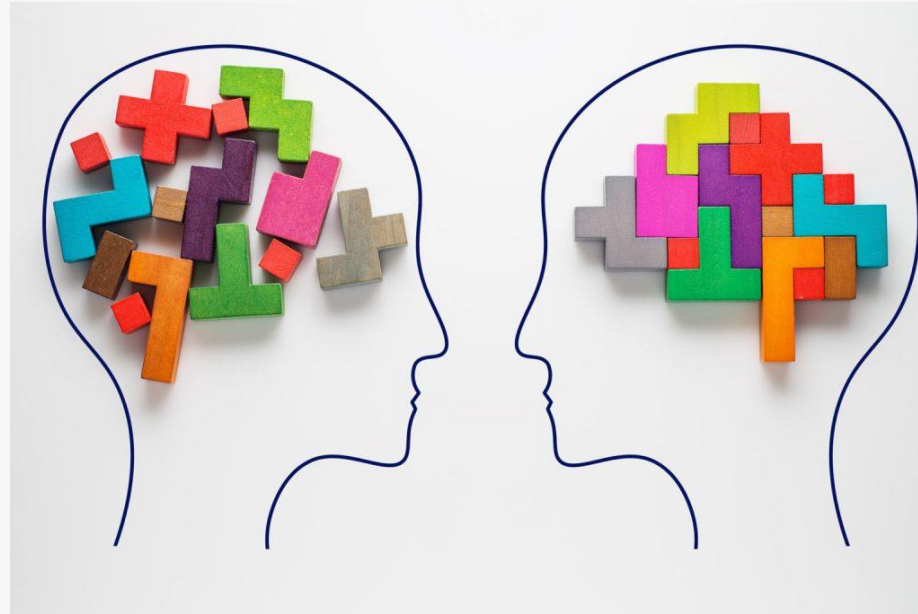


Adrien Fillon

19/04/2024



# The Bias Bias in Behavioral Economics – Nudges - and the Heterogeneity Revolution



SInnoPSis

ERA chair in science and  
innovation policy and studies

University of  
Cyprus

# Limitations of Behavioral Economics

- The study of behaviors from economics began after the WW2.
- Researchers found out that most people are rational.
- It lead to the theorisation of the **intuitive statistician program**:
  - In a 1967 [review](#) of more than 160 experiments, psychologists Cameron Peterson and Lee Roy Beach concluded that people can make reasonably accurate inferences about probabilities. People, the researchers argued, are intuitive statisticians.

- However, in the 70's Tversky and Kahneman, with the heuristics and biases program, postulated that people are irrational, with cognitive limitations.
  - How can we resolve this paradox?
- 
- By taking into account that **Experimental methods are not neutral tools**

# Experimental methods are not neutral tools

## How Experimental Methods Shaped Views on Human Competence and Rationality

Tomás Lejarraga<sup>1</sup> and Ralph Hertwig<sup>2</sup>

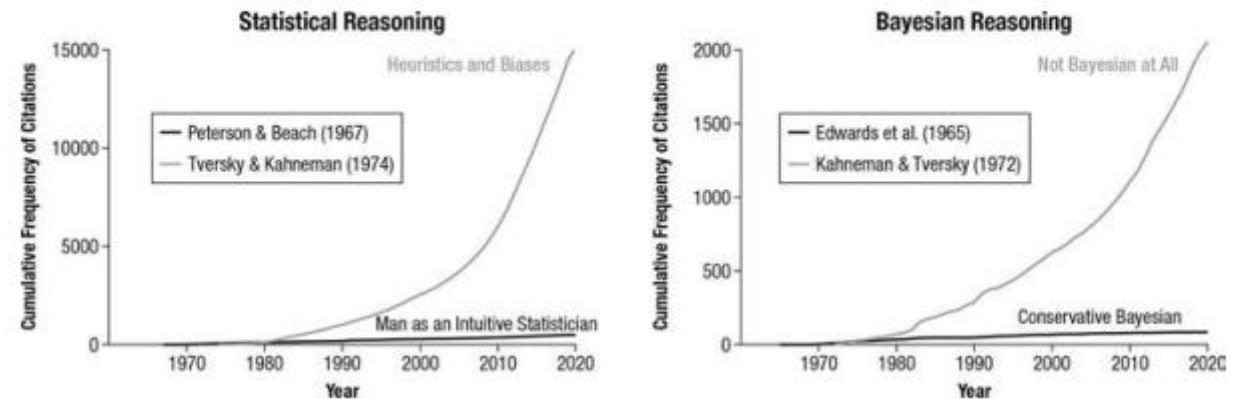
<sup>1</sup> Departament d'Economia de l'Empresa, Universitat de les Illes Balears

<sup>2</sup> Center for Adaptive Rationality, Max Planck Institute for Human Development, Berlin, Germany

Within just 7 years, behavioral decision research in psychology underwent a dramatic change: In 1967, Peterson and Beach (1967) reviewed more than 160 experiments concerned with people's statistical intuitions. Invoking the metaphor of the mind as an intuitive statistician, they concluded that "probability theory and statistics can be used as the basis for psychological models that integrate and account for human performance in a wide range of inferential tasks" (p. 29). Yet in a 1974 *Science* article, Tversky and Kahneman rejected this conclusion, arguing that "people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simple judgmental operations" (p. 1124). With that, they introduced the heuristics-and-biases research program, which has profoundly altered how psychology, and the behavioral sciences more generally, view the mind's competences and rationality. How was this radical transformation possible? We examine a previously neglected driver: The heuristics-and-biases program established an experimental protocol in behavioral decision research that relied on described scenarios rather than learning and experience. We demonstrate this shift with an analysis of 604 experiments, which shows that the descriptive protocol has dominated post-1974 research. Specifically, we examine two lines of research addressed in the intuitive-statistician program (Bayesian reasoning and judgments of compound events) and two lines of research spurred by the heuristics-and-biases program (framing and anchoring and adjustment). We conclude that the focus on description at the expense of learning has profoundly shaped the influential view of the error-proneness of human cognition.

Figure 1

*Cumulative Citation Frequencies of Four Key Articles on Statistical Reasoning and Bayesian Reasoning*



# Learning and feedback

In the 1960s, researchers used an experiential protocol that allowed people to learn probabilities from direct experience. Usually, people could practice, sample information sequentially, and adjust responses continually with feedback.

But Tversky and Kahneman replaced this experiential protocol with a descriptive one. Their experiments presented people with descriptive scenarios and word problems and tended to ask for a one-off estimate or judgment. Participants in their studies had little opportunity to practice or learn from feedback.

# Real situation versus description

- Simon (1979, 1989) urged economists to move away from as-if expected utility models and study how people actually make decisions in realistic situations of uncertainty as opposed to under risk.
- One example from Bayesian reasoning:

A disease has a base rate of .1, and a test is performed that has a hit rate of .9 and a false positive rate of .1 (the conditional probability of a positive test given no disease). What is the probability that a random person with a positive test result actually has the disease?

Among every 100 people, 10 are expected to have a disease. Among those 10, nine are expected to correctly test positive. Among the 90 people without the disease, nine are expected to falsely test positive. What proportion of those who test positive actually have the disease?

A disease has a base rate of .1, and a test is performed that has a hit rate of .9 and a false positive rate of .1 (the conditional probability of a positive test given no disease). What is the probability that a random person with a positive test result actually has the disease?

$$(0,1*0,9)/[(0,1*0,9)+(0,9*0,1)] = 0,5$$

Among every 100 people, 10 are expected to have a disease. Among those 10, nine are expected to correctly test positive. Among the 90 people without the disease, nine are expected to falsely test positive. What proportion of those who test positive actually have the disease?

$$9/(9+9)=0,5$$

160 Gynecologists

21% guessed right

87% guessed right

De-biasing effect: humans can learn Bayesian inference quickly if the information is presented in natural frequencies.

# Why was the heuristics and biases program so popular ?

- Minimal setup and implementation cost leading to cheaper data collection
- A tendency for researchers to like these theories
- A possibility for researchers to advance their career
- A demand from policy-makers

A Bias of Bias



# The Bias of Bias

- Lack of rationality.
  - Experiments have shown that people's intuitions are systematically biased.
- 2. Stubbornness.
  - Like visual illusions, biases are persistent and hardly corrigible by education.
- 3. Substantial costs.
  - Biases may incur substantial welfare-relevant costs such as lower wealth, health, or happiness.
- 4. Biases justify governmental paternalism.
  - To protect people from their biases, governments should “nudge” the public toward better behavior.

*Review of Behavioral Economics*, 2018, 5: 303–336

## The Bias Bias in Behavioral Economics

Gerd Gigerenzer\*

*Max Planck Institute for Human Development, Lentzeallee 94, 14195 Berlin, Germany; gigerenzer@mpib-berlin.mpg.de*

---

### ABSTRACT

Behavioral economics began with the intention of eliminating the psychological blind spot in rational choice theory and ended up portraying psychology as the study of irrationality. In its portrayal, people have systematic cognitive biases that are not only as persistent as visual illusions but also costly in real life—meaning that governmental paternalism is called upon to steer people with the help of “nudges.” These biases have since attained the status of truisms. In contrast, I show that such a view of human nature is tainted by a “bias bias,” the tendency to spot biases even when there are none. This may occur by failing to notice when small sample statistics differ from large sample statistics, mistaking people’s random error for systematic error, or confusing intelligent inferences with logical errors. Unknown to most economists, much of psychological research reveals a different portrayal, where people appear to have largely fine-tuned intuitions about chance, frequency, and framing. A systematic review of the literature shows little evidence that the alleged biases are potentially costly in terms of less health, wealth, or happiness. Getting rid of the bias bias is a precondition for psychology to play a positive role in economics.

---

*Keywords:* Behavioral economics, Biases, Bounded Rationality, Imperfect information

# Lack of rationality.

A disease has a base rate of .1, and a test is performed that has a hit rate of .9 and a false positive rate of .1 (the conditional probability of a positive test given no disease). What is the probability that a random person with a positive test result actually has the disease?

$$(0,1*0,9)/[(0,1*0,9)+(0,9*0,1)] = 0,5$$

160 Gynecologists

21% guessed right

De-biasing effect : humans can learn Bayesian inference quickly if the information is presented in natural frequencies.

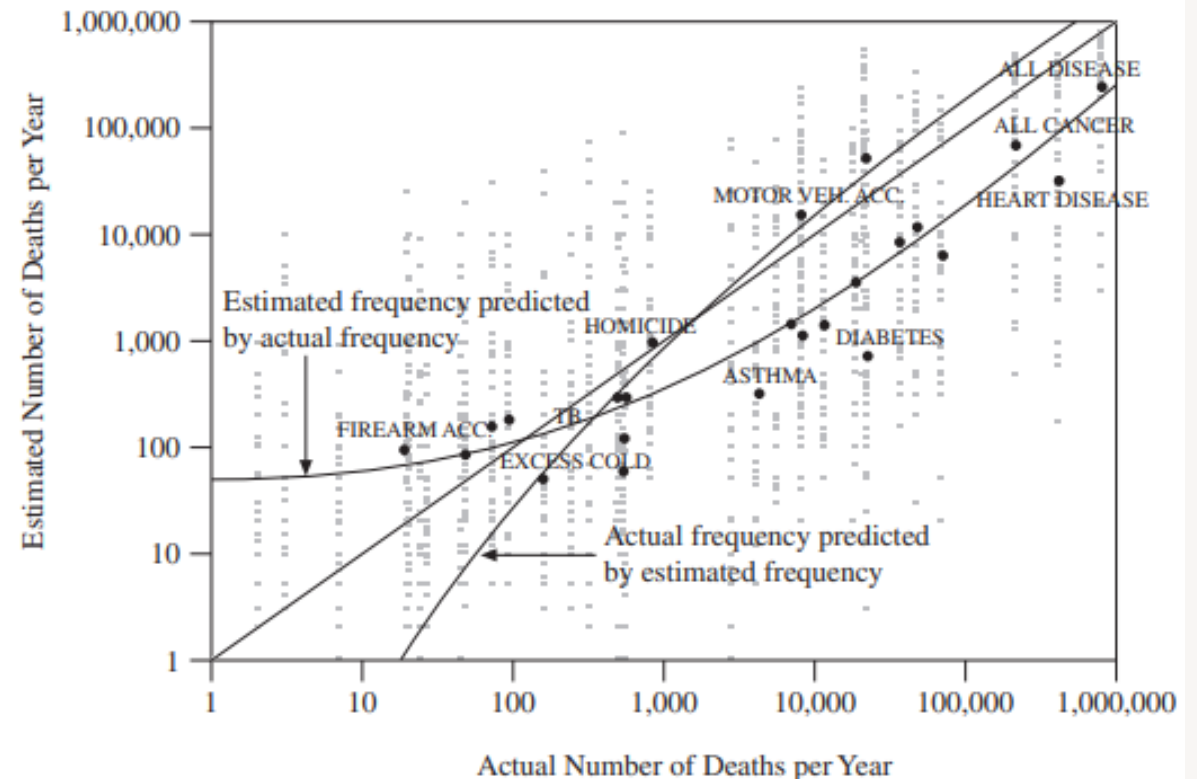
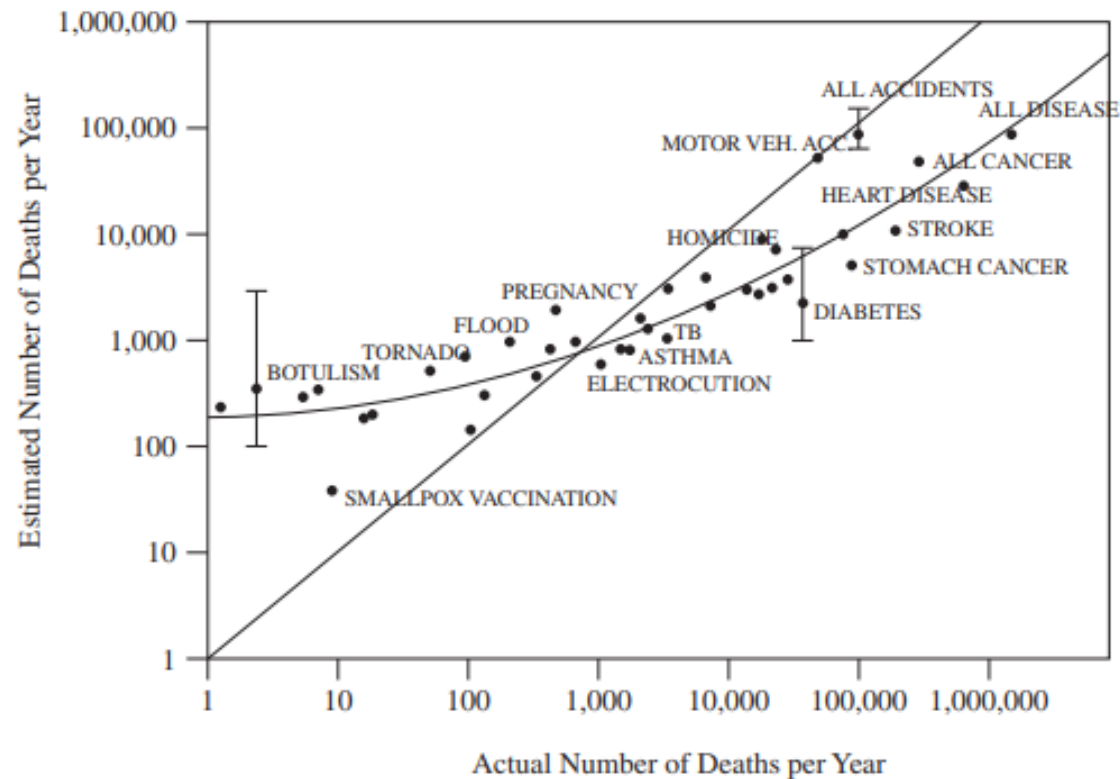
Among every 100 people, 10 are expected to have a disease. Among those 10, nine are expected to correctly test positive. Among the 90 people without the disease, nine are expected to falsely test positive. What proportion of those who test positive actually have the disease?

$$9/(9+9)=0,5$$

87% guessed right

# Lack of rationality.

- Regression to the mean



# Lack of rationality.

## Remember this problem?

There is an impending pandemic threatening to kill 600 people and you have two options:

*(A) Save 200 people*

**AND NOT SAVE 400 PEOPLE**

*(B) Save 600 people with 1/3 chance and save 0 people with 2/3 chance.*

The same disease is threatening society, but you are given two different options this time:

*(C) Kill 400 people* **AND NOT KILL 200 PEOPLE**

*(D) Kill 0 people with 1/3 chance and kill 600 people with 2/3 chance.*

We need the full information for both programs

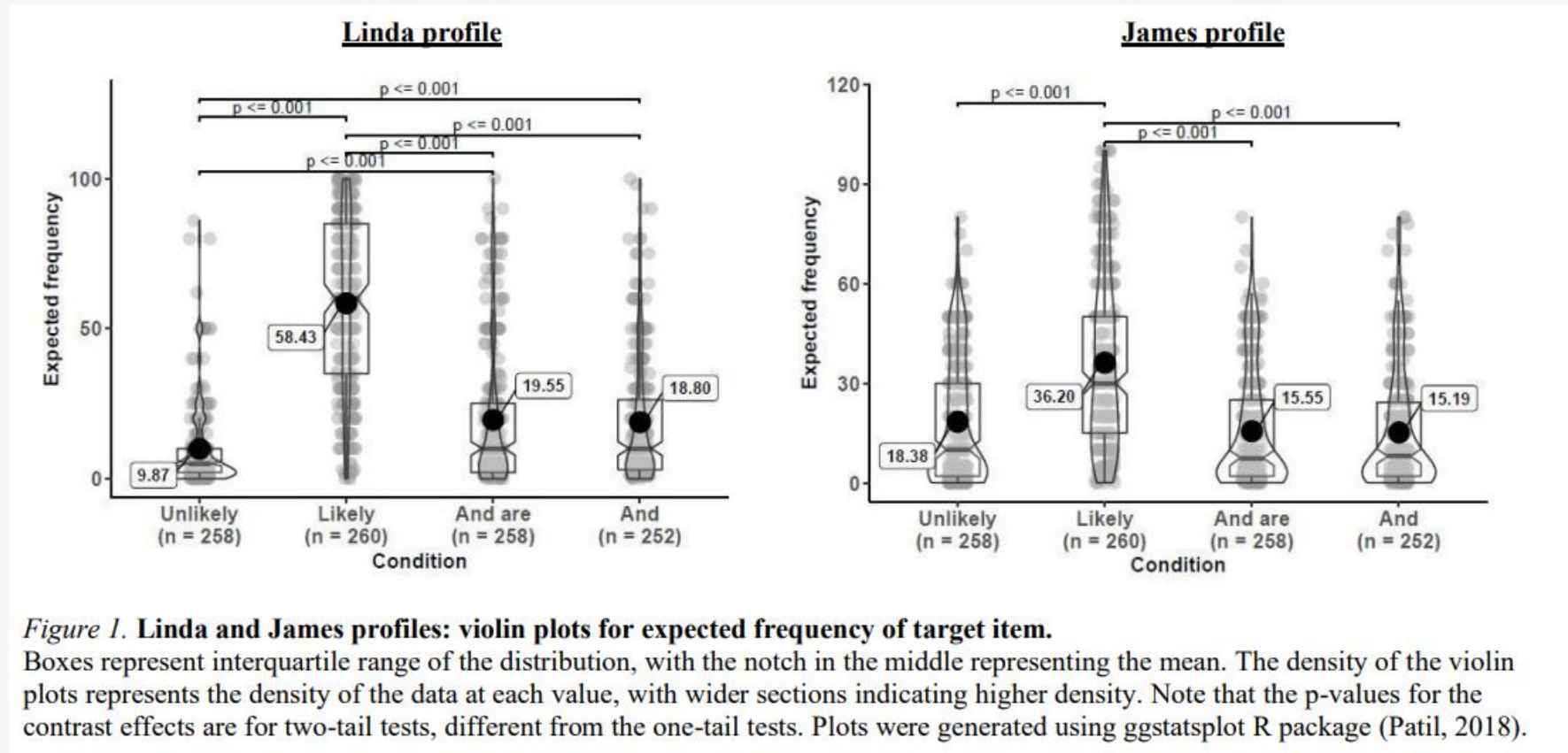
# Lack of rationality.

## Conjunction bias is frame dependent

- Linda is 31 years old, single, outspoken and very bright. She holds a master's degree in philosophy. As a student, she was very concerned about issues of discrimination and social justice, and she also participated in anti-nuclear demonstrations.
  - Do you think Linda is more likely to be:
  - A bank teller.
  - Active in the feminist movement.
  - A bank teller and active in the feminist movement.
- James grew up in a family of gypsies. His father was a musician and his mother a painter. They lived together for 40 years and never married. James was a very talented kid with a special gift for comedy, but he turned into a rebellious troublemaker in his youth. He dropped out of college after two years and traveled to Asia to learn the craft. James is now 35 years old.
  - Do you think James is more likely to be:
  - An Artist.
  - Voting for the Conservative Party.
  - An Artist and Conservative Party voter.

# Lack of rationality.

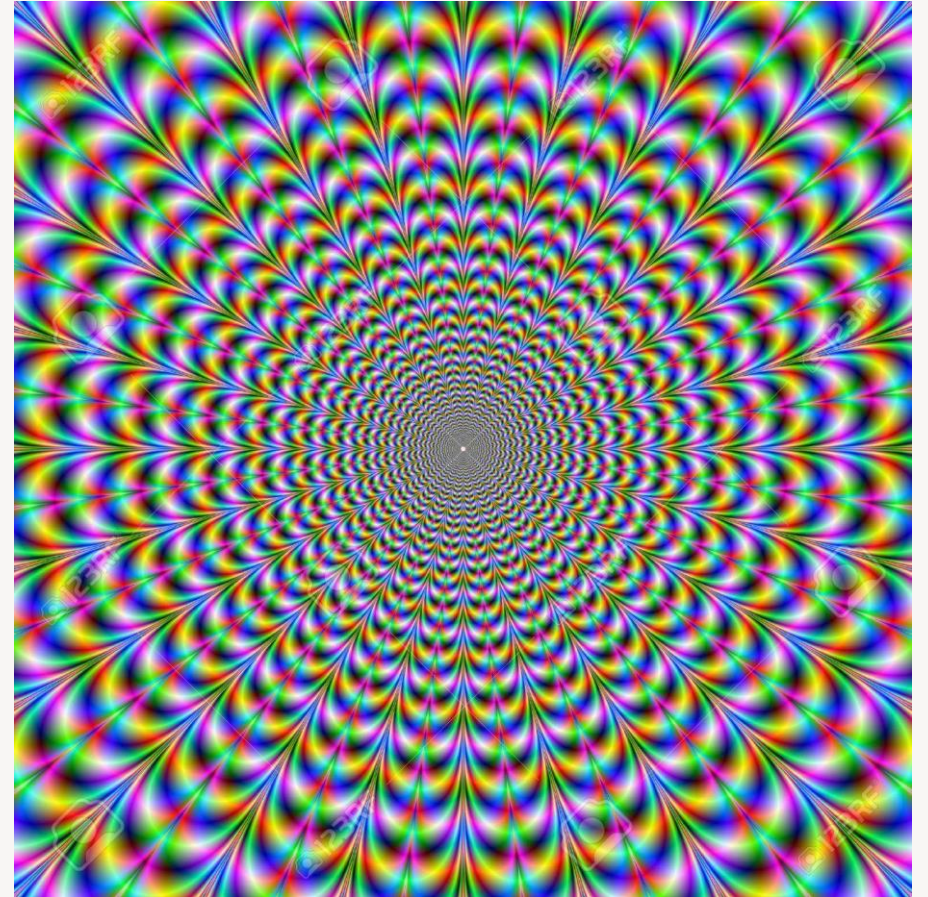
## Conjunction bias is frame dependent





# Stubbornness.

- Like visual illusions, biases are persistent and hardly corrigible by education.
- Even if you know they exist, you can't help but see them



# Stubbornness.

- Visual illusions are not a sign of irrationality, but a byproduct of an intelligent brain that makes “unconscious inferences from two-dimensional retinal images to a three-dimensional world.
- In Shepard’s (1990) words, “to fool a visual system that has a full binocular and freely mobile view of a well illuminated scene is next to impossible”. Thus, in psychology, the visual system is seen more as a genius than a fool in making intelligent inferences, and inferences, after all, are necessary for making sense of the images on the retina.



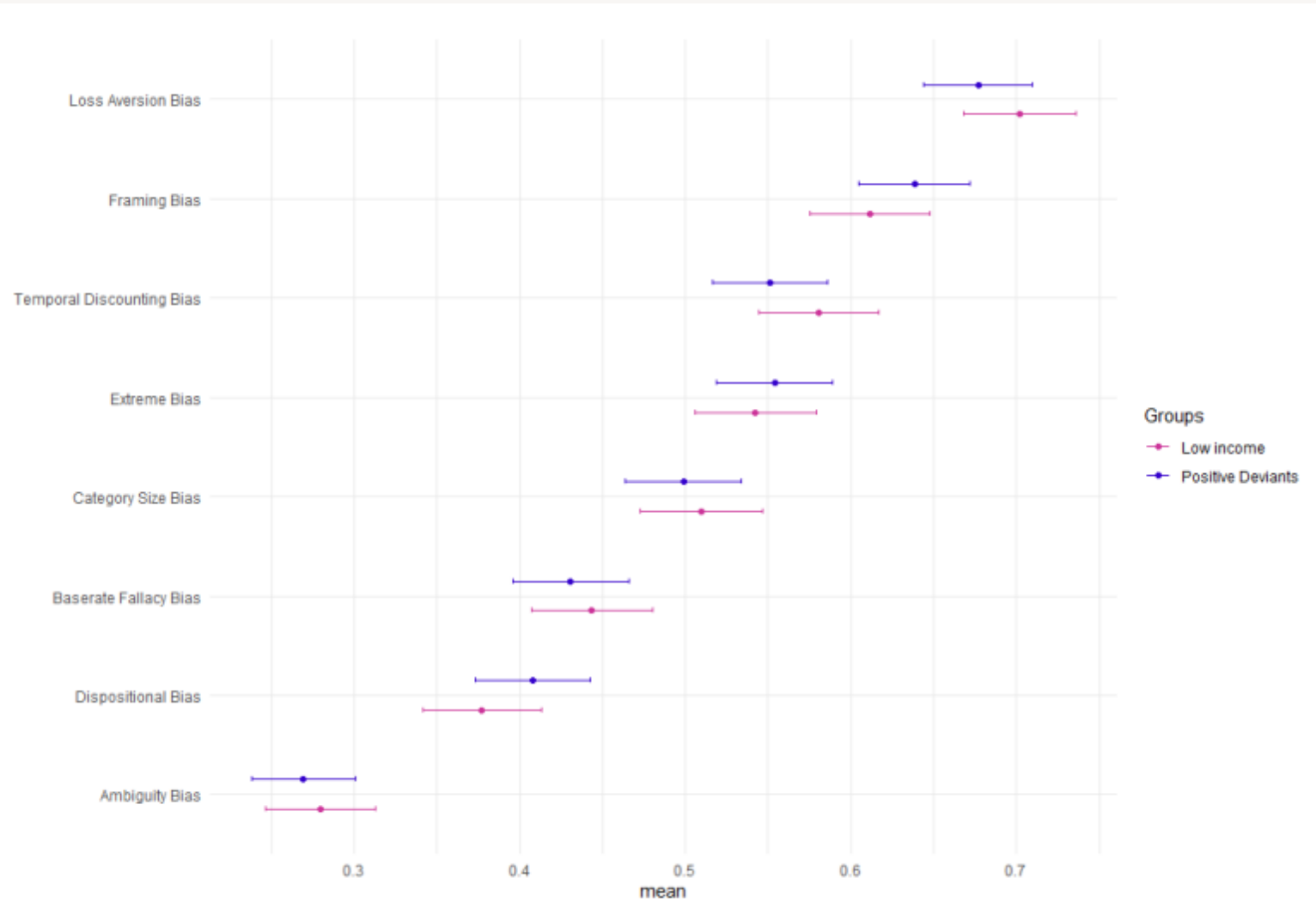
# Substantial costs.

- Biases may incur substantial welfare-relevant costs such as lower wealth, health, or happiness.
- 27 countries, 5000 participants
- Test between low-income people and positive deviants
- Positive deviants: individuals that had overcome financial disadvantages as children

## Poor but not by choice(s)

Kai Ruggeri\*, Sarah Ashcroft-Jones\*, Giampaolo Abate Romero Landini, Narjes Al-Zahli, Natalia Alexander, Mathias Houe Andersen, Katherine Bibilouri, Katharina Busch, Jennifer Chen, Barbora Doubravová, Tatianna Dugué, Aleena Asfa Durrani, Nicholas Dutra, Eduardo Garcia-Garzon, Christian Gomes, Aleksandra Gracheva, Neža Grilc, Deniz Mısra Gürol, Zoe Heidenry, Clara Hu, Rachel Krasner, Romy Levin, Justine Li, Ashleigh Marie Elizabeth Messenger, Melika Miralem, Fredrik Nilsson, Julia Marie Oberschulte, Takashi Obi, Anastasia Pan, Sun Young Park, Daria Stefania Pascu, Sofia Pelica, Maksymilian Pyrkowski, Katherine Rabanal, Pika Ranc, Žiga Mekiš Recek, Alexandra Symeonidou, Olivia Symone Tutuska, Milica Vdovic, Qihang Yuan, Friederike Stock

\*Contributed equally & sharing first-authorship



**Fig. 3.** Rate of cognitive biases between low income and positive deviant groups

# The Bias of Bias

- Lack of rationality
  - Experiments have shown that people's intuitions are systematically biased.
- 2. Stubbornness
  - Like visual illusions, biases are persistent and hardly amenable to education.
- 3. Substantial costs
  - Biases may have substantial welfare-relevant costs such as low wealth, health, or happiness.
- 4. Biases justify governmental paternalism.
  - To protect people from their biases, governments should “nudge” the public toward better behavior.



*Review of Behavioral Economics*, 2018, 5: 303–336

## The Bias Bias in Behavioral Economics

Gerd Gigerenzer\*

*Max Planck Institute for Human Development, Lentzeallee 94, 14195 Berlin, Germany; gigerenzer@mpib-berlin.mpg.de*

---

### ABSTRACT

Behavioral economics began with the intention of eliminating the psychological blind spot in rational choice theory and ended up portraying psychology as the study of irrationality. In its portrayal, people have systematic cognitive biases that are not only as persistent as visual illusions but also costly in real life—meaning that governmental paternalism is called upon to steer people with the help of “nudges.” These biases have since attained the status of truisms. In contrast, I show that such a view of human nature is tainted by a “bias bias,” the tendency to spot biases even when there are none. This may occur by failing to notice when small sample statistics differ from large sample statistics, mistaking people’s random error for systematic error, or confusing intelligent inferences with logical errors. Unknown to most economists, much of psychological research reveals a different portrayal, where people appear to have largely fine-tuned intuitions about chance, frequency, and framing. A systematic review of the literature shows little evidence that the alleged biases are potentially costly in terms of less health, wealth, or happiness. Getting rid of the bias bias is a precondition for psychology to play a positive role in economics.

---

*Keywords:* Behavioral economics, Biases, Bounded Rationality, Imperfect information

- Developmental psychologist and APS President [Alison Gopnik once asked](#), “Why are grown-ups often so stupid about probabilities when even babies and chimps can be so smart?” (Gutiérrez, 2014).
- Answer : the experimental methods to study babies and adults are different and lead to different conclusions
- **The Bias Bias:** The tendency to see systematic biases in behavior even when there is only unsystematic error or no verifiable error at all.

# Behavioral policies : Governmental paternalism

- To protect people from their biases, governments should “nudge” the public toward better behavior.

# Behavioral Policy

- Economic policy informed by behavioral theory.
- Since behavioral (like neoclassical) economists take their central normative concern to be welfare, and perhaps its distribution, this work is often discussed under the heading of **behavioral welfare economics**.

# Libertarian Paternalism

- **Libertarian paternalism:** the thesis that it is legitimate to help people make better decisions themselves, by their own lights, if it is possible to do so without interfering with their liberty or autonomy.

# Libertarian

- Libertarian paternalism is **paternalistic** in the sense that it aims to make people better off.
  - It aims to enhance the welfare of the people who are targeted by the policy.
- Libertarian paternalism is **libertarian** in the sense that it tries to do so in a manner that respects their liberty and autonomy.
  - It eschews dictatorial solutions.



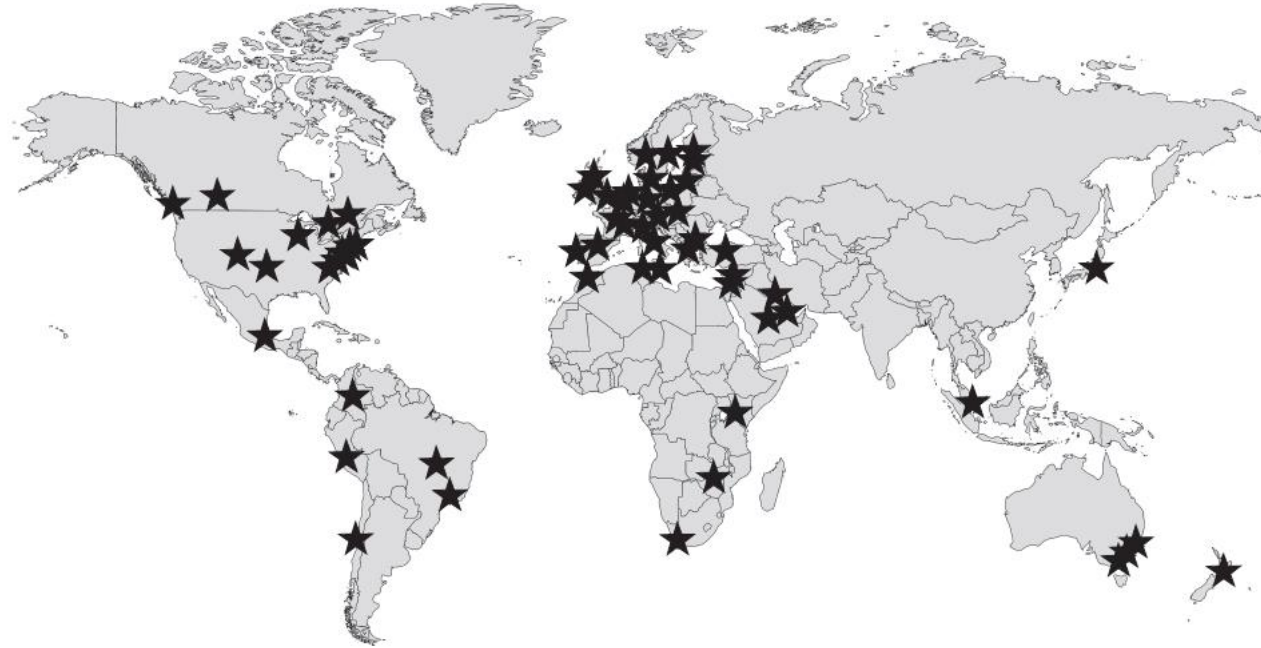
# A Nudge

- A **nudge** is an intervention on the choice architecture, such that the following criteria are satisfied:
  1. Aims to help people make better decisions themselves, rather than making decisions for them
  2. Imposes trivial costs on people
  3. No, or trivial, effects on people who are already rational and informed
  4. Has a non-trivial and potentially large beneficial effect on people who are not already rational or informed (by their own lights)

# Examples of Nudges

- **Default options** are options that are made default unless the decision-maker makes an active choice to opt in or out.
  - Example: Social-media privacy settings are often “public” unless you change them.
- **Cooling-off periods** are periods of time following a decision in which decision-makers can reverse their choice to counteract impulsive decisions.
- **The Save More Tomorrow (SMarT) Program** encourages workers to save more for retirement by giving them the option of committing in advance to allocating a portion of their future raises toward savings.

# BI Teams Worldwide



**Figure 12.3** Behavioral-insight teams across the world. Data from OECD (TK)

# Nudges are political tools

<i><b>Policy issue</b></i>	<i><b>Potential i-frame interventions</b></i>	<i><b>Potential s-frame interventions</b></i>
Climate change	Social feedback on energy use (Schultz et al., 2007) Smart meters (Department for Business, Energy & Industrial Strategy, 2013) Carbon footprint calculators (West et al., 2016)	Carbon pricing (Best, Burke, & Jotzo, 2020) Decarbonization of the power sector (Jägemann et al., 2013) Green building codes (e.g., LEED certification) (U.S. Environmental Protection Agency, n.d.)
Obesity	Calorie labels (Jue et al., 2012; Swartz et al., 2011) Portion size changes (Schwartz et al., 2012; Downs & Loewenstein, 2011) Weight loss incentives (Volpp et al., 2008) Individual incentives to exercise (Charness & Gneezy, 2009)	Sugar tax (Allcott et al., 2019) Subsidies for healthy food (Afshin et al., 2017)
Retirement savings	Advisors declare conflicts (Cain et al., 2005) Defaulting into pensions (Madrian & Shea, 2001) Save More Tomorrow (Benartzi, 2012)	Employer-provided pensions (e.g., Australian Age Pension) (Agnew, 2013) Social security expansion (Social Security Administration, n.d.)
Healthcare	Medication reminders (Volpp et al., 2017) Choice architecture for insurance exchanges (Johnson et al., 2013)	Government negotiation of prescription drug prices (Ginsburg & Lieberman, 2021) Single-payer health insurance (Woolhandler & Himmelstein, 2019)
Waste	Keep America Beautiful campaign (Mann, 2021) Painted footsteps leading pedestrians to trash bins (Keep Britain Tidy, 2015)	“Polluter pay” policies (Corkery, 2020) Plastic bag bans (National Conference of State Legislatures, 2021)

## The i-Frame and the s-Frame: How Focusing on Individual-Level Solutions Has Led Behavioral Public Policy Astray

*Please cite as: Chater, N. & Loewenstein, G. (in press). The i-frame and the s-frame: How focusing on individual-level solutions has led behavioral public policy astray. Behavioral and Brain Sciences. DOI: <https://doi.org/10.1017&am>*

63 Pages • Posted: 11 Mar 2022 • Last revised: 23 Sep 2022

[Nick Chater](#)

University of Warwick - Warwick Business School

[George Loewenstein](#)

Carnegie Mellon University - Department of Social and Decision Sciences

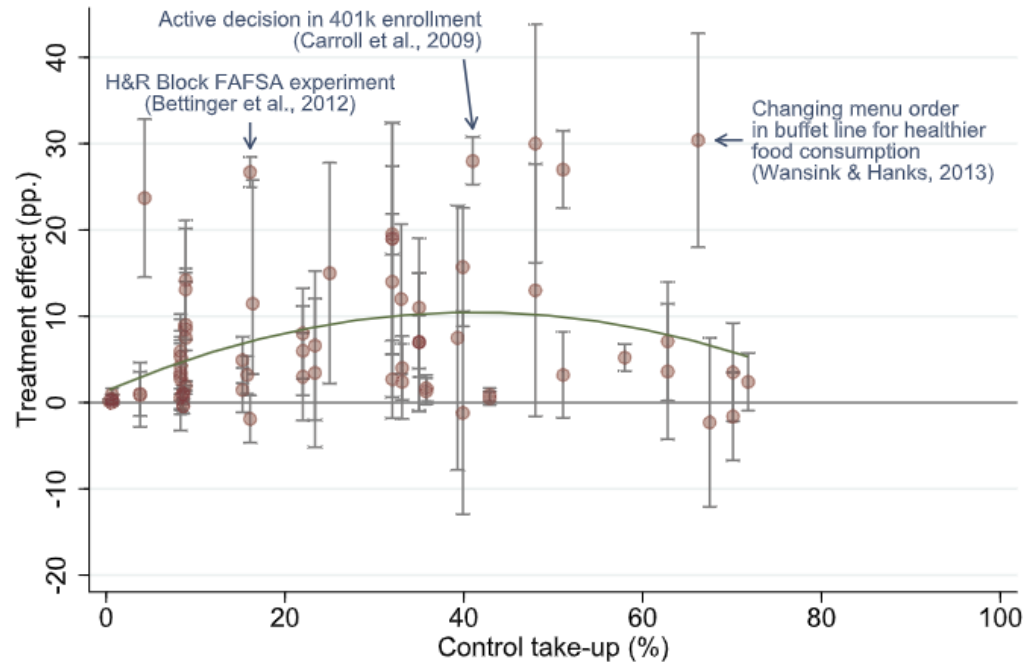
Date Written: March 1, 2022

## RCTS TO SCALE: COMPREHENSIVE EVIDENCE FROM TWO NUDGE UNITS

STEFANO DELLAVIGNA  
Department of Economics, UC Berkeley and NBER

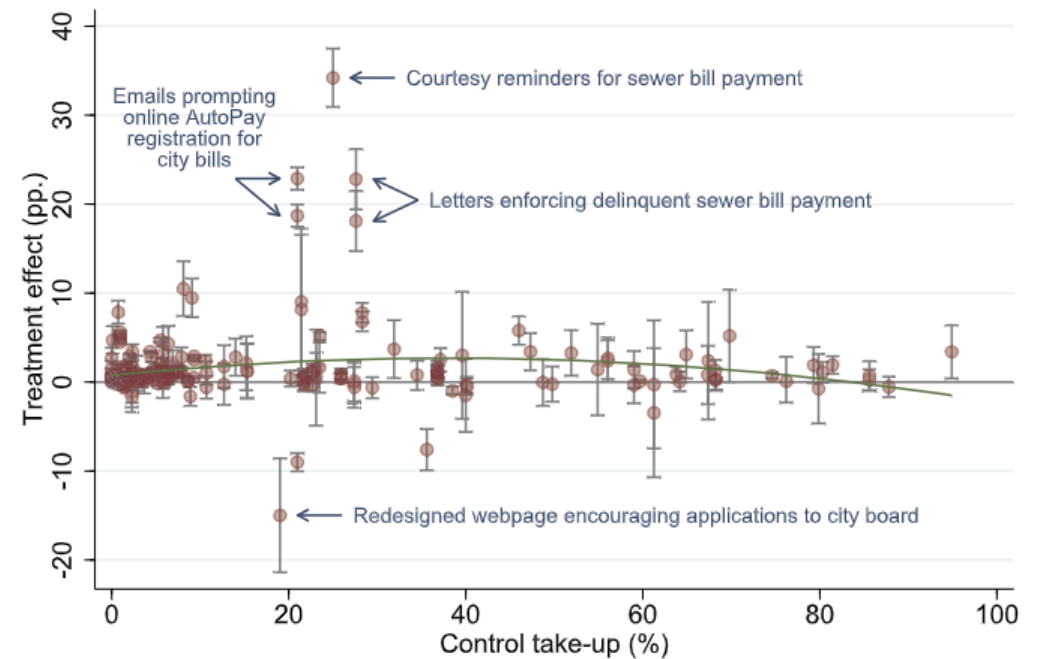
ELIZABETH LINOS  
Goldman School, UC Berkeley

(a) Academic Journals sample



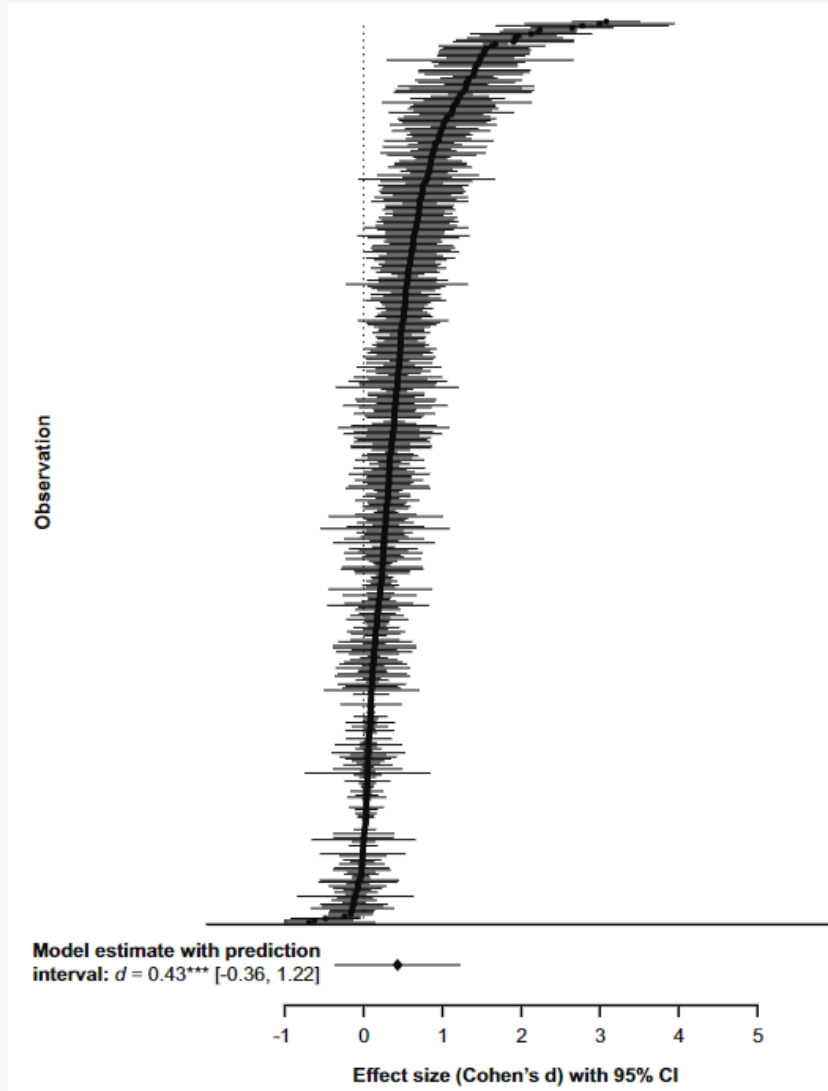
Sample: 71 nudges (26 trials)  
3 nudges with treatment effects >40 pp. are not shown.

(b) Nudge Units sample



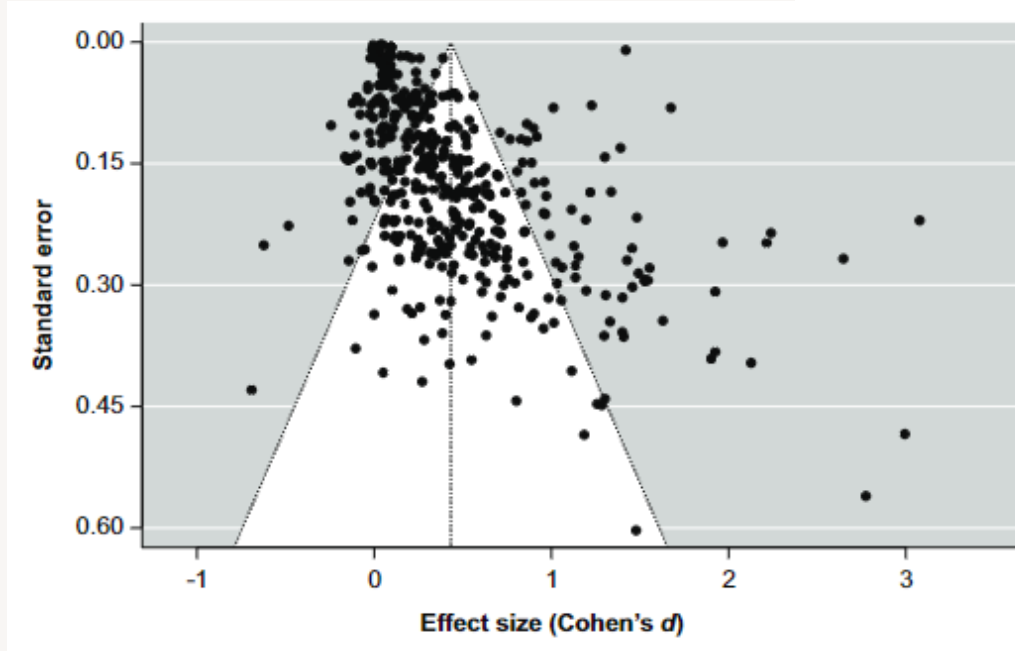
Sample: 237 nudges (124 trials)  
4 nudges (2 trials) with missing control take-up data are not shown.

# Do Nudges Work?



## The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains

Stephanie Mertens<sup>1</sup>, Mario Herberz<sup>2,3</sup>, Ulf J J Hahnel<sup>2,3</sup>, Tobias Brosch<sup>1,3</sup>



- Drawing on more than 200 studies reporting over 450 effect sizes ( $n = 2,149,683$ ) [...], our results show that choice architecture interventions overall promote behavior change with a small to medium effect size of Cohen's  $d = 0.45$  (95% CI [0.39, 0.52]).

# Do Nudges Work?





Aaron Charlton

@AaronCharlton · Follow

I found it really shocking that PNAS would publish a meta-analysis in which nearly all of the outliers ( $d=1+$ ) are Brian Wansink papers. How is that okay? cc @sTeamTraen

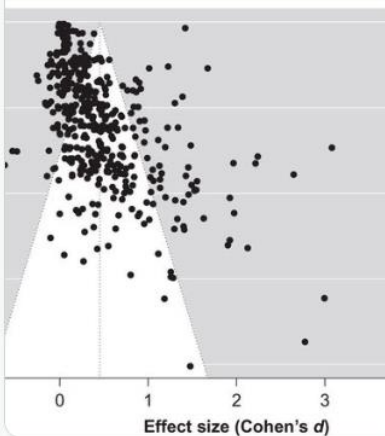


Mark Brandt @mjbsp

New meta-analysis of choice architecture interventions finds a positive effect.

[pnas.org/content/119/1/...](https://pnas.org/content/119/1/...)

But look at this funnel plot. Depending on your assumptions, the true effect is either ~25% smaller (and sig), or basically zero



**Bias.**  
ction of the relation between effect sizes and their corresponding  
asymmetric distribution that suggested a one-tailed overrepresent  
ct sizes in studies with comparatively low statistical power (43). Th  
y confirmed by Egger's test (44), which found a positive association  
and SEs ( $b = 2.28$ , 95% CI [1.31, 3.25],  $t(339) = 4.61$ ,  $P < 0.00$   
s point to a publication bias in the literature that may favor the rep  
as opposed to unsuccessful implementations of choice architectur  
s in studies with small sample sizes. Sensitivity analyses imposing  
tions on a simplified random effects model suggested that this one  
bias could have potentially affected the estimate of our meta-analy  
ing a moderate one-tailed publication bias in the literature attenuat  
t size of choice architecture interventions by 26.79% from Cohen's  
7, 0.46], and  $r^2 = 0.20$  (SE = 0.02) to  $d = 0.31$  and  $r^2 = 0.23$   
e-tailed publication bias attenuated the overall effect size even fur  
nd  $r^2 = 0.34$ ; however, this assumption was only partially support  
Although our general conclusion about the effects of choice archit  
s on behavior remains the same in the light of these findings, the  
ventions is likely to be smaller than estimated by our meta-analytic  
representation of positive effect sizes in our sample.

5:56 AM · Jan 6, 2022



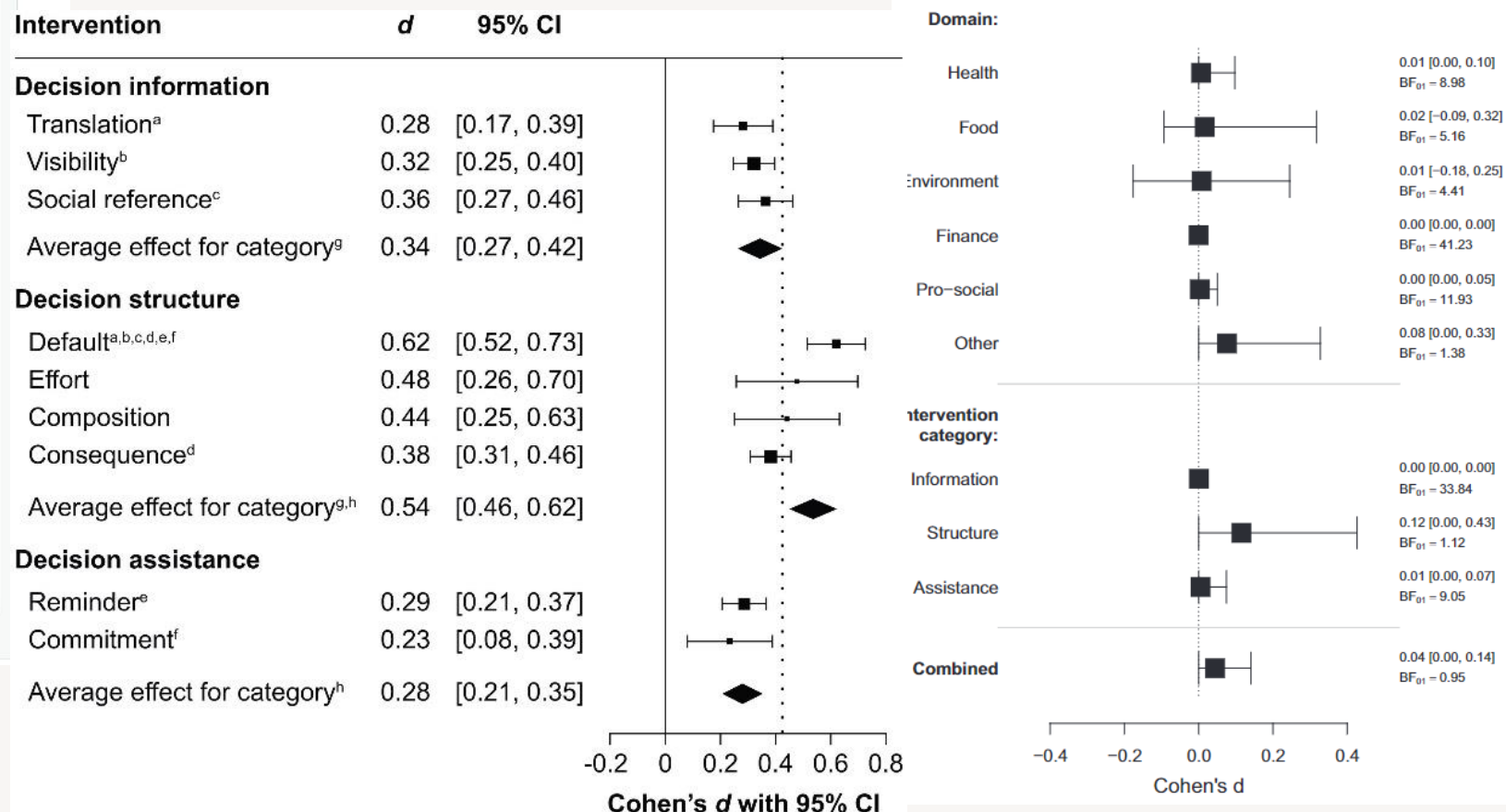
PNAS

LETTER



## No evidence for nudging after adjusting for publication bias

Maximilian Maier<sup>a,1,2</sup>, František Bartoš<sup>b,1</sup>, T. D. Stanley<sup>c,d</sup>, David R. Shanks<sup>a</sup>, Adam J. L. Harris<sup>a</sup>, and Eric-Jan Wagenmakers<sup>b</sup>



# Do Nudges Work?

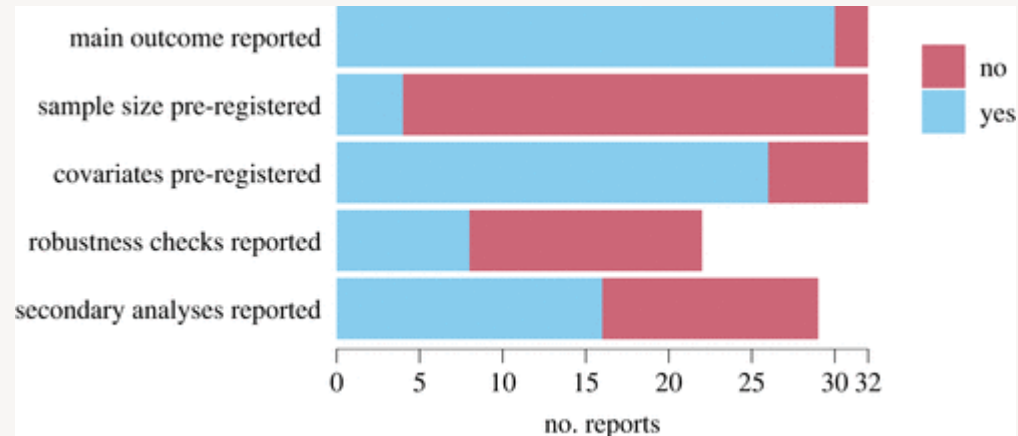
Research articles

## Exploring open science practices in behavioural public policy research

Maximilian Maier<sup>†</sup>✉, František Bartoš<sup>†</sup>, Nichola Raihani, David R. Shanks, T. D. Stanley, Eric-Jan Wagenmakers and Adam J. L. Harris

Published: 21 February 2024 | <https://doi.org/10.1098/rsos.231486>

- Pre-registration by Nudge units
- Using data from DellaVigna & Linos





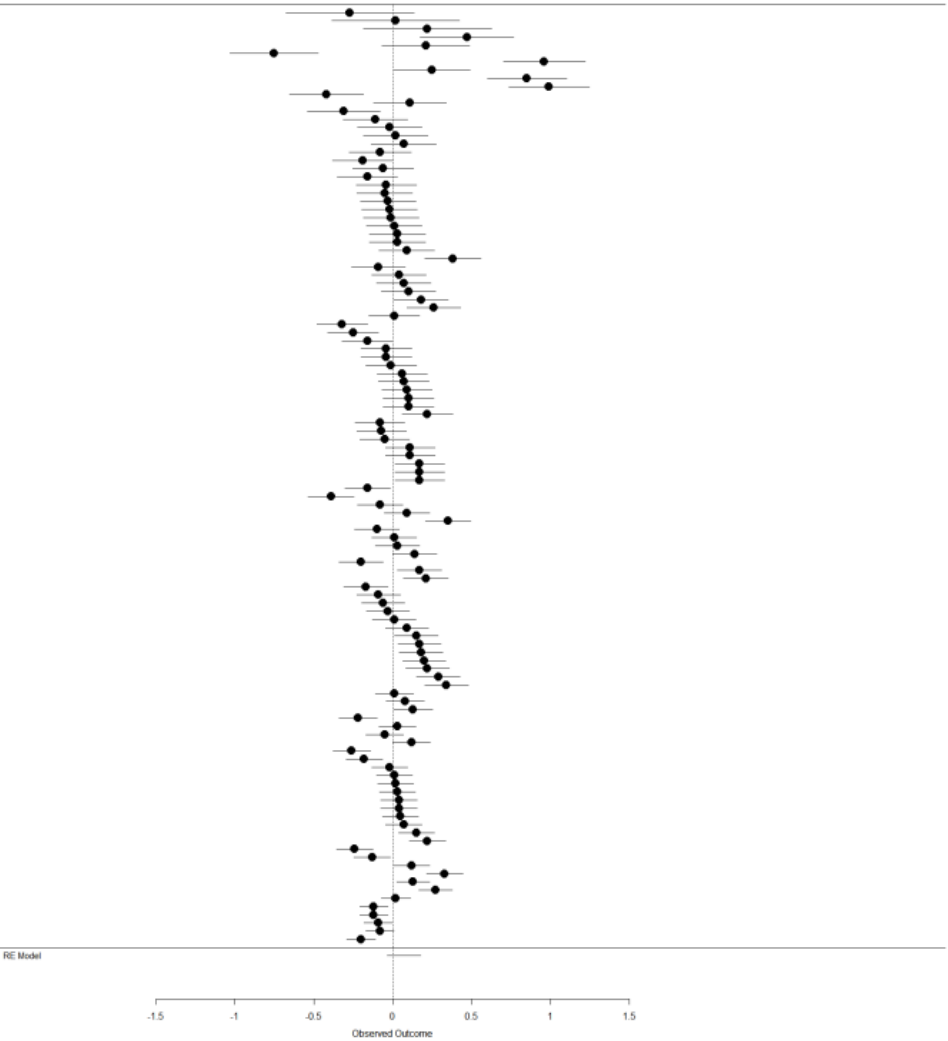
**‘Fear of the Light’? Transparency does not reduce the effectiveness of nudges. A data-driven review.<sup>1</sup>**

Hendrik Bruns, The European Commission’s Joint Research Centre (JRC), Brussels, 0000-0003-4301-0009

Adrien Fillon, SInnoPSis unit, Economics Dept., University of Cyprus, 0000-0001-8324-2715

Zacharias Maniadis, SInnoPSis unit, Economics Dept., University of Cyprus, 0000-0002-3225-0835

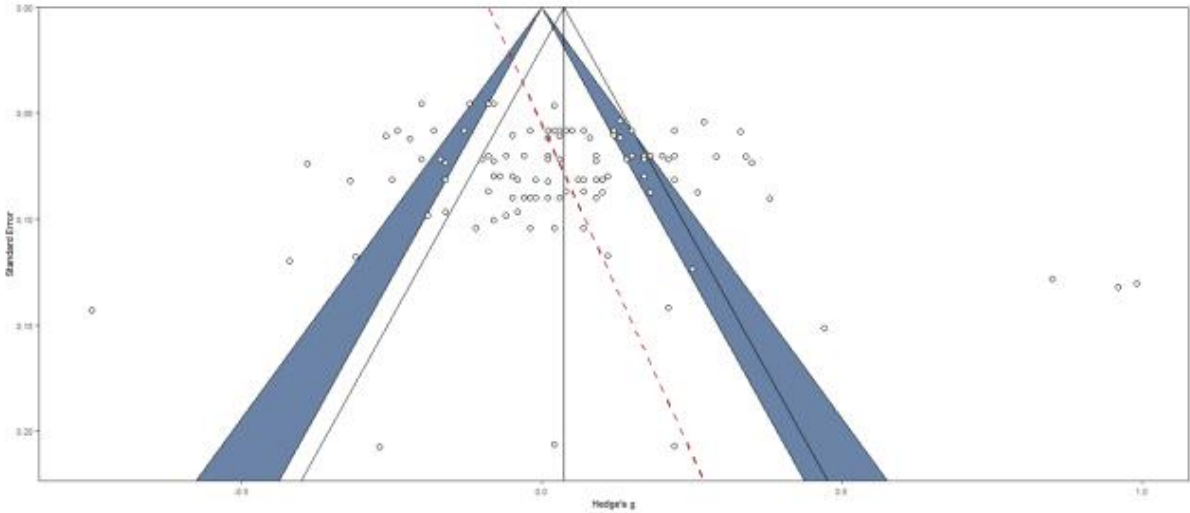
Yavor Paunov, Royal Institute of Technology, Stockholm, 0000-0002-7595-3258



**Table 2: Moderator analysis**

Effect	<i>k</i>	<i>g</i>	95% CI	Test statistic	<i>P</i>
Type of Experiment				$F(2, 108) = 0.03$	0.96
Online	99	0.08	[-0.06, 0.21]		
Laboratory	10	0.06	[-0.02, 0.14]		
Field	2	0.02	[-0.07, 0.12]		
Intervention Category				$F(1, 112) = 0.14$	0.71
Decision Structure	105	0.10	[-0.02, 0.22]		
Decision Information	8	-0.06	[-0.21, 0.09]		
Decision Assistance	1	-0.05			
Domain				$F(1, 112) = 0.01$	0.92
Environment	43	0.04	[-0.01, 0.10]		
Food	2	0.02	[-0.07, 0.12]		
Health	14	-0.18	[-0.43, 0.07]		
Other	27	0.17	[-0.10, 0.43]		
Pro-social	28	0.03	[-0.02, 0.08]		

**Figure 3: Funnel plot displaying each observation as a function of its effect size and SE.**



# Do Nudges Work?

- As any social sciences, Behavioral Economics is subject to false findings, created by questionable practices and publication biases.
- It is then difficult to conclude for or against an effectiveness of nudges
- As a meta-science group, our goal is to find ways to improve credibility in findings

# Bias of Bias

- Lack of rationality.
  - Experiments have shown that people's intuitions are systematically biased.
- 2. Stubbornness.
  - Like visual illusions, biases are persistent and hardly corrigible by education.
- 3. Substantial costs.
  - Biases may incur substantial welfare-relevant costs such as lower wealth, health, or happiness.
- 4. Biases justify governmental paternalism.
  - To protect people from their biases, governments should “nudge” the public toward better behavior.

*Review of Behavioral Economics*, 2018, 5: 303–336

## The Bias Bias in Behavioral Economics

Gerd Gigerenzer\*

*Max Planck Institute for Human Development, Lentzeallee 94, 14195 Berlin, Germany; gigerenzer@mpib-berlin.mpg.de*

---

### ABSTRACT

Behavioral economics began with the intention of eliminating the psychological blind spot in rational choice theory and ended up portraying psychology as the study of irrationality. In its portrayal, people have systematic cognitive biases that are not only as persistent as visual illusions but also costly in real life—meaning that governmental paternalism is called upon to steer people with the help of “nudges.” These biases have since attained the status of truisms. In contrast, I show that such a view of human nature is tainted by a “bias bias,” the tendency to spot biases even when there are none. This may occur by failing to notice when small sample statistics differ from large sample statistics, mistaking people’s random error for systematic error, or confusing intelligent inferences with logical errors. Unknown to most economists, much of psychological research reveals a different portrayal, where people appear to have largely fine-tuned intuitions about chance, frequency, and framing. A systematic review of the literature shows little evidence that the alleged biases are potentially costly in terms of less health, wealth, or happiness. Getting rid of the bias bias is a precondition for psychology to play a positive role in economics.

---

*Keywords:* Behavioral economics, Biases, Bounded Rationality, Imperfect information

# Bias of Bias

- 4. Biases justify governmental paternalism.
  - To protect people from their biases, governments should “nudge” the public toward better behavior.

Nudges are political decisions. They need to be embedded in systematic policies and should not serve political agenda just because they « sound » evidence-based, they have to be rigorously tested.

Instead of a paternalistic approach, some researchers are talking about Boosting, the idea to empower people to make better decisions by and for themselves.

I am not so sure about the differences between Boosting and education. At least, boosting seems more democratic.

# Kahneman's last contribution

- During the last 10 years, Kahneman moved away from Bias to noise
- While bias is about a “average error” in judgment, noise is about variability in errors

The New York Times

## *Daniel Kahneman, Who Plumbed the Psychology of Economics, Dies at 90*

He helped pioneer a branch of the field that exposed hard-wired mental biases in people's economic behavior. The work led to a Nobel.

Share full article



122



Perspective | Published: 22 July 2021

## Behavioural science is unlikely to change the world without a heterogeneity revolution

[Christopher J. Bryan](#) , [Elizabeth Tipton](#)  & [David S. Yeager](#) 

[Nature Human Behaviour](#) **5**, 980–989 (2021) | [Cite this article](#)

## Harnessing heterogeneity in behavioural research using computational social science

Published online by Cambridge University Press: **04 December 2023**

[Giuseppe A. Veltri](#) 

[Show author details ▾](#)

Perspective | Published: 20 March 2023

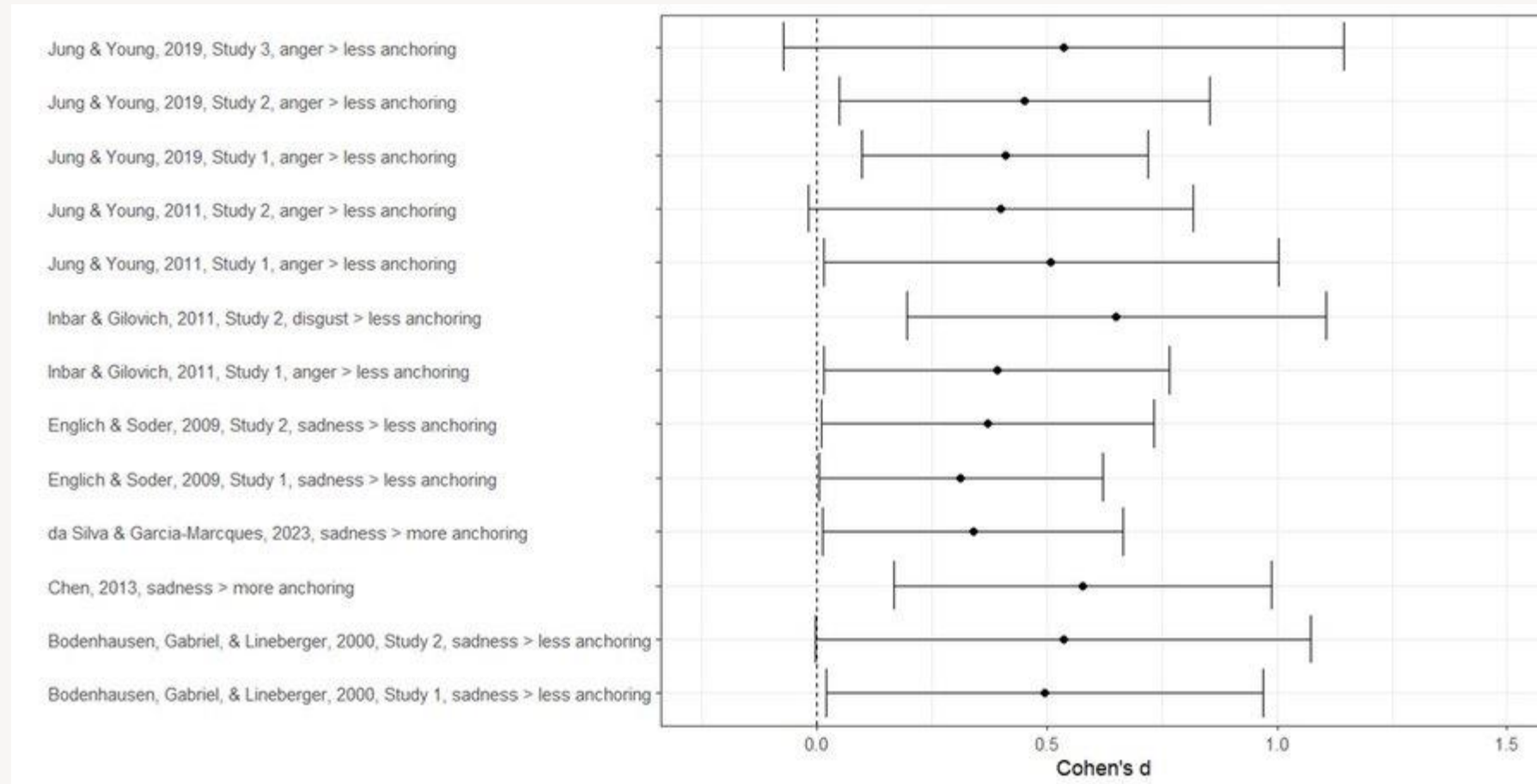
## A manifesto for applying behavioural science

[Michael Hallsworth](#) 

[Nature Human Behaviour](#) **7**, 310–322 (2023) | [Cite this article](#)

## Beyond lists of biases

The heterogeneity in behavioural science findings also means that our underlying theories need to improve: we are lacking good explanations for why findings vary so much<sup>[84](#)</sup>. This need for better theories can be seen as part of a wider ‘theory crisis’ in psychology, which has thrown up two big concerns for behavioural science<sup>[90,91](#)</sup>.





# Framing the default: Influence of Choosing vs Rejecting Frame on Default Effects (Chandrashekar & Fillon, 2024)

Table 3

Job Scenario: Results based on logistic regression analysis with interaction terms.

Predictors	Job preference				
	Odds Ratios	Std. Error	CI	Statistic	p
(Intercept)	3.23	0.56	2.32 – 4.60	6.72	<0.001
Framing [Reject vs. Choose]	0.46	0.11	0.29 – 0.72	-3.35	.001
Default condition 1 (DC1)	0.72	0.17	0.45 – 1.14	-1.40	.162
Default condition 2 (DC2)	0.49	0.11	0.31 – 0.76	-3.11	.002
Framing × DC1	1.13	0.36	0.60 – 2.13	0.38	.704
Framing × DC2	1.32	0.42	0.71 – 2.46	0.89	.375
Observations	1072				
R <sup>2</sup> Tjur	0.035				

Note. Default 1 condition had the job with higher vacation days as the preselected option and Default 2 condition had higher paid job as the preselected option.

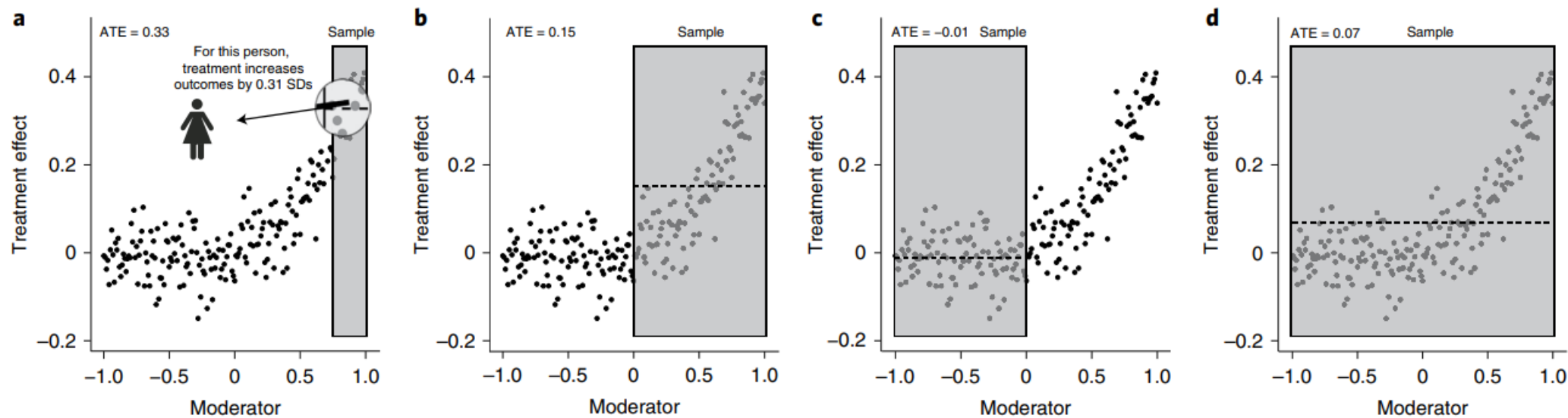
Table 4

Medication Scenario: Results based on logistic regression analysis.

Predictors	Medication preference				
	Odds Ratios	std. Error	CI	Statistic	p
(Intercept)	3.23	0.56	2.32 – 4.60	6.72	<0.001
Framing [Reject vs. Choose]	0.42	0.10	0.27 – 0.66	-3.76	<0.001
Default condition 1 (DC1)	0.96	0.24	0.59 – 1.55	-0.18	.855
Default condition 2 (DC2)	0.82	0.20	0.51 – 1.32	-0.82	.414
Framing × DC1	1.34	0.44	0.71 – 2.55	0.90	.370
Framing × DC2	1.06	0.34	0.56 – 1.99	0.17	.865
Observations			1072		
R <sup>2</sup> Tjur			0.035		

Note. Medication scenario: Default 1 condition had expensive medication as the preselected option and Default 2 condition had cheaper medication as the preselected option.





**Table 1 | Examples of common sources of treatment-effect heterogeneity in behavioural intervention research**

Source of heterogeneity	Definition	Examples
Experimental procedure	Details of an intervention's implementation that might seem trivial can have a substantial impact on its effectiveness.	An intervention in which tax preparer H&R Block automatically pre-populated the Free Application for Federal Student Aid form for parents of college-eligible students using data already collected for tax returns increased college enrolment by eight percentage points <sup>22</sup> . A subsequent intervention in which participants were merely informed that tax data could be used to pre-populate the form and directed to a website that could help them do this had no detectable effect <sup>27</sup> .
Research population	Members of some cultural or demographic groups or people with particular psychological characteristics (for example, high need for cognition or reward sensitivity) are more responsive to an intervention than others.	Many effects foundational to the nudge movement <sup>53</sup> (for example, conformity, heuristics and biases) were found to be substantially stronger in subpopulations that closely resemble the college-student samples in which they were originally documented (that is, younger, more educated and wealthier) than in the population at large. This finding is based on meta-analysis of replications conducted in nationally representative samples <sup>62</sup> .
Objective or structural affordances of the context	Objective features of the context can afford more or less opportunity for the psychological effect of an intervention to lead to the targeted behaviour.	A growth-mindset intervention, which teaches participants that intelligence can grow with effort, was designed to prevent ninth graders from failing core courses. Pre-registered analyses revealed that it was effective in low- and middle-achieving schools, but had no effect on course failures in high-achieving schools. This is probably because high-achieving schools have such ample resources to prevent failures that the intervention was superfluous for that purpose <sup>61</sup> .
Psychological affordances of the context	Subjectively experienced features of the context can afford more or less opportunity for the intervention to have the intended psychological effect.	An intervention that frames voting as a way to claim (or re-affirm) a desirable identity ('voter') increases turnout in major elections <sup>23</sup> . The same treatment has no effect in uncompetitive congressional primaries where the identity 'voter' does not feel important or meaningful <sup>48,59,118</sup> .
	Even if an intervention has the intended psychological effect immediately, subjectively experienced features of the context can either support or undermine that psychological state.	A growth-mindset intervention, which teaches participants that intelligence can grow, has a larger effect in classrooms with norms that are supportive of a growth mindset. Its effect in classrooms with norms that do not support growth mindset is weaker <sup>61</sup> (this result comes from pre-registered analyses).

BCFG Team

## The Behavior Change for Good Initiative

The Behavior Change for Good Initiative develops behavior change programs to improve daily decisions about health, education, and savings.



Psychological Science Accelerator

*Character* LAB

Just over a decade ago, Character Lab was created to advance scientific insights that help kids thrive. Today, we write to celebrate the organization's achievements, to thank the many individuals who made them possible, and, finally, to announce that we will sunset operations by the end of June 2024.

Consistent with our core value of scientific integrity, this letter relies on data to share two important lessons from our journey.

Criticism		Proposal	Responsible actors			
		<div>Scope</div> <div>Methods</div> <div>Values</div>	Practitioners	Clients	Academics	Funders
Limited impact	→	Use behavioural science as a lens	●			
Failure to reach scale	→	Build behavioural science into organizations	●	●		
Mechanistic thinking	→	See the system	●	●	●	
Flawed evidence base	→	Put RCTs in their place	●		●	
Lack of precision	→	Replication, variation and adaptation	●		●	●
Overconfidence	→	Beyond lists of biases			●	●
Control paradigm	→	Predict and adjust	●		●	
Neglect of social context	→	Be humble, explore and enable	●	●		●
Ethical concerns	→	Data science for equity	●	●	●	
Homogeneity of participants and perspectives	→	No "view from nowhere"	●	●	●	●

# Behavioral Economics on decision-making

- There are criticism of neoclassical theories on « what is » rationality
- However, if we study decision-making based on rationality, we see that people make several errors
- Only a few have been found as systematic
- Most of them are noise
  - Because of complexity of human being
  - Because of context dependency
  - Because of the difference between experimental method used

# Conclusion

- We came from « we are all victims of our biases because we are irrational »,
- To « we have developed a theory of rationality and irrationality and are trying to figure out how , and how well this theory applies in real-life situations ».
- Are we intuitive statisticians or irrational beings? It depends on the choice, the context of the choice and the way we measure it.

# References 1/2

- Bryan, C. J., Tipton, E., & Yeager, D. S. (2021). Behavioural science is unlikely to change the world without a heterogeneity revolution. *Nature human behaviour*, 5(8), 980-989.
- Chandrashekar, S., Cheng, Y. H., Fong, C. L., Leung, Y. C., Wong, Y. T., Cheng, B. L., & Feldman, G. (2021). Frequency estimation and semantic ambiguity do not eliminate conjunction bias, when it occurs: Replication and extension of Mellers, Hertwig, and Kahneman (2001). In *Meta-Psychology* (Vol. 5). Linnaeus University.  
<https://doi.org/10.15626/mp.2020.2474>
- Chater, N., & Loewenstein, G. F. (2022). The i-Frame and the s-Frame: How Focusing on the Individual-Level Solutions Has Led Behavioral Public Policy Astray. In *SSRN Electronic Journal*. Elsevier BV.  
<https://doi.org/10.2139/ssrn.4046264>
- DellaVigna, S., & Linos, E. (2022). RCTs to scale: Comprehensive evidence from two nudge units. *Econometrica*, 90(1), 81-116.
- Gigerenzer, G. (2018). The Bias Bias in Behavioral Economics. In *Review of Behavioral Economics* (Vol. 5, Issues 3–4, pp. 303–336). Now Publishers. <https://doi.org/10.1561/105.00000092>
- Hallsworth, M. (2023). A manifesto for applying behavioural science. *Nature Human Behaviour*, 7(3), 310-322.
- Lejarraga, T., & Hertwig, R. (2021). How experimental methods shaped views on human competence and rationality. In *Psychological Bulletin* (Vol. 147, Issue 6, pp. 535–564). American Psychological Association (APA).  
<https://doi.org/10.1037/bul0000324>
- Maier, M., Bartoš, F., Stanley, T. D., Shanks, D. R., Harris, A. J., & Wagenmakers, E. J. (2022). No evidence for nudging after adjusting for publication bias. *Proceedings of the National Academy of Sciences*, 119(31), e2200300119.

# References 2/2

- Maier, M., Bartoš, F., Raihani, N., Shanks, D. R., Stanley, T. D., Wagenmakers, E. J., & Harris, A. J. (2024). Exploring open science practices in behavioural public policy research. *Royal Society Open Science*, 11(2), 231486.
- Mertens, S., Herberz, M., Hahnel, U. J., & Brosch, T. (2022). The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains. *Proceedings of the National Academy of Sciences*, 119(1), e2107346118.
- Ruggeri, K., Ashcroft-Jones, S., Abate Romero Landini, G., Al-Zahli, N., Alexander, N., Andersen, M. H., Bibilouri, K., Busch, K., Chen, J., Doubravová, B., Dugue, T., DURRANI, A., Dutra, N., Garcia-Garzon, E., Gomes, C., Gracheva, A., Grilc, N., Gurol, D. M., Heidenry, Z., ... Stock, F. (2022). Poor but not by choice(s): The persistence of cognitive biases across economic groups. Center for Open Science. <https://doi.org/10.31234/osf.io/mrxy6>
- Simon, H. A. 1979. "Information processing models of cognition". *Annual Review of Psychology*. 30: 363–396.
- Simon, H. A. 1989. "The scientist as problem solver". In: *Complex information processing: The impact of Herbert A. Simon*. Ed. by D. Klahr and K. Kotovsky. Hillsdale, NJ: Erlbaum. 375–398.
- Veltri, G. A. (2023). Harnessing heterogeneity in behavioural research using computational social science. *Behavioural Public Policy*, 1-18.