Undesirable psychological influences on human responses to risk and investment decision making.

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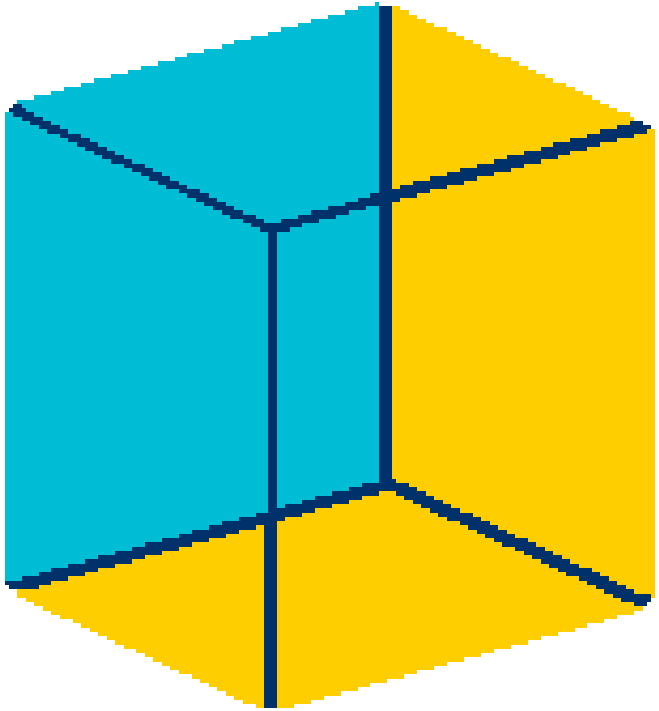
Project introduction

- Most of research in behavioural finance focused on individuals: limited research on more sophisticated institutional investors
  - Research has shown that knowledge, expertise and sophistication might not immunize institutional investors from decision-making biases
- We have been funded by the IFoA to investigate decision-making biases in pension fund trustees
- This is joint academic research by City, Leeds, and UEL, together with Ipsos and Resonance supported by Aon and Invesco
  - Collaborators: Peter Ayton (City), Leo Weiss-Cohen (City/Leeds), Iain Clacher (Leeds), Volker Thoma (UEL), David Calfo (Resonance), Colin Strong (Ipsos)

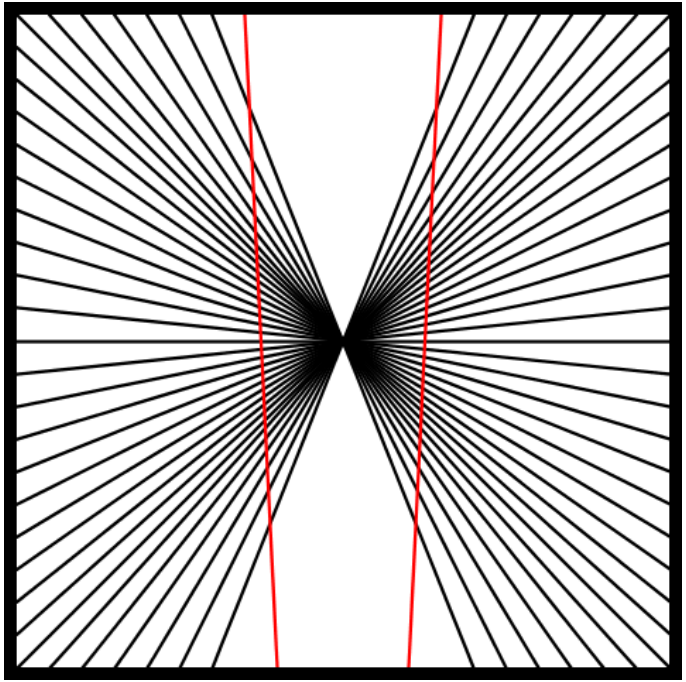
Illusions – as a way of studying covert cognitive processes

Visual and Cognitive



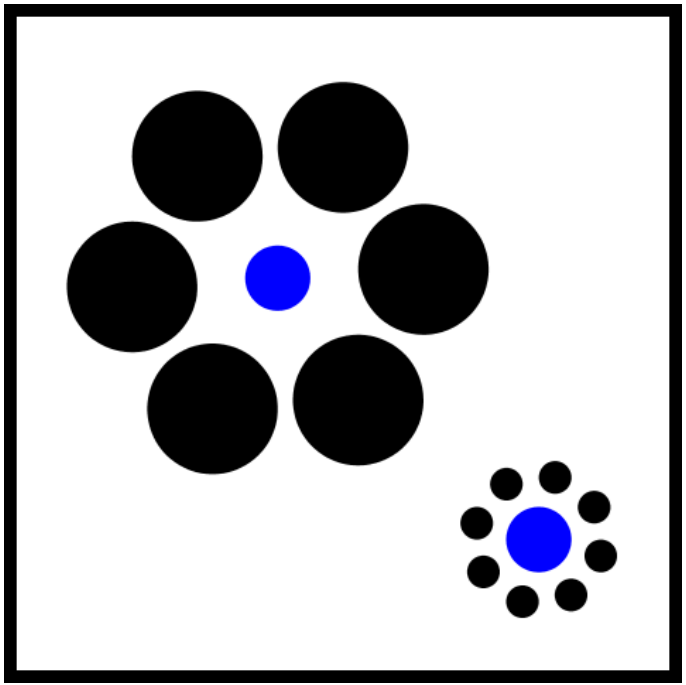
Is the blue on the inner left back or the outer left front?

Hering Illusion



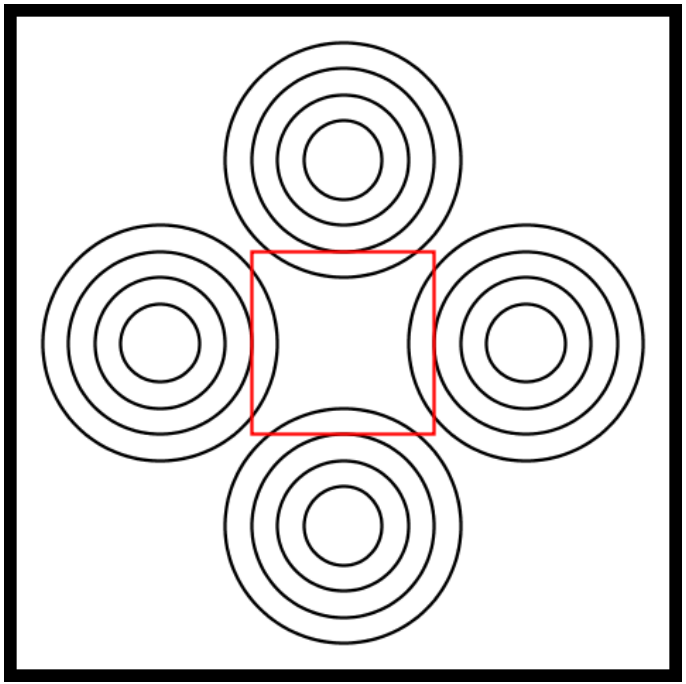
The red lines are perfectly straight (but not parallel).

Ebbinghaus Illusion



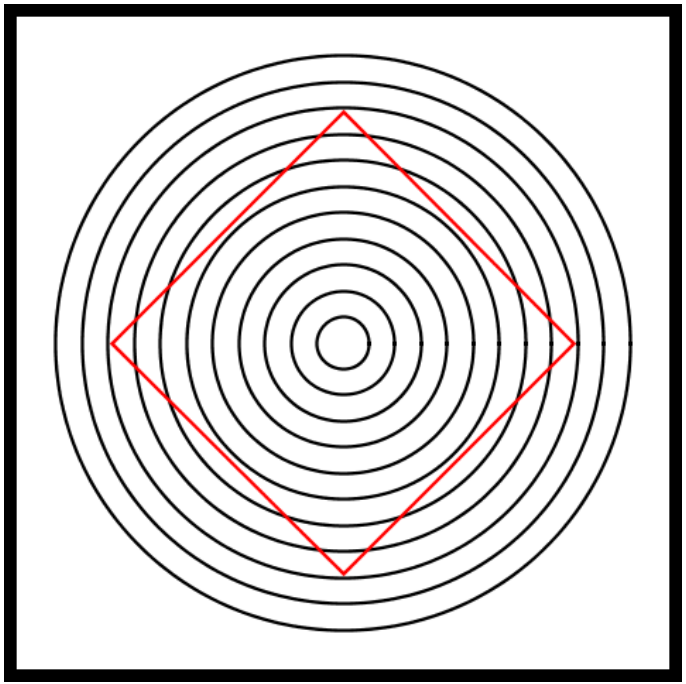
The blue circles are the same size.

Circled Square

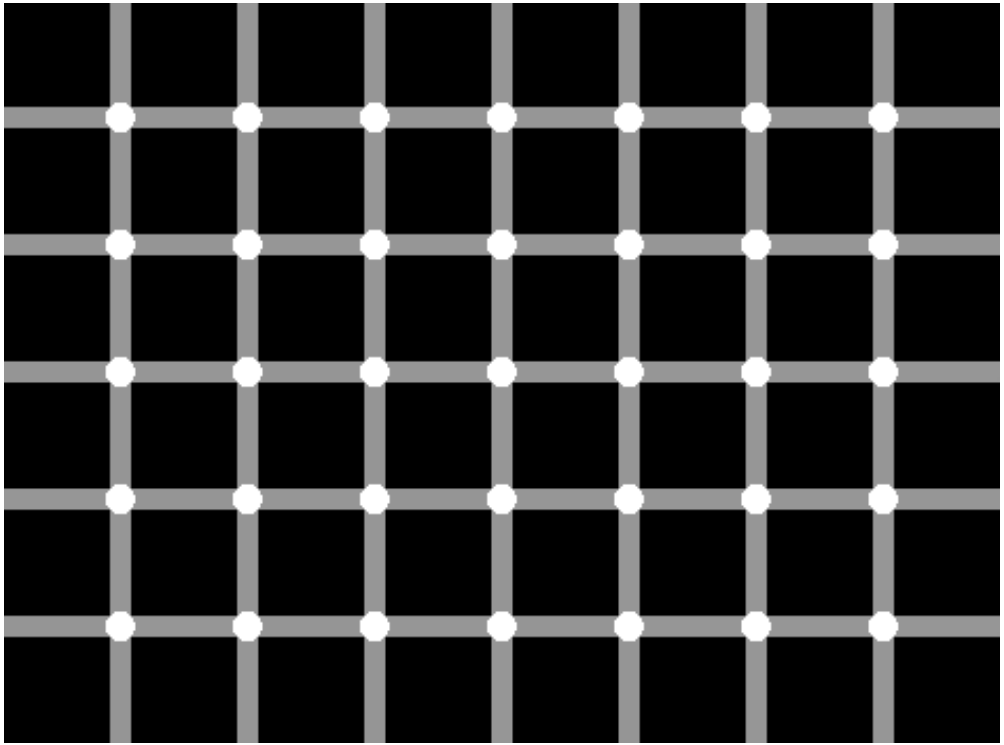


The square appears to bend outwards but does not.

Orbison Illusion

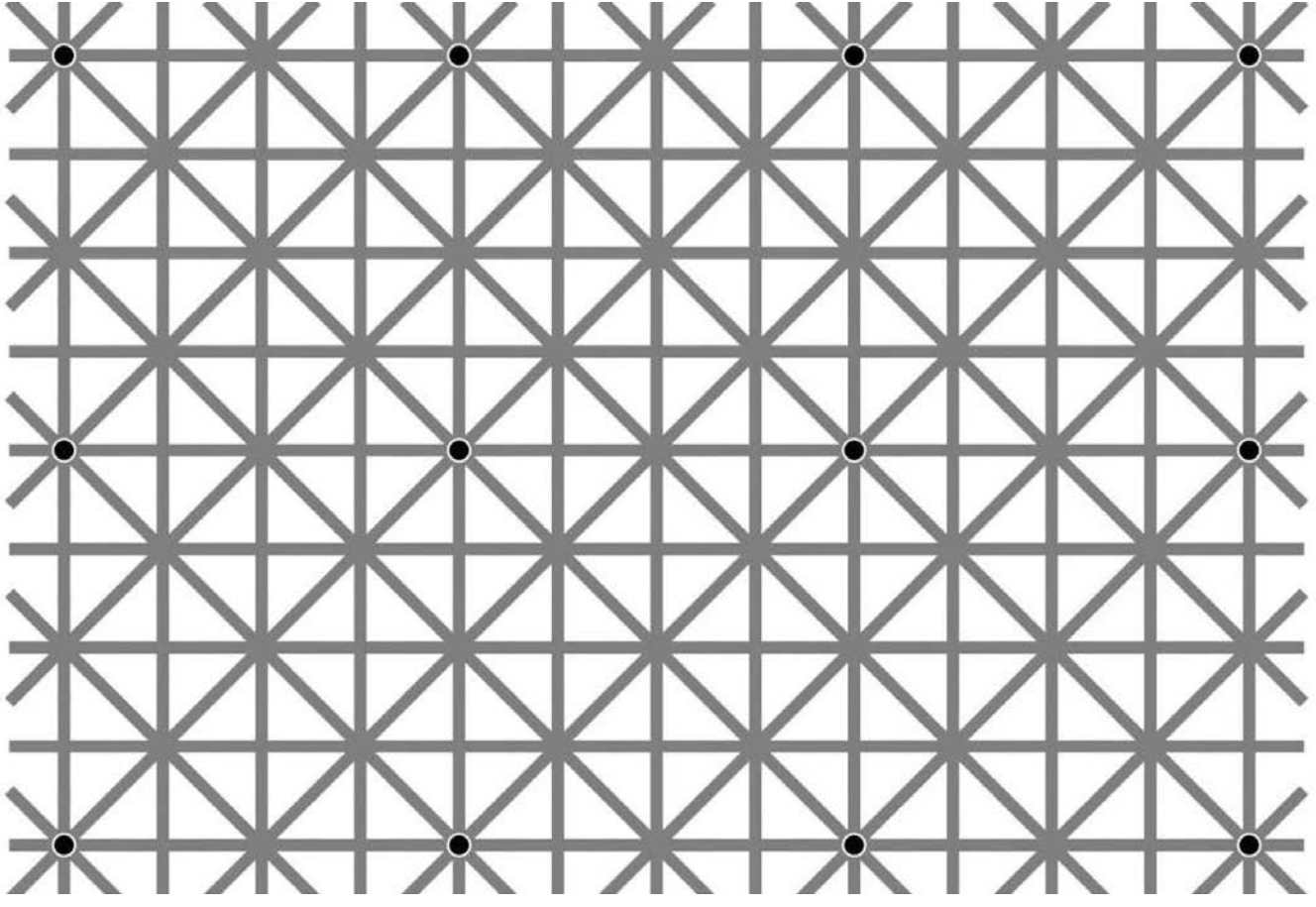


This time the square appears to bend inwards.

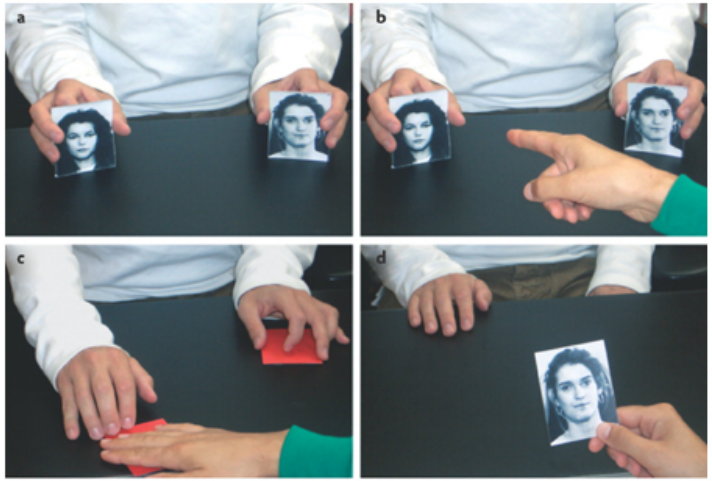


Count the black dots

The Hermann grid There are twelve black dots at the intersections in this image but your brain won't let you see them all at once.



Choice blindness (Johansson, Hall, Sikström & Olsson, 2005)



Nature Reviews | Neuroscience

“Sleight of hand”: Most participants fail to detect that their “choice” is not what they chose. When asked to explain their choices, participants deliver their verbal reports with the same confidence, and with the same level of detail and emotionality for the faces that were not chosen, as for the ones that were actually chosen.

A follow-up experiment involved shoppers in a supermarket tasting two different kinds of jam, then verbally explaining their choice while taking further spoonfuls from the "chosen" pot. The pots were rigged so that when explaining their choice, the subjects were tasting the jam they had previously rejected. Similar experiments were done with tea.

Example: Cheeseburgers

50 % 50 %

Example: Cheeseburgers

30 % 60 % 10 %

NYC taxi drivers

Camerer, Babcock, Loewenstein, & Thaler (2000)

Heuristic:

Set daily income target.
Stop working when target is reached.

Phenomenon: Drivers work least when marginal salaries are highest.

Could earn 8% more if they shifted worked same # hours every day.

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Could earn 8% more if they shifted worked same # hours every day.

And it would be easier for passengers to get cabs on rainy days…

Effects of Emotions on Risky Choices & Behaviour

DREAD RISK

Americans switched from Flying to driving in the wake of 9/11 attacks – leading to extra 1500 road deaths in 2002 - Gigerenzer (2004; 2006)

Londoners switched from underground to bicycle travel resulting in 214 additional casualties. (Ayton, Hampton & Murray, 2019)

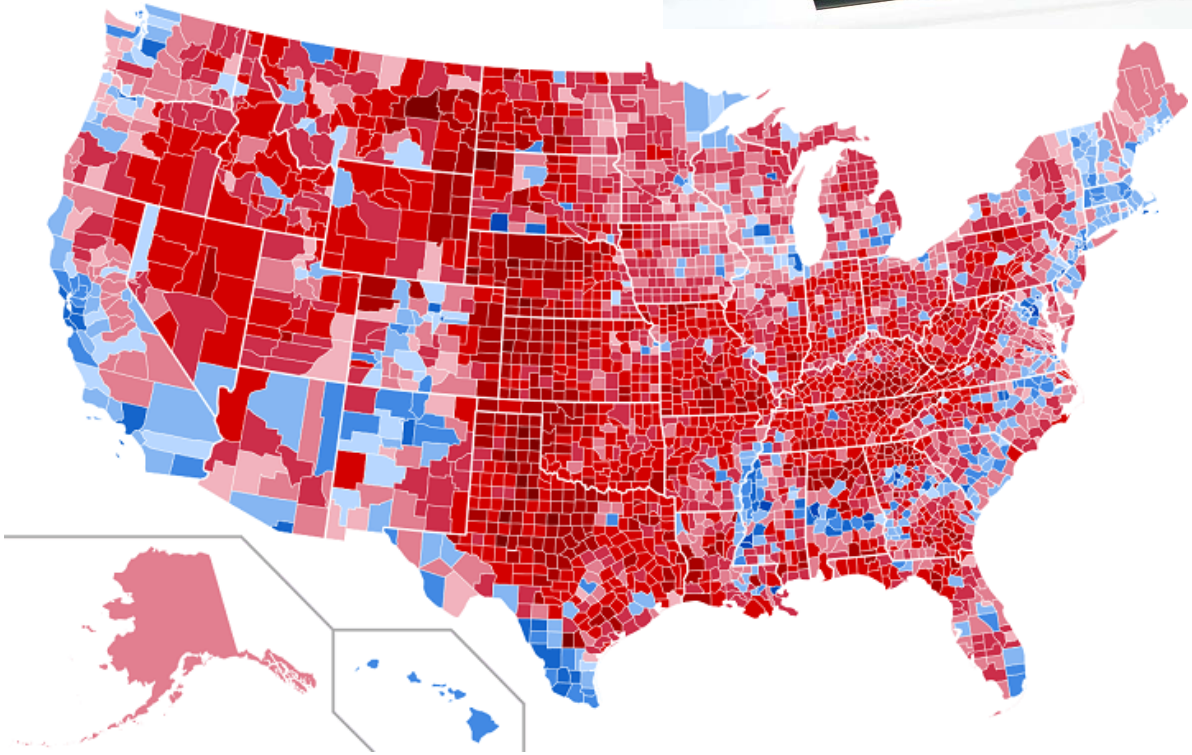
Laboratory studies find effects of emotions on various judgments and decisions.

Anger increases preferences for risky options (Lerner & Keltner, 2000, 2001; Leith & Baumeister, 1996; Fessler et al. 2004).

Sadness decreases risk taking (Chou et al, 2007; Yuen & Lee, 2003; Raghunathan & Pham, 1999).

Happiness increases risk taking (Chou et al, 2007; Stanton et al, 2014; Au et al., 2003)

A Trump Effect on Road Accidents?



A Trump Effect on Road Accidents?

We obtained (*fatal*) road accident data for 3141 of 3,142 counties and county-equivalents in the USA for 2006-2015.

We used 3141 regression models to predict the expected number of accidents in each of 378 local authority areas for the period following the US election on November 8th 2016.

We then compared the predictions with the actual number of accidents in each county for November 9- December 31st 2016 to measure the 'excess' accidents (actual – predicted).

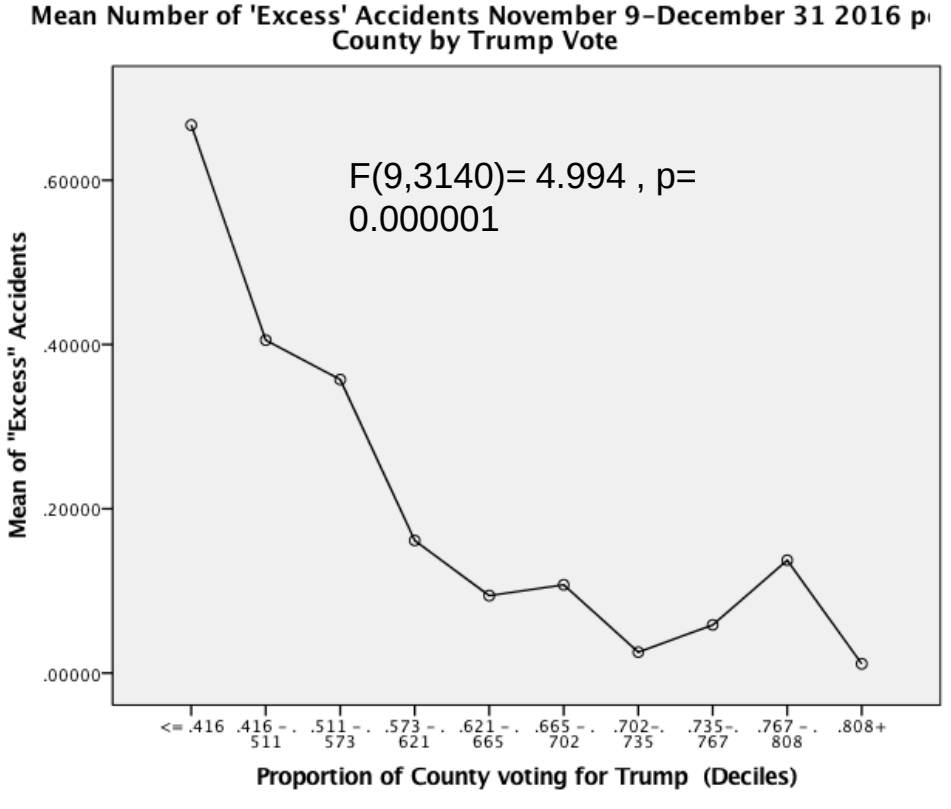
We computed the correlation between 'excess' accidents and the % Trump vote across 3141 counties.

A Trump Effect on Road Accidents?

Correlation: Pearson's r = -0.115, p<0.00001 - excess accidents increase in counties with greater Clinton vote

Relatively more accidents – relative to predictions – in areas with more voters on the losing side….

Are Clinton voters angry?



Review of previous research

Behavioural finance biases

- There are many behavioural biases which have been identified
  - Almost exclusively conducted with individual/retail investors
  - Limited research with professional/sophisticated institutional investors
- Some (selected) examples:
  - Naïve diversification and home bias
  - Disposition effect – buying high and selling low
  - Mental accounting and framing
  - Overconfidence – excessive trading and excessive market entry
- Comprehensive reviews:
  - Shefrin (2009). Behavioralizing finance. *Foundations and Trends in Finance;*
  - Barberis & Thaler (2003). A survey of behavioral finance. *Handbook of the Economics of Finance;*
  - Benartzi & Thaler (2007). Heuristics and biases in retirement savings behavior. *Journal of Economic Perspectives.*

The unique setting for trustees' decisions

- Judge-Advisor Systems
  - Trustees employ expert advice
- Surrogate decision-making
  - Trustees make decisions on behalf of others
- Group decision-making
  - Trustees make decisions in groups

- Published review:
  - Weiss-Cohen, L., Ayton, P., Clacher, I., & Thoma, V. (2019). Behavioral biases in pension fund trustees' decision making. *Review of Behavioral Finance*

Judge-Advisor Systems

- Judges egocentrically discount advice received
  - Individuals only partially adjust from their beliefs towards the advice given
- However advice can receive higher weights in certain situations
  - When the decision is cued, and not independent
  - To diffuse responsibility (legal liability of trustees)
  - When the task is complex/important
  - When the adviser is confident and articulated
  - When advice is paid-for
- All of the situations above apply to trustee decisions

Surrogate decision-making

- Surrogates are poor at making decisions for others
  - Most of the research is on medical decision-making
- Surrogates project their own preferences
  - Even when the preferences of the other is discussed beforehand
  - Surrogates tend to insufficiently adjust from their preferences towards the other's
- Choose what other *should* do, instead of what they *would* do
- Choices are more regressive towards social norm / less extreme
  - E.g., what is the socially acceptable gift, instead of what the other really wants
  - Can lead to wrong levels of risk taking (both too high and too low)

Group decision-making

- Group decisions are not as efficient as commonly thought
  - Fewer ideas generated during brainstormings than individually
- Information is not shared
  - ‘Hidden profiles’
- Process losses
  - Loafing
  - Free-riding
  - Self-censorship
- Choices become more extreme: shifted and polarized
  - No one wants to be ‘average’

New experimental research

Experiments

- During our project, we have collected experimental data from pension scheme trustees and other pension professionals
  - With the help of Aon, Invesco, AMNT, and Professional Pensions
  - Throughout, we observed differences in financial experience and expertise. Employer-nominated trustees are more sophisticated than member-nominated trustees.

- Three main research themes:

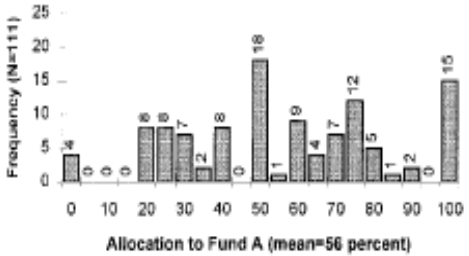
1. Menu effects
2. Surrogate decisions
3. Mutual fund fees *vs.* performance

1. Menu effects

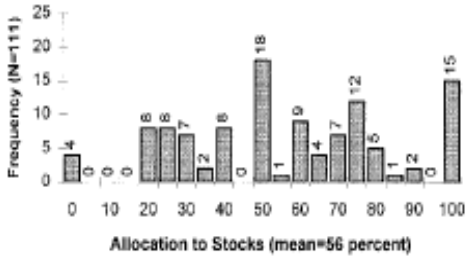
- Financial decisions should be based on principled underlying financial fundamentals
  - However, the method of describing the alternatives can be perceived by the decision-maker as communicating relevant information, even when it is determined by arbitrary factors (Fox, Ratner, & Lieb, 2005, J. Exp. Psych. Gen.; DellaVigna, 2009, J. Econ. Lit.)
- Menu effects are subtle variations in the description/presentation of options which can affect decisions
  - Adding irrelevant decoys
  - Changing the number of menu options
  - Framing an alternative as middle or extreme
  - Changing the menu layout
- We tested three menu manipulations with a total of 252 trustees

1/n heuristic & partition dependence Benartzi and Thaler (2001)

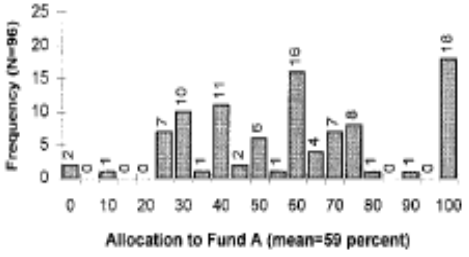
Panel A1: Stock Fund (A) & Bond Fund (B)



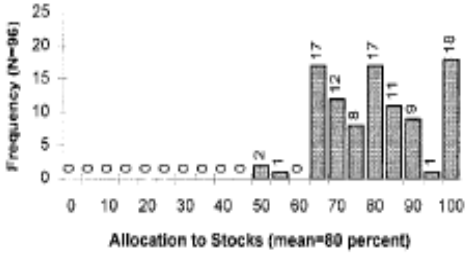
Panel A2: Stock Fund (A) & Bond Fund (B)



Panel B1: Stock Fund (A) & Balanced Fund (B)



Panel B2: Stock Fund (A) & Balanced Fund (B)



Panel C1: Balanced Fund (A) & Bond Fund (B)

Panel C2: Balanced Fund (A) & Bond Fund (B)

Naïve Diversification

Read and Loewenstein (1995) conducted an ingenious experiment on Halloween night. The “subjects” in the experiment were young “trick-or-treaters”.

In one SEQUENTIAL condition the children approached two adjacent houses and were offered a choice between two candies (Three Musketeers and Milky Way) at each house.

In the SIMULTANEOUS condition children approached a single house where they were asked to “choose whichever two candy bars you like.” Large piles of both candies were displayed to assure that the children would not think it was rude to take two of the same.

In the SIMULTANEOUS choice condition: every child selected one of each candy.
In the SEQUENTIAL choice condition only 48% of the children picked different candies.

This result is striking since in either case the candies are dumped into a bag and consumed later. It is the portfolio in the bag that matters, not the portfolio selected at each house.

Experiment 1: Menu items and naïve diversification

2 Funds - Balanced

Fund
FTSE All-Share companies
FTSE UK Conventional Gilts All

4 Funds - Balanced

Fund
FTSE All-Share companies
FTSE 100 companies
FTSE UK Conventional Gilts All
FTSE UK Conventional Gilts over 15 years

2 Funds – Unbalanced/Shares

Fund
FTSE All-Share companies
Balanced Fund (50% FTSE All-Share, 50% FTSE All Gilts)

4 Funds – Unbalanced/Shares

Fund
FTSE All-Share companies
FTSE 350 companies
FTSE 100 companies
FTSE UK Conventional Gilts over 15 years

There were 2 more conditions unbalanced towards bonds

Experiment 1: Menu items and naïve diversification

- We asked 119 trustees to allocate pension scheme assets across different combinations of mutual funds
  - Menu of options presented was either balanced (50/50 bonds/equities), bond-heavy (75/25) or equity-heavy (25/75)
  - Based on similar research with retail pension investors by Benartzi & Thaler (2001) in American Economic Review
- The investment allocation between bonds and equities was influenced by the balance of options ($p<.001$)
  - E.g., more investment in bonds when there were more bond funds from which to choose

Condition	Average allocations	
	Bonds	Equities
Bond-Heavy	69.7% ± 2.7%	30.3% ± 2.7%
Balanced	61.5% ± 2.7%	38.5% ± 2.7%
Equity-Heavy	44.3% ± 2.7%	55.7% ± 2.7%

Condition	Concentration (Σw^2)	Funds Chosen
2 Funds	0.66 ± 0.2	1.83 ± 0.09
4 Funds	0.43 ± 0.2	2.95 ± 0.09

Experiment 2: Menu context and framing

Label 30%	Bonds	Stocks	Worst Case	Average Case	Best Case
	100%	0%	£11,000	£11,000	£11,000
	90%	10%	£10,750	£11,500	£12,250
	80%	20%	£10,500	£12,500	£14,500
	70%	30%	£10,000	£13,500	£17,000
	60%	40%	£9,500	£15,000	£20,500
Conservative	50%	50%	£9,000	£16,500	£24,000
	40%	60%	£8,900	£18,000	£28,000
Moderate	30%	70%	£7,000	£20,000	£33,000
	20%	80%	£6,000	£22,000	£35,000
Aggressive	10%	90%	£5,000	£24,000	£43,000
	0%	100%	£2,500	£26,000	£49,500

Label 70%	Bonds	Stocks	Worst Case	Average Case	Best Case
	100%	0%	£11,000	£11,000	£11,000
Conservative	90%	10%	£10,750	£11,500	£12,250
	80%	20%	£10,500	£12,500	£14,500
Moderate	70%	30%	£10,000	£13,500	£17,000
	60%	40%	£9,500	£15,000	£20,500
Aggressive	50%	50%	£9,000	£16,500	£24,000
	40%	60%	£8,900	£18,000	£28,000
	30%	70%	£7,000	£20,000	£33,000
	20%	80%	£6,000	£22,000	£35,000
	10%	90%	£5,000	£24,000	£43,000
	0%	100%	£2,500	£26,000	£49,500

Experiment 2: Menu context and framing

- We asked 111 trustees to choose one of 11 combinations of bonds and equities for their default pension fund
  - One option was labelled as “moderate”, either the 30% or 70% bond option; or no label
  - Based on research with retail investors by Benartzi & Thaler (2002) in J. Finance (also Sela, Berger, Li, 2009, J. Cons. Res.)
- The asset mix was influenced by the labelling (p=.032). Member nominated-trustees were attracted by the “moderate” label (p=.033) but not employer-nominated trustees (p=.73)

Average allocation into bonds	Fund with “moderate” label		
	30% Bonds	No label	70% Bonds
Member nominated	34.4% ± 3.8%	37.1% ± 3.9%	48.2% ± 3.5%
Employer nominated	26.2% ± 4.1%	32.1% ± 4.3%	26.2% ± 3.3%
Average	30.3% ± 2.5%	34.6% ± 2.9%	37.2% ± 2.7%

Experiment 3: Menu layout and search patterns

- We asked 123 trustees to choose mutual funds by clicking to reveal hidden information about each fund
  - Based on the “Mouselab” paradigm by Payne, Bettman & Johnson (1993)
  - We traced the order and frequency in which each item was revealed
  - There were 10 asset classes, each with two fund options
  - Some subjects could click in as many items as they wanted, others were limited to 10 or 6 items per asset class

	Fund A	Fund B
1-year short term returns		
3-year medium term returns		
5-year long term returns		
Size of funds (net assets)		
Fees (TER – Total Expense Ratio)		
Risk (one year Standard Deviation)		
Risk Evaluation (within its asset class)		
Sharpe Ratio (return per unit of risk)		
Fund manager’s age and gender		

Experiment 3: Menu layout and search patterns

Trustees followed the choice layout closely when clicks were not restricted. They considered their search pattern more carefully when restricted, prioritizing the most important items (long-term returns, risk, and fees). “Nudge”?

(There was no statistically measurable difference between types of trustees (p=.09)).

Experiment 4: Surrogate decision making

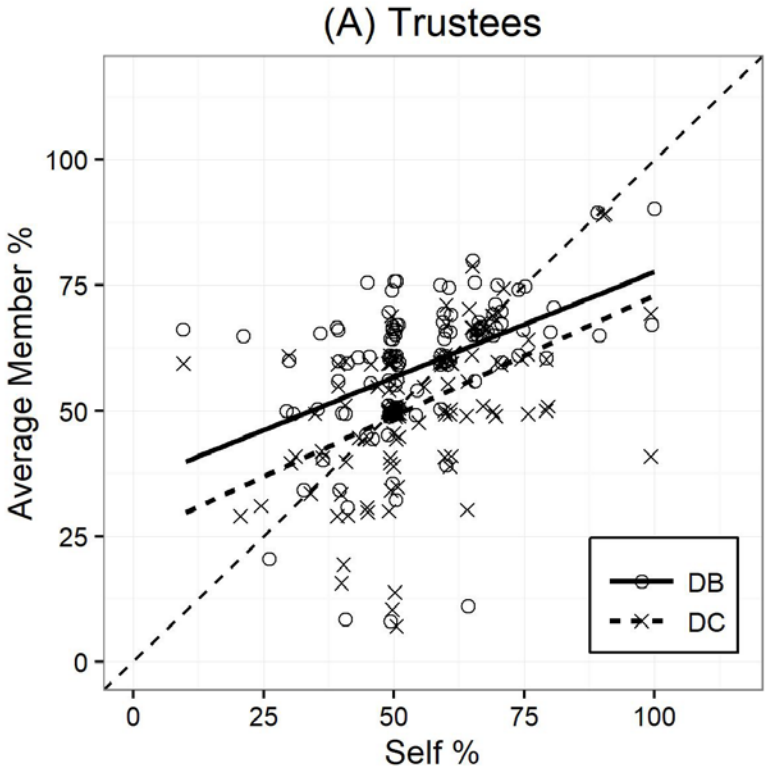
- Trustees make surrogate decisions on behalf of members
- Even in flexible plans, most members accept the default options with limited consideration
  - Effectively outsourcing their decisions to trustees
  - See Byrne, Blake, Cairns, & Dowd (2007) Default funds in UK defined-contribution plans, Fin. Analyst Journal; and Madrian & Shea (2001) The power of suggestion: Inertia in 401(k) participation and savings behaviour, Q. J. Econ.
- We tested 120 scheme trustees and 116 scheme members
  - We asked trustees and members what they believed to be ideal pension income replacement rates for themselves and for an average scheme member
  - Detailed information about the scheme and average member was provided to ensure consistent responses
- Review on surrogate decision making: Tunney & Ziegler (2015) Toward a psychology of surrogate decision making, PPS

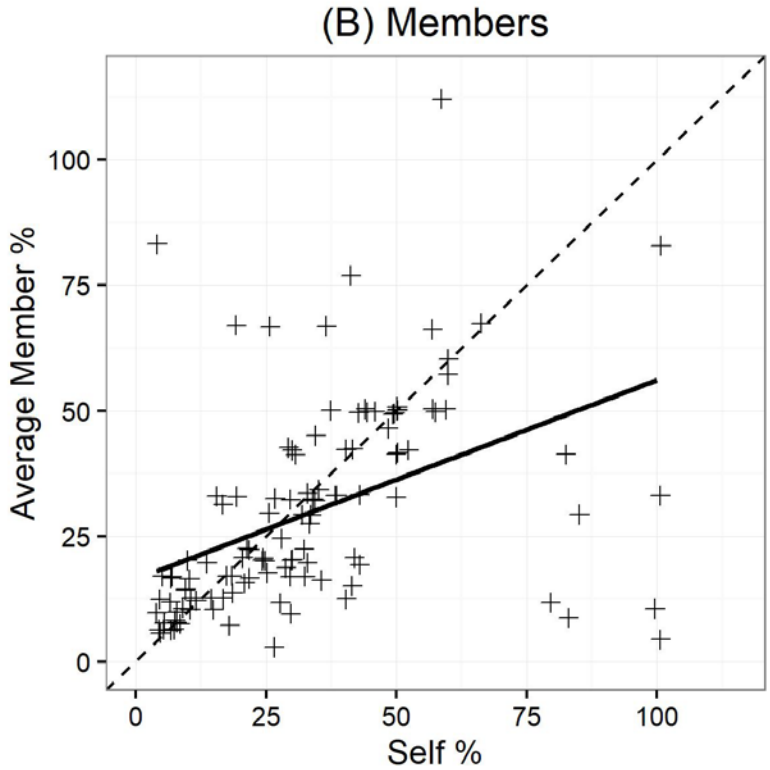
Experiment 4: Surrogate decision making - findings

- Trustees projected their preferences
  - Positive correlation between the replacement rates trustees chose for members and those they chose for themselves (p<.001)
- Replacement rates chosen by trustees for members were higher than those chosen by members for themselves (p<.001)
  - Trustees are not demographically representative of members (richer and older, mostly retired on DB)
  - Would require considerably higher contributions
- Trustees' replacement rates for DB were higher than for DC (p<.001): legacy effects
- Members' replacement rates were better aligned to the guidelines proposed by The Pensions Regulator (and contributions)

Condition	Pension replacement rate
Trustees	
Self	55% ± 1.3%
Other: Average DB member	59% ± 1.3%
Other: Average DC member	51% ± 1.3%
Members	
Self	34% ± 2.5%
Other: Average member	31% ± 2.4%

Experiment 4: Surrogate decision making - findings





Experiment 5: Mutual fund fees *vs.* performance

- Investors tend to ignore fees when choosing funds
  - Investors end up paying too much in fees
  - In particular recurring management fees (as opposed to front-load fees)
  - Average mutual fund fee is 0.55% p.a. even though there are now zero-fee funds
- Instead, investors choose fund with the highest past performance
  - Past returns can not reliably be used to predict future performance
  - In the long-term the cheaper funds are the winning funds (within the same asset class)
  - Fund managers exploit this bias by advertising funds with higher returns and by incubating funds before marketing them – further inflating fees

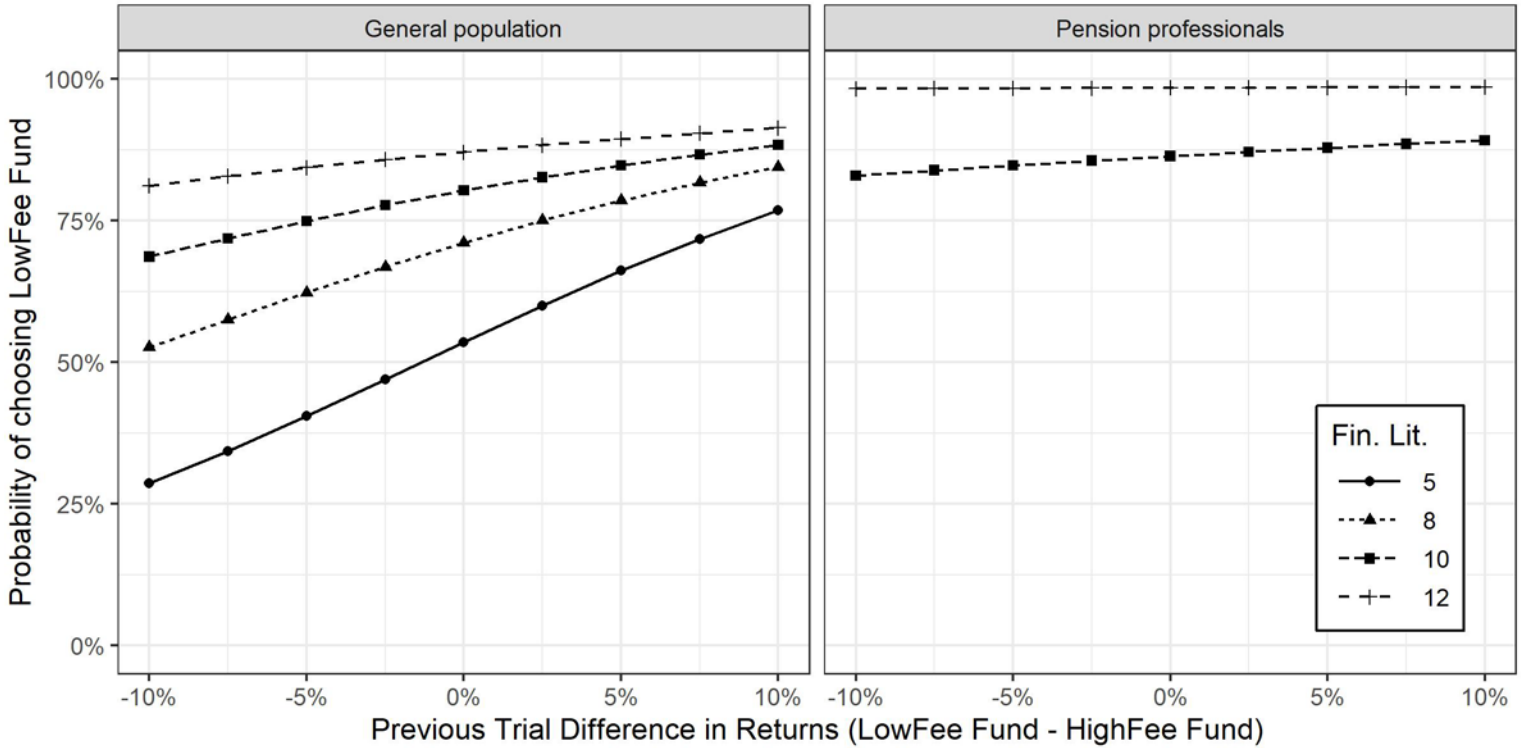
- Some references: Haslem, Baker & Smith (2008). Performance and characteristics of actively managed retail equity mutual funds with diverse expense ratios, Fin. Serv. Rev.; Carhart (1997). On persistence in mutual fund performance, J. Finance; Pontari, Stanaland, & Smythe (2009). Regulating information disclosure in mutual fund advertising, J. Consum. Pol.

Experiment 5: Mutual fund fees *vs.* performance findings

- Mutual fund selection task between a high-fee and a low-fee fund
  - Based on actual historical returns simulating real funds, for 60 months
  - Past performance was not correlated with future returns
  - Financial payments based on selections
- We tested general population (200) and pension professionals (62)
  - Professionals chose the low-fee fund more frequently than the general population ($p<.001$) and did not chase past performance

	General population	UK Pension professionals
Low-fee fund selection	64.0% ±2.0%	78.8% ±3.7%
Slope for past performance	0.96% ±0.11%	0.33% ±0.19%
Financial literacy level	9.6 / 13 ±0.2	11.3 / 12 ±0.1

3. Mutual fund fees *vs.* performance - plot



Conclusions

Findings

- Trustee decisions are set in environments that differ from the majority of behavioural finance research:
  - More sophisticated investors making decisions in group, with advice, on behalf of others
  - Level of sophistication differs by type of professional
- Trustees displayed behavioural finance biases, but to a lesser extent than unsophisticated investors
  - Less experienced member-nominated trustees generally more susceptible to biases than more experienced professional trustees
  - Trustees were influenced by the menu of options and how information was presented
  - Trustees projected their own (biased) preferences when choosing on behalf of members
  - Professional investors minimize fees instead of chasing past performance

Conclusions

- It is important for pension professionals and regulators to be aware of the decision-making biases of pension trustees
  - Despite being more sophisticated, trustees are not immune from decision-making biases
  - Biases can negatively influence funding levels, risk, investment returns, and the outcome of pensions for members
- This knowledge is important to improve:
  - Training of - and advice & guidance provided to - trustees
  - Type and format of Information presented to trustees
  - Regulation and policy around trustee decision-making
- Care should be taken to ensure that irrelevant factors do not unduly influence the decisions of trustees

Trustees are the custodians of US$27.6 trillion in pension fund assets in the OECD countries in 2018, equivalent to 57% of their GDP. Trustees can move markets, influence the real economy, and ultimately impact global financial well-being.