus model still common in economic theory, which effectively forms the microeconomic basis for market efficiency, has once again come under hefty criticism.
In this paper the assumptions of the homo economicus model are compared with the results of psychological experiments. It clearly emerges that in real life people do not always make rational decisions based on established preferences and complete information. In many ways their behaviour thus contradicts the homo economicus model. Much of the behaviour observed is caused through people trying to cope with the complexity of the world around them by approximating, because collating and evaluating all the factors of relevance to a decision overtaxes their mental processing capacity. As a rule these approximation methods deliver serviceable results, but they often also lead to distorted perceptions and systematic flaws.
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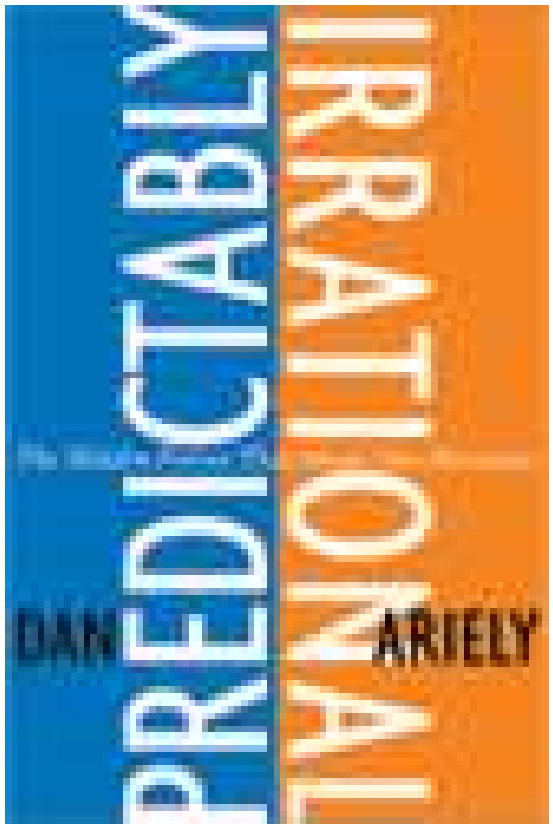
Claims of widespread irrationality



The authoritarian turn?

- Jolls, C. Sunstein, C. R. and Thaler, R. H. (1998) A behavioral approach to law and economics, *Stanford Law Review*, 50, 1471-1541.
  - State should "de-bias" the individual
- Sunstein, C. R. and Vermeule, A. (2009). Conspiracy theories: Causes and cures. *Journal of Political Philosophy,* 17 (2):202-227.
  - Individual irrationality motivates anti-mis-information campaigns and suppression of skeptics' beliefs

Pluralistic decision-making toolkit

- In some environments (e.g., taking GRE exams, economics classes, etc.), logical consistency is precisely what is required for high performance
- Violations of axiomatic norms do not, by themselves, imply pathology, or low performance as measured by norms that matter in many contexts
- But…when choosing a house, a spouse, a career, a food-production system or a set of policies for a heterogeneous population: inconsistency tells us almost nothing meaningful about performance metrics that matter

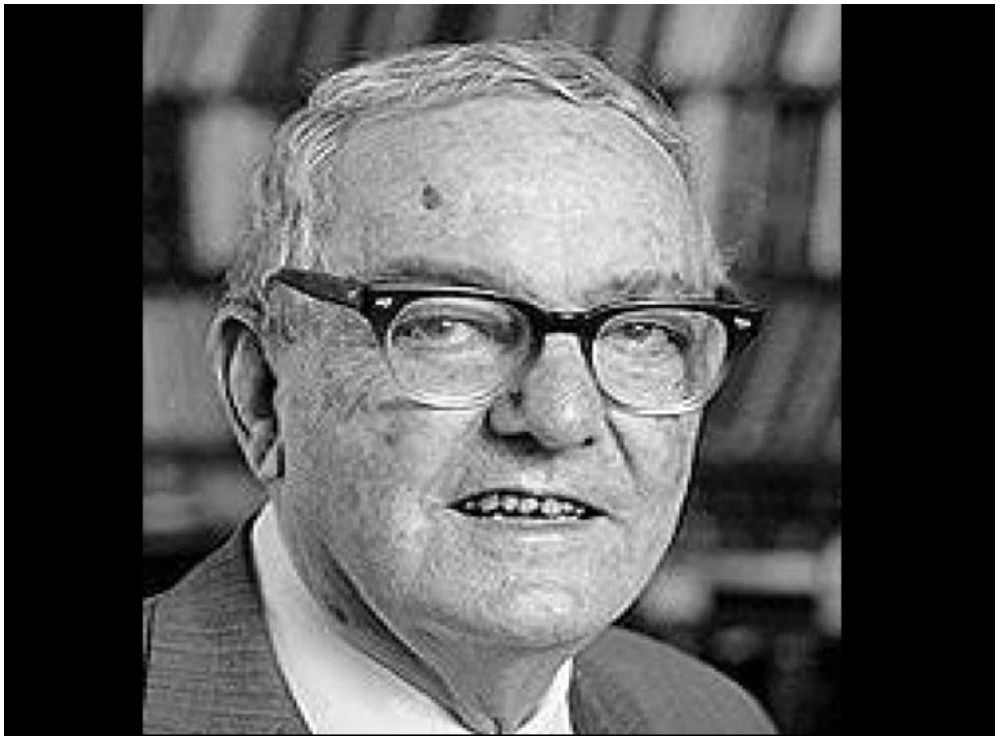
(ii) Match risk-management policy to the way**s** that human minds work (*ecological rationality*)

Ecological rationality is a matching concept: choose tools appropriately

- Dispensing with constrained optimization as a singular/exclusive methodological norm (based on consistency axioms) does not imply that we must abandon math models, statistical enquiry or become relativists.
- We try for better models (e.g., economic systems with heuristic users), run experiments that are more informative about decision process, and pay attention to **changes in the environment** and **different segments** of staff and consumer populations we engage with.

(iii) Utilise diversity of staff mindsets so that there are *multiple* ways your staff can contribute to risk-management objectives

Herbert Simon's research program on bounded rationality and the economics of creativity, innovation and entrepreneurship



Small versus large world risks

Small-world rationality:

Look before you leap

Consider all available information

Weigh pros and cons of each available action

Choose best available action **from a *known* menu** of actions (i.e. **optimal** or rational choice)

Axiomatic (domain-general rationality)

More information is always better

Large-world rationality:

Don't know the menu of 'all available actions'

Don't know how each action maps into payoffs

Choose what to **ignore**

Be **fast** (act before others act)

Find a **good-enough** action and stop searching (i.e. "satisfice"→Herb Simon, Joseph Schumpeter, Gigerenzer & Berg)

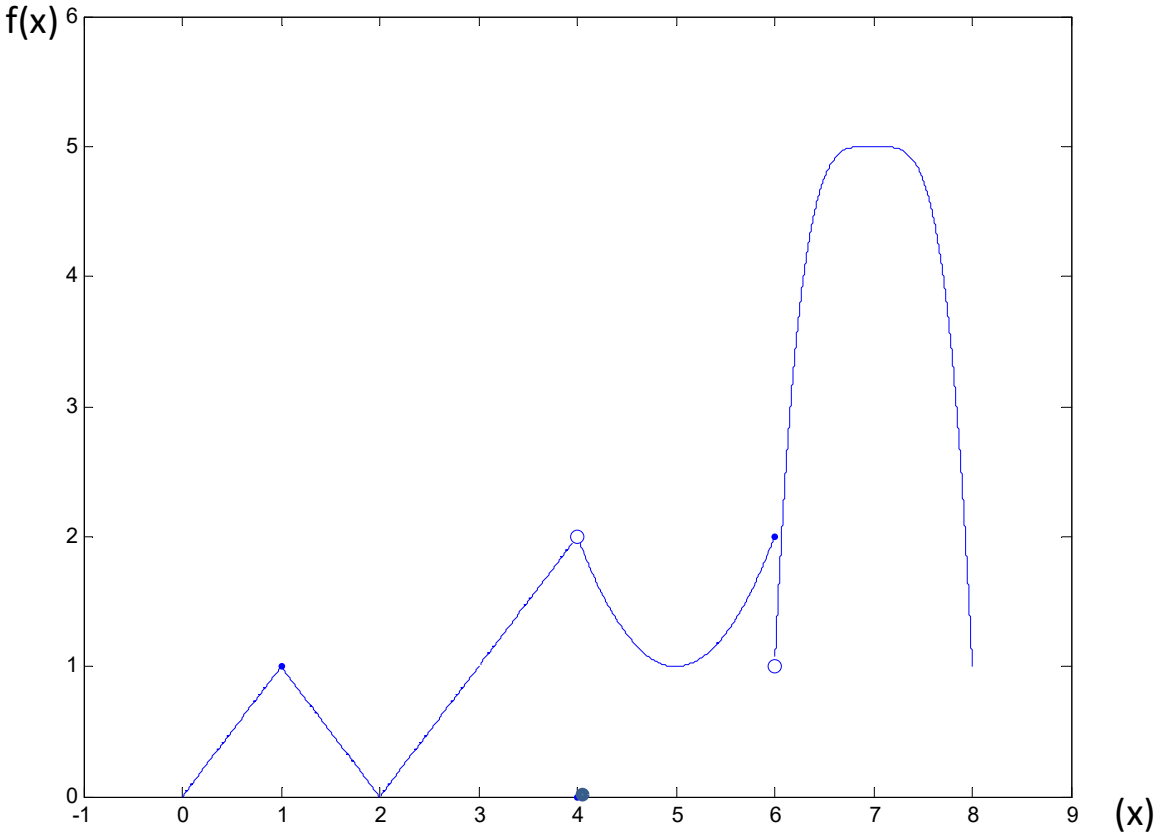
Ecological rationality

Less is more

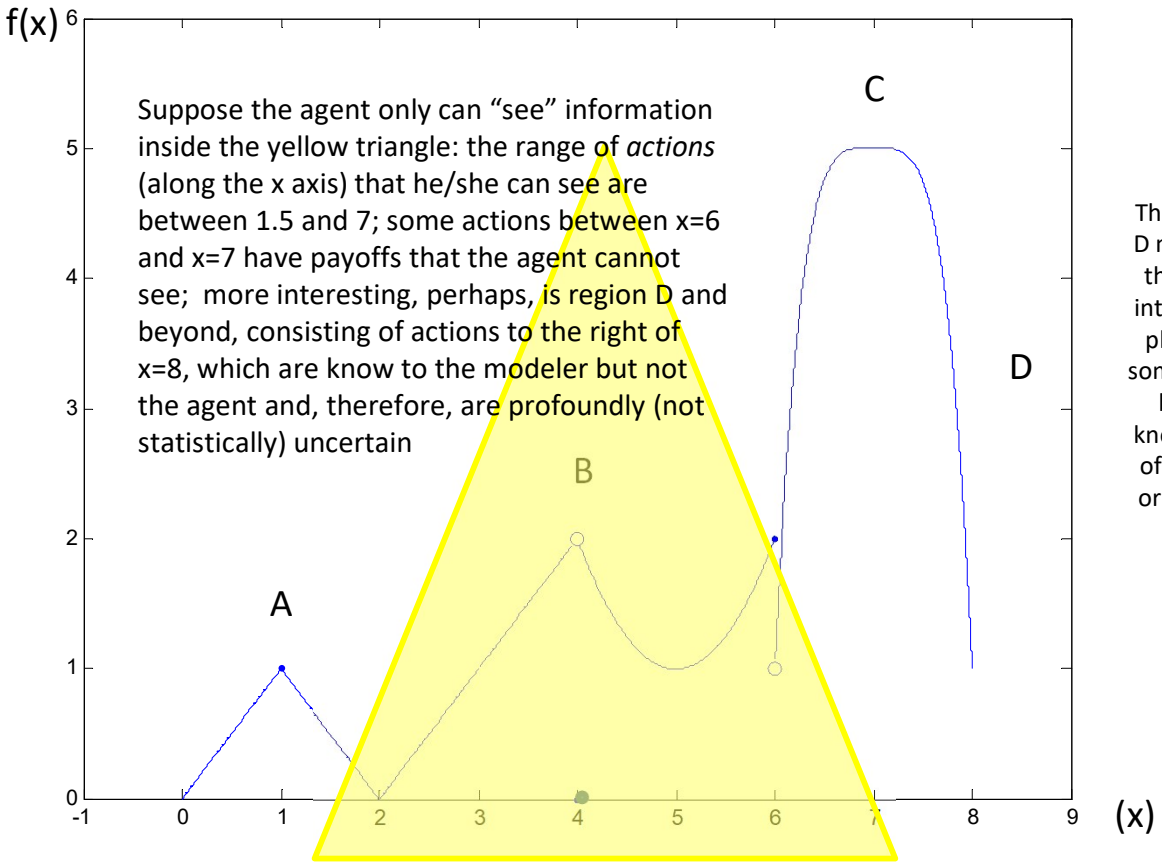
Ignorance can be an advantage

Experimentation & Flexibility & Purposive Action beat internal consistency required for small-world Optimization

x is any real number: which x would you choose?



Problems in the small world



The region D might be the most interesting place for someone to be: no knowledge of actions or payoffs

entrepreneurial culture

Polynesian navigators voyaged to Aotearoa a thousand years ago. Talk about entrepreneurial spirit!

whakatauki about resilience and perseverance:

Tūwhitia te hopo, mairangatia te angitū.
'feel the fear, and do it anyway'.

This whakatauki reflects "the risks, challenges and perseverance our ancestors took in order to get to Aotearoa".

Teams benefit from heterogeneous beliefs and decision processes

- Gains from trade
- Multiple pairs of eyes on the task at hand
- Why we employ humans
- Many instances in our research from the most sophisticated and risk-savvy organisations reveal benefits of intuition and gut decision making

Methodological theme of irreducible multi-dimensionality (i.e. when to *not* decide based on weighted averages)

- Multi-bottom-line reporting
- Wellbeing
- High-quality soil
- Definition of sustainability should be universal or context-specific?

(iv) Autonomy and intrinsic motivation versus coercion: manage outcomes rather than beliefs or people's decision processes

Disagreement

- Do we fail to notice the subtle benefits of disagreement in strengthening our relationships and culture?

Scepticism

- Healthy fats? Saturated? Polyunsaturated omega-3, omega-6, etc.
- Investigation that there has been no progress in Alzheimer's and that the beta amyloid theory is probably bogus, based upon a study with fraudulent findings done in 2003.
  - https://www.science.org/content/article/potential-fabrication-research-images-threatens-key-theory-alzheimers-disease
- The LDL-heart disease hypothesis in error? Alternate hypothesis: LDL fills the arteries in response to injury.
- Protective effects of nicotine in Parkinson's disease and IBS
- Nearly the entire economics profession forgetting that restricting supply (with lockdown policies) and expanding money supply was a well-known recipe for runaway inflation

Heterogeneity of beliefs and behaviour diversifies risk, promotes discovery and can be regarded as biodiversity

- Berg, N. and Watanabe, Y. (2020), **Conservation of behavioral diversity: Nudging, paternalism-induced monoculture, and the social value of heterogeneous beliefs and behaviors**. *Mind and Society* 19, 103–120.

The market for expert information

- Berg, N. and Kim, J.Y. (2019), A good advisor. *Bulletin of Economic Research* 71(3), 558-572.
- Berg, N. (2018), Decentralization mislaid: On New Paternalism and skepticism toward experts. *Review of Behavioural Economics* 5(3-4), 361-387.
- Berg, N. and Kim, J.Y. (2018), Free expression and defamation. *Law, Probability and Risk* 17(3), 201–223.

Crisis in replication, data access and trust in scientific publishing

- **We want raw data, now. Godlee F.** BMJ2009;339:b5405doi:10.1136/bmj.b5405
- **Why Most Published Research Findings Are False**
  - Ioannidis JPA (2005) Why Most Published Research Findings Are False. PLoS Med 2(8): e124. https://doi.org/10.1371/journal.pmed.0020124
- **BMJ editor Fiona Godlee takes on corruption in science**
  - https://www.cbc.ca/news/health/bmj-fiona-godlee-science-1.3541769
- Time to assume that health research is fraudulent until proven otherwise? Richard Smith, former editor of *BMJ* https://blogs.bmj.com/bmj/2021/07/05/time-to-assume-that-health-research-is-fraudulent-until-proved-otherwise/
- **Will covid-19 vaccines save lives? Current trials aren't designed to tell us**
  - Peter Doshi https://www.bmj.com/content/371/bmj.m4037/rr-19
- **Covid-19 vaccines and treatments: we must have raw data, now**
  - Peter Doshi co-editor BMJ *BMJ* 2022; https://doi.org/10.1136/bmj.o102 (Published January 2022)

The Cochrane Collaboration (1993-__) and evidence-based medicine

- During its 2018 annual meeting, the Cochrane board expelled Peter C. Gøtzsche, board member and director of Cochrane's Nordic center, from the organization, telling *Nature* that it had received "numerous complaints" about Gøtzsche after he co-authored an article in *BMJ Evidence-Based Medicine* alleging bias in Cochrane's May 2018[21] review of HPV vaccines. Gøtzsche's expulsion led four elected board members to resign in protest, which in turn led the board to cut two appointed members in order to comply with the ratio of elected to appointed members required by the organization's charter.[22] Gøtzsche announced that this had happened via an open letter, in which he said there is a "**growing top-down authoritarian culture and an increasingly commercial business model**" taking root at Cochrane that "**threaten the scientific, moral and social objectives of the organization**". Gøtzsche remains an outspoken critic of Cochrane's relationship with the **pharmaceutical industry**.

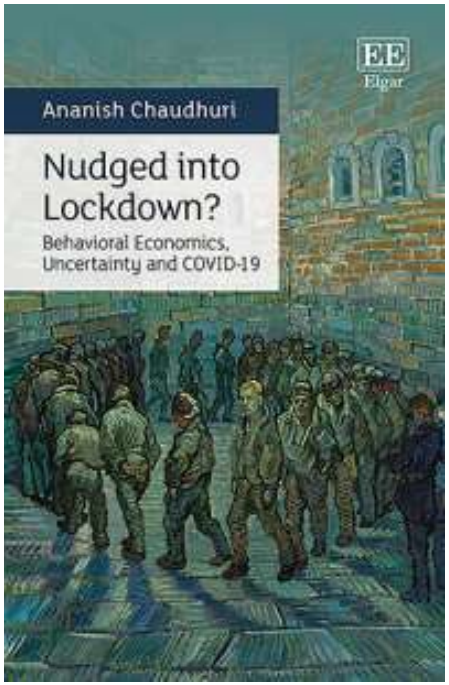
Bias and inefficient lock-in amongst scientists and experts

- “[T]he rapid flow of new papers can force scholarly attention to already well-cited papers …. Rather than causing faster turnover of field paradigms, a deluge of new publications entrenches top-cited papers, precluding new work from rising into the most-cited, commonly known canon of the field.”
- Chu and Evans (2022) Slowed canonical progress in large fields of science, *PNAS*

Professor John Gibson (Waikato)

- Gibson, J. (2022). Hard, not early: putting the New Zealand Covid-19 response in context. *New Zealand Economic Papers*, *56*(1), 1-8. doi:10.1080/00779954.2020.1842796
- Gibson, J. (2022). Rebuttal of Hendy, Wiles, Binny and Plank. *New Zealand Economic Papers*, *56*(1), 36-40. doi:10.1080/00779954.2022.2034177

Professor Ananish Chaudhuri (UoA)



- https://www.auckland.ac.nz/en/news/2022/06/16/new-book-examines-pandemic-decision-making-and-responses-.html

Martin Lally

- https://croakingcassandra.com/2021/11/15/a-cost-benefit-approach-to-thinking-about-vaccine-coercion/
- Michael Reddell's review: "The point about cost-benefit analysis is not that using those techniques, or that way of thinking about the issue, will generate "the" right answer. On many of these things there is no "the" right answer. The merit lies in a combination of (a) forcing people to write down their assumptions, including which variables (even hard to estimate ones) should be relevant to a particular decision, and (b) then enabling users to get a sense of how much difference a different set of assumptions might make to the bottom line. Using the techniques facilitates disciplined thinking and transparency..."

Behavioural Insights Team (2010-___)

- In 2019, a Parliamentary report found that the distress evoked in people targeted by behavioural insights in relation to tax collection may, in some instances, have led to victims taking their own lives.
- As a retired consultant clinical psychologist, I – and 39 professionals from the psychology/therapy/mental health sphere – have become so concerned we are calling on the UK Parliament to formally investigate the government's use of behavioural science
- https://brownstone.org/articles/the-nudge-ethically-dubious-and-ineffective/
-

(cont. critique of some behavioural nudges used by BIT)

- there are three ‘nudges’ which have evoked most alarm: the exploitation of **fear** (inflating perceived threat levels), **shame** (conflating compliance with virtue) and **peer pressure** (portraying non-compliers as a deviant minority) – or “affect,” “ego” and “norms,”

Symphony or film?

“We don’t have a misinformation problem. We have a trust problem.”

-- Prof. Heidi Larson, Vaccine Confidence Project, London School of Hygiene & Tropical Medicine

Positive social externalities from skepticism toward expert claims regarding risk

How use behavioural science to achieve world-class risk management, satisfying essential objectives with intrinsically motivated staff


Thank you
UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
BUSINESS SCHOOL
Te Kura Pakihi

Discussion

Counterfactuals require a model/theory

- Coding that led to lockdown was 'totally unreliable' and a 'buggy mess', say experts
  - “In our commercial reality, we would fire anyone for developing code like this and any business that relied on it to produce software for sale would likely go bust.” David Richards, co-founder of WANdisco
  - Predicted that between 50 and 50,000 people could die from exposure to BSE (mad cow disease) in beef. He also predicted that number could rise to 150,000 if there was a sheep epidemic as well. In the UK, there have been fewer than 200 deaths from the human form of BSE.
  - A paper produced by Prof Ferguson’s team predicted that the coronavirus pandemic could lead to 250,000 deaths in the UK unless stringent lockdown measures were implemented. His research is said to have convinced the Government to change direction.
  - https://www.telegraph.co.uk/technology/2020/05/16/coding-led-lockdown-totally-unreliable-buggy-mess-say-experts/

- **COVID-19 Technical Advisory Group**
- https://www.health.govt.nz/about-ministry/leadership-ministry/expert-groups/covid-19-technical-advisory-group
- https://thedisinfoproject.org/about-us/
- https://www.tepunahamatatini.ac.nz/2020/09/06/covid-19_disinformation-in-aotearoa-new-zealand-social-media/

Less-is-more effects (e.g. the Recognition heuristic)

- Which city has a larger population:
  - San Antonio
  - San Francisco
- Which city has a larger population:
  - Essen
  - Frankfurt

Defining Behavioural Economics

- Psychology and economics
- Socio-economics, biology and economics, pluralistic toolkit
- Experimental versus behavioural economics
- Bounded rationality (Herb Simon)
  - cognitive capacity
  - self-interest
  - willpower
  - ecological instead of axiomatic definition of rationality
- Applied BE, nudging, is all rational behaviour the solution to a constrained optimisation problem? No.

Themes

- Framing [often interpreted as bounded cognition]
- Pro-social preferences [bounded self-interest]
  - Dictator game, Ultimatum game, Public Goods games
  - Contingent Valuation and measuring the value of untraded goods
- Time inconsistency [bounded willpower, i.e. people don't carry out plans]
- Modelling and **measuring** non-orthodox decision-making process
  - Risk attitudes
  - Patience
  - Formation of subjective beliefs
  - Consumer preferences for hedonic characteristics of
- Nudges and 'libertarian paternalism'
- Designing institutions, industry groups, policies to fit human minds

Applications

- Do museums that offer ‘free access on Tuesdays’ lose revenue?
- Food deserts
- Visual cues in urban design that...
  - encourage physical activity
  - reduce littering
  - reduce crime
- Social-norm framing in letters sent to people with overdue parking fines significantly increased fines payment
- Social grocery stores: Can food assistance be mana-enhancing?
- Willingness-to-pay (WTP) premium for local food
- RCTs for pricing, marketing, location choice, staff compensation, cause-related-marketing
- Farm entrepreneurship, LMP decisions, social licence for aquaculture

Methodological theme of irreducible multi-dimensionality (i.e. when to *not* decide based on weighted averages)

- Multi-bottom-line reporting
- Wellbeing
- High-quality soil
- Definition of sustainability should be universal or context-specific?

Embracing the upside of uncertainty and heterogeneity

- Heterogenous beliefs and actions in human populations provide ecosystem services:
  - Diversification against risks of monoculture
  - Mitigates risk of expert advice that turns out to be wrong
  - Nurtures adaptation rather than dogmatism and self-limiting belief
  - Volunteerism versus coercion
  - Discoveries/information externalities/new best-practices

Measuring risk preference: Eckel-Grossman instrument

- Choose the risky payoff (one of the following six options) that you most prefer.
- Each of the six options is a different random payoff distribution. It's like choosing one of six investment projects, or one of six stocks (in share markets), that you'd most like to own.
- Each of the six risky payoffs has two possible outcomes (Event A or Event B) with 50%/50% probabilities.
- Your final payoff depends on the choice you make and an element of chance (i.e. whether Event A or Event B occurs).
- This is a purely subjective question to measure risk preferences. There's no right answer.
- Event A: $28 with 50% probability. Event B: $28 with 50% probability (1)
- Event A: $36 with 50% probability. Event B: $24 with 50% probability (2)
- Event A: $44 with 50% probability. Event B: $20 with 50% probability (3)
- Event A: $52 with 50% probability. Event B: $16 with 50% probability (4)
- Event A: $60 with 50% probability. Event B: $12 with 50% probability (5)
- Event A: $70 with 50% probability. Event B: $2 with 50% probability (6)

Measuring time preference

Suppose you are to receive a risk-free payment (e.g. from government) either **one year from now** (choose left) or **two years from now** (choose right). There is no risk of default. The only issues at stake are the amounts and arrival times. In each row below, make a binary left/right choice between the smaller amount one year from now (left) or the larger amount two years from now (right).

	1 (1)	2 (2)	
$6,000 one year from now	○	○	**$6,240 two years from now**
$6,000 one year from now	○	○	**$6,570 two years from now**
$6,000 one year from now	○	○	**$6,900 two years from now**
$6,000 one year from now	○	○	**$7,230 two years from now**
$6,000 one year from now	○	○	**$7,560 two years from now**

Size/frequency/quality of social interaction

- How many people do you know that you'd be willing to approach if you wanted detailed feedback and help vetting a new business idea or writing a detailed business plan to show potential investors?
  - none
  - 1
  - 2-3
  - 4-5
  - 6-10
  - 10-20
  - more than 20
- How confident would you be in the advice you get from those people helping vet your new business idea? Would you be confident enough to invest a substantial share of your personal net wealth by following their advice?
  - not at all confident
  - somewhat confident
  - moderately confident
  - highly confident
  - extremely confident

Trust

How many people would you trust enough to share potentially high-value intellectual property (in confidence or with a signed non-disclosure agreement)?

- none
- 1
- 2-3
- 4-5
- 6-10
- 10-20
- more than 20
-
-

When you think about the 5 people whose feedback influences your professional decision making and whose information you benefit from the most, how frequently (on average) do you interact with them?

- once per year
- twice per year
- 4 times per year
- monthly
- weekly
- 5 or more times per week

Trust game

- Regarding the people in your entrepreneurial network that you trust the most:
  Suppose you could invest any amount from $0 to $100,000 with one of these people.
  Suppose, too, that you know with certainty that **this person could turn any investment you choose to make into 3 times whatever amount you passed to them**.

  That person's tripling of the amount you invest requires little effort on their part, mainly due to their pre-existing network of customers and investors.

  The only uncertainty you face is the amount of money they would then return to you: It could be anywhere from $0 to $300,000.

  Assume that you have $100,000 cash in the bank.

  How much of it would you pass to this person without any assurance or agreement about how much they would pass back to you (which could be anywhere from 0 to 3 times the amount you pass to them)?
  - $0
  - $10,000
  - $25,000
  - $50,000
  - $75,000
  - $90,000
  - $100,000
  - other amount _____

Recognition heuristic

- Which city has a larger population?:
  - San Antonio
  - San Francisco
- Which city has a larger population?:
  - Essen
  - Frankfurt

incommensurability and lexicographic preferences

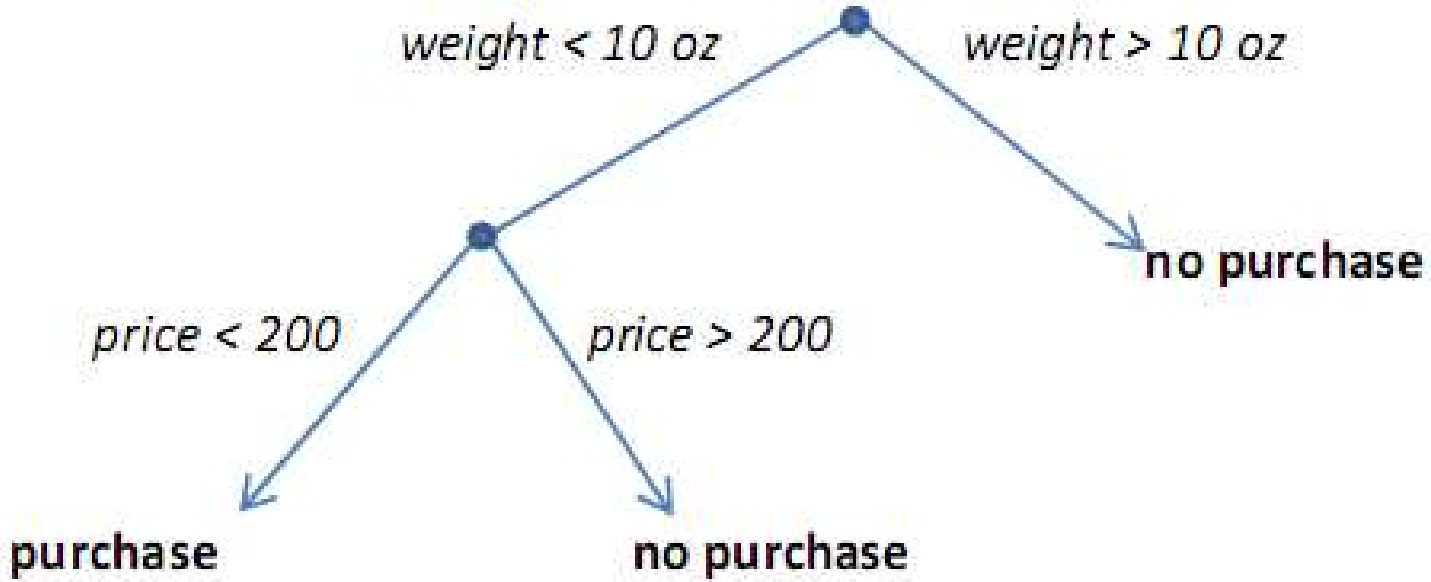
- Precautionary principle
  - Nuclear energy
  - GMO
- Land management practices, value**s**-based food production systems
- Recruiting
- Consumer behaviour


Zip Code: 90095
Reset
maximum PRICE*
$ 700
maximum
HEIGHT
WEIGHT
minimum
TALK TIME
STANDBY TIME
7
inches
7
ounces
100
minutes
60
hours
CARRIERS:
Cingular
Verizon
T-Mobile
Sprint
Nextel
BRANDS:
Nokia
Sony-Eric
Motorola
Samsung
Siemens
LG
All Others
Digital Camera
Don't Need
resolution
low
medium
high
Phone Design
Any
Color Screen
Don't Need
Data/Net Access
Any
Text Messaging
Don't Need
Video Recorder
Don't Need
Speakerphone
Don't Need
Special Roaming
Don't Need
Push-to-Talk
Don't Need
PDA
Don't Need
Music
Don't Need
Bluetooth
Don't Need
MyPhoneFinder
The cell phones currently available in your location appear below. As you use the toggles and levers at left, the number of phones will decrease. At any time, you can click on a phone image, and specific information about that phone will appear in this area of the page.
Best Price:
Carrier:
Height:
Weight:
Talk Time:
Standby:
Technology:
Purchase
100 of 100 phones for Los Angeles, CA shown
Help

Example showing why ‘no-trade-off’ decision processes matter

- 100 or so phones
- Each with 16 features
- Combinatorics of pairwise rankings for 100 phones over 16 features is an overwhelming task: $16 \times 100!/(2! \times 98!) = 79{,}200$ pair-wise comparisons
- Smart decision-makers use no-trade-off heuristics to quickly shrink the size of the consideration set

No-trade-off decision rule



Shopper sees 4 phones, buys 1:

weight in ounces	price in dollars	purchase decision (y=1 if yes, 0 otherwise)
2	250	0
9	199	1
11	50	0
12	0	0

Estimated linear model

- Probability of purchase =
  -2.509 + .201*ounces* + 0.008*price*
- Linear model assumes all phone features are considered and traded off.
- It pays attention to information that is irrelevant (i.e. cheap prices for phones that are eliminated from the consideration set based on weight).
- Wrong model → misleading result

- Expropriation risk
  - Akhtaruzzaman, A., Berg, N. and Hajzler, C. (2017), Expropriation risk and FDI in developing countries: Does return of capital dominate return on capital?. *European Journal of Political Economy 49*, 84-107.