

Evidence-based Decision Making Interventions

Rui Mata, FS 2023

Version: May 15th, 2023

Goals

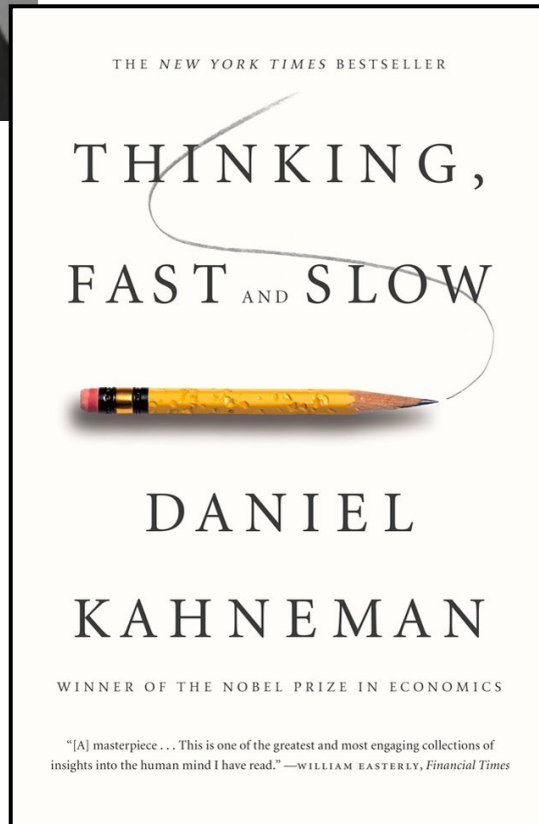
- be familiar with nudging as a type of behavioural intervention arising from a collaboration between psychology and economics - discuss conceptual and empirical strengths/weaknesses
- compare nudging to other interventions based on a taxonomy of behavioural interventions (i.e., behavioural change wheel)
- be aware of potential bias in academic work (on nudging), and factors other than efficacy that are relevant to the adoption of evidence-based interventions in practice...

Behavioral sciences to the rescue!



Daniel Kahneman

2002 Nobel Memorial Prize
in Economic Sciences

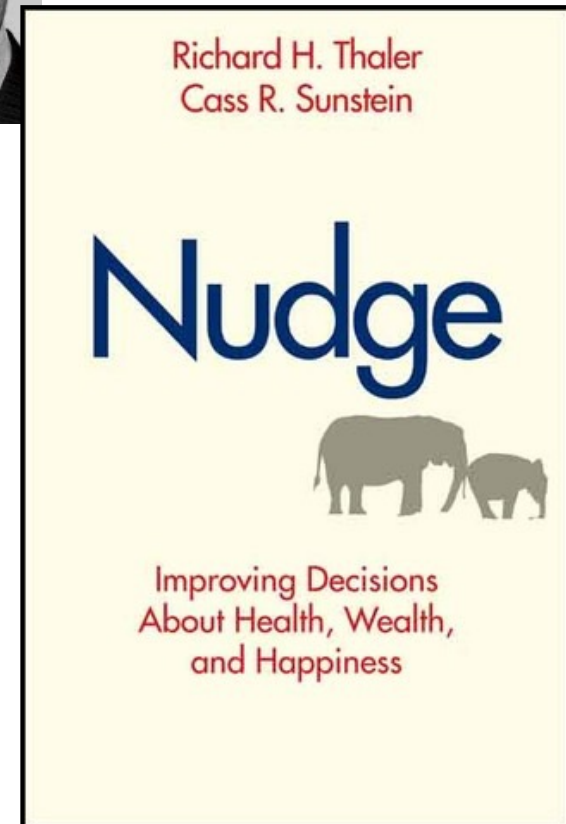


2011



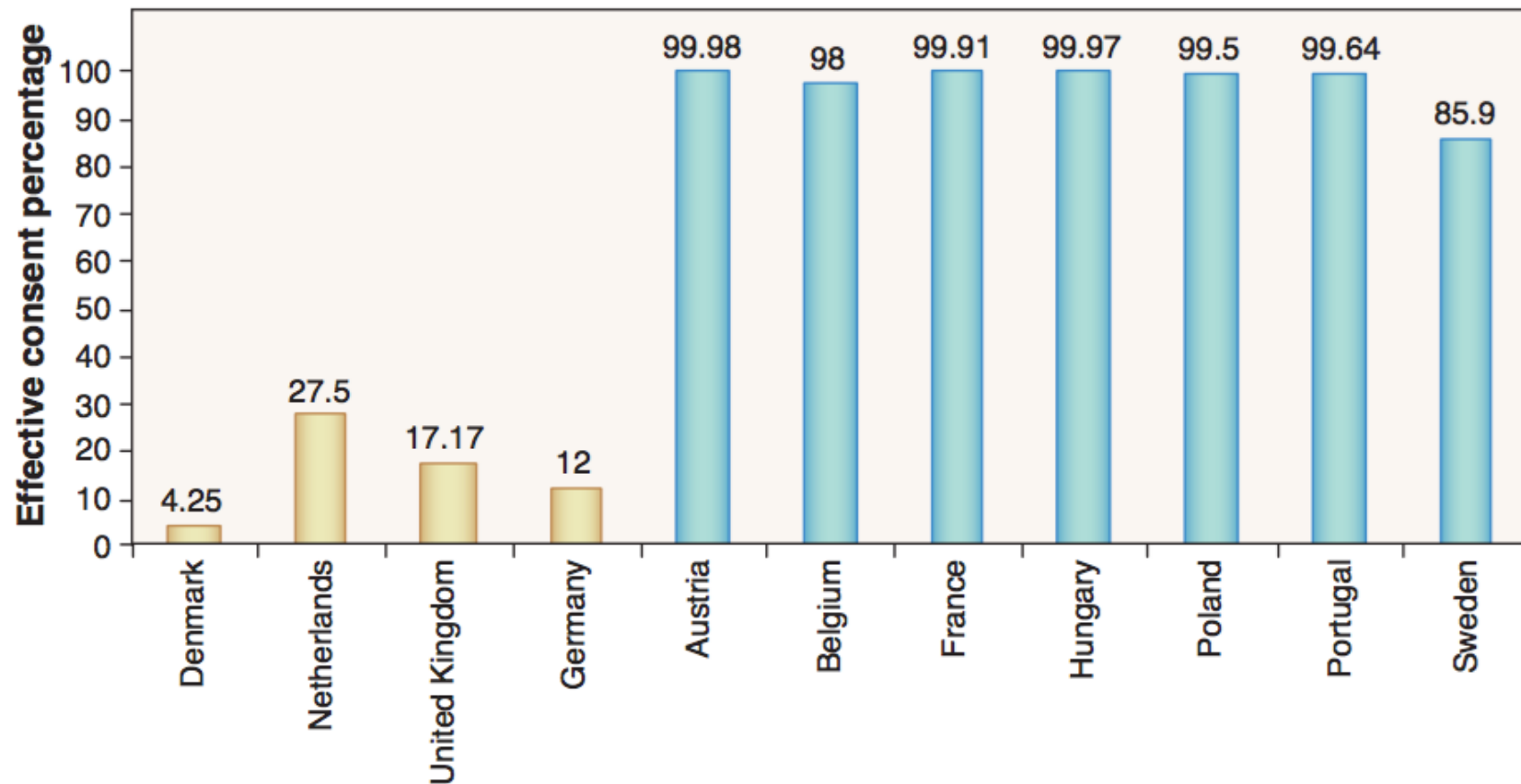
Richard Thaler

2017 Nobel Memorial Prize
in Economic Sciences



2008

Nudges



Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

Johnson, E. J., & Goldstein, D. (2003). Do defaults save lives? *Science*, 302(5649), 1338–1339.

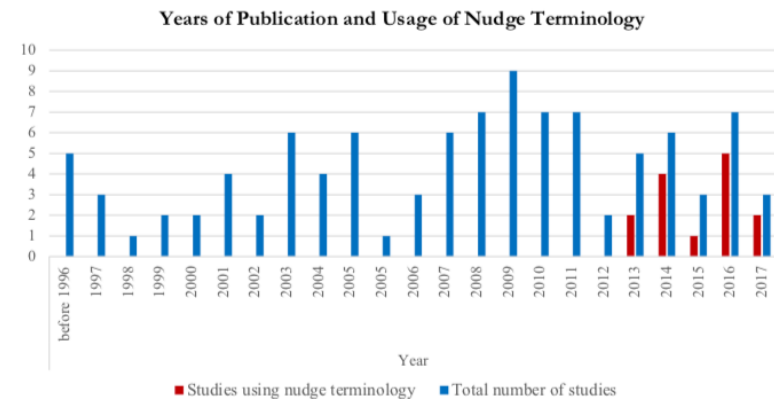
Nudges

1. help decision makers achieve a desired goal
2. exploit known cognitive/motivational shortcomings
3. affect features over which people claim not to care about (e.g., position in a list, defaults, framing)
4. are in principle reversible, allowing the chooser to decide freely

Grüne-Yanoff, T., & Hertwig, R. (2015). Nudge versus Boost: How coherent are policy and theory? *Minds and Machines*, 1–35.

Old wine in new bottles?

Nudge category	Number	Example
A. Decision information		
A1 Translate information	9 (7%)	Emphasizing consequences for patients of proper hand hygiene (Grant & Hofmann, 2011)
A2 Make information visible	23 (19%)	Suggesting alternatives when clinicians propose antibiotics (Meeker et al., 2016)
A3 Provide social reference point	7 (6%)	Showing general practitioners that they prescribe more antibiotics than their peers (Hallsworth et al., 2016)
B. Decision structure		
B1 Change choice defaults	9 (7%)	Changing the default for tests from optional to pre-selected (Olson et al., 2015)
B2 Change option-related efforts	8 (6%)	Putting medical tools in line of sight (hand hygiene dispensers) (Nevo et al., 2010)
B3 Change range or composition of options	10 (8%)	Grouping tests on order forms or displaying them individually (Kahan et al., 2009)
B4 Change option consequences	4 (3%)	Asking for accountable justifications (Meeker et al., 2016)
C. Decision assistance		
C1 Provide reminders	28 (23%)	Putting reminders on operating room schedules (Patterson, 1998)
C2 Facilitate commitment	5 (4%)	Hanging poster-sized commitment letters including photographs and signatures (Meeker et al., 2014)
Other (Multifaceted)	21 (17%)	Providing cues through posters and stickers in a schematic breast shape with space for recording three mammography referrals on charts (Grady, Lemkau, Lee & Caddell, 1997)
Total (n)	124	(This is higher than the number of studies as some studies addressed multiple nudges.)



Nagtegaal, R., Tummers, L., Noordegraaf, M., & Bekkers, V. (2019). Nudging healthcare professionals towards evidence-based medicine: A systematic scoping review. *Journal of Behavioral Public Administration*, 2(2), 1–20. <http://doi.org/10.30636/jbpa.22.71>

Efficacy: How effective is nudging?

Table 1

Overview of existing literature reviews and quantitative analyses on nudging.

Reference	Context	Main variable	#Papers	Method	Exemplary results
Abrahamse et al. (2005)	Energy	Household energy conservation	38	SLR	Information results in higher knowledge levels, but not necessarily in behavioral change or save energy
Skov et al. (2013)	Health	Eating behavior in self-service settings	12	SLR	Labeling, plate and cutlery size, assortment and other manipulations associated with healthier food choices
Arno and Thomas (2016)	Health	Adult dietary behavior	37	SLR & QA	Nudges resulted in average 15.3 % increase in healthier dietary or nutritional choices
Adam and Jensen (2016)	Health	Obesity related interventions at supermarkets	42	SLR	Most studies reported that store interventions were effective in promoting purchase of healthy food
Bucher et al. (2016)	Health	Positional influences	15	SLR	Manipulating food product order & proximity can influence food choice
Wilson et al. (2016)	Health	Healthy food and beverage choices	13	SLR	Mixed effectiveness of nudging healthier food and beverage choices
Mirsch et al. (2017)	Digital	Digital Nudging	65	SLR	Psychological mechanisms that underlie digital nudging
Lycett et al. (2017)	Health and education	Children's dietary behaviors in the home	40	SLR	Studies showed improvement in dietary behaviors and were more effective in older children
Cadario and Chandon (2018)	Health	Healthy eating nudges	78	QA	Experiments yields a moderate but significant overall effect size ($d = 0.28$)
Benartzi et al. (2017)	Cross-context	Nudging and tradit. policy tools	18	QA	Nudges often compare favorably with traditional interventions
This study	Cross-context	Overall effect sizes of nudging	100	SLR & QA	See below

Note: SLR = systematic literature review; QA = quantitative analysis

Hummel, D., & Maedche, A. (2019). How effective is nudging? A quantitative review on the effect sizes and limits of empirical nudging studies. *Journal of Behavioral and Experimental Economics*, 80, 47–58.

<http://doi.org/10.1016/j.socec.2019.03.005>

Efficacy: How effective is nudging?

Dimension	Characteristic									
Setting (100)	Conventional (68)					Digital (32)				
Choice architecture tool (304)	Structuring the choice task (117)					Describe choice options (187)				
Category (290)	Default (60)	Simplification (12)	Social ref. (49)	Change effort (41)	Disclosure (18)	Warnings/graphics (55)	Precommitment (6)	Reminders (34)	Implement. Intent. (8)	
Application context (96)	Health (38)	Environment (19)	Finances (12)	Energy (10)	Policy Making (10)					
Clusters of outcomes (317)	Energy consumption (18)	Healthy products chosen or purchase (60)	Sales of environmentally friendly products (43)	Amount donated (20)	Other (176)					
Data collection (291)	Online experiment (46)	Lab experiment (47)	Field experiment (150)	Experiment (other) (6)	Survey (experiment) (42)					
Significance (308)	Insignificant effect (118)					Significant effect (190)				
Magnitude (273)	Low (<10%) (78)			Medium (10%-30%) (81)			High (>30%) (112)			

Fig. 2. Morphological box of empirical nudging studies including counting.

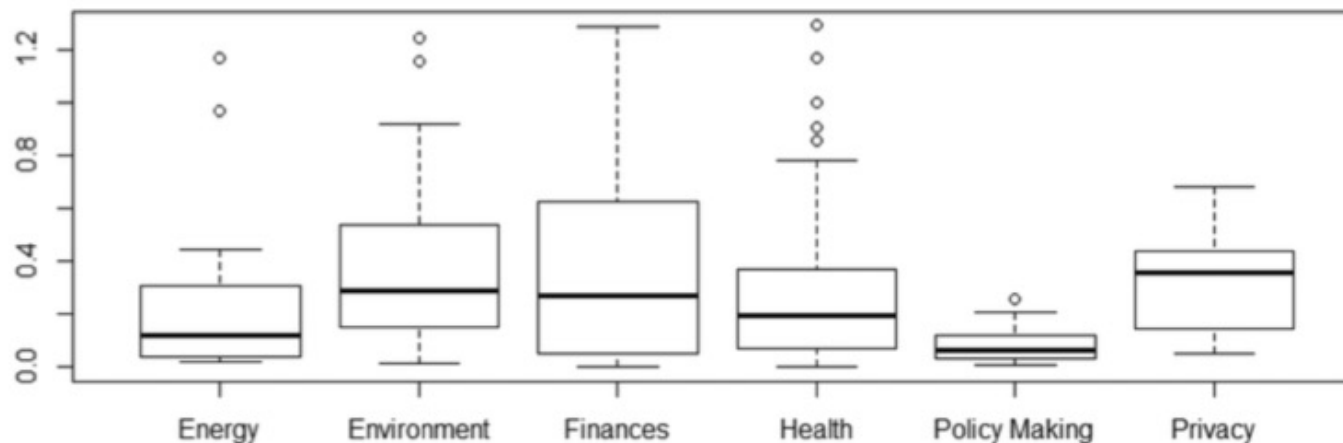
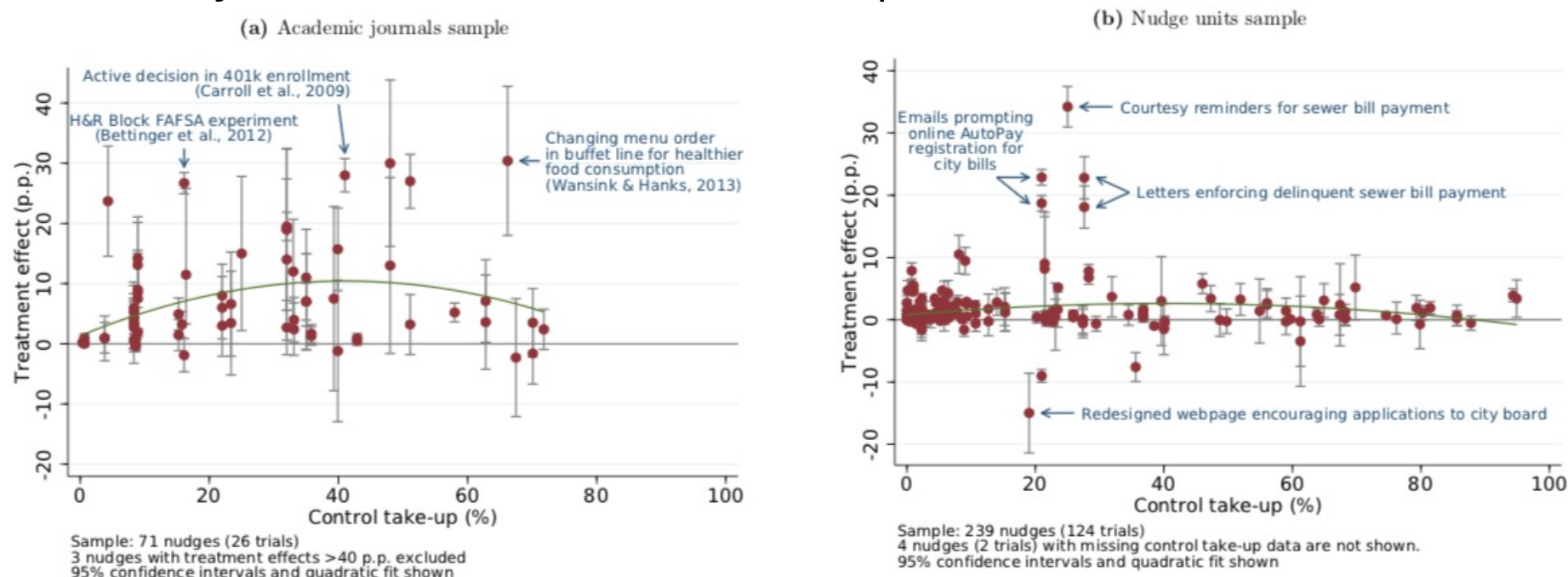


Fig. 4. Boxplot of relative effect sizes per context.

Hummel, D., & Maedche, A. (2019). How effective is nudging? A quantitative review on the effect sizes and limits of empirical nudging studies. *Journal of Behavioral and Experimental Economics*, 80, 47–58.

<http://doi.org/10.1016/j.socec.2019.03.005>

Efficacy vs. Effectiveness? No, publication bias...



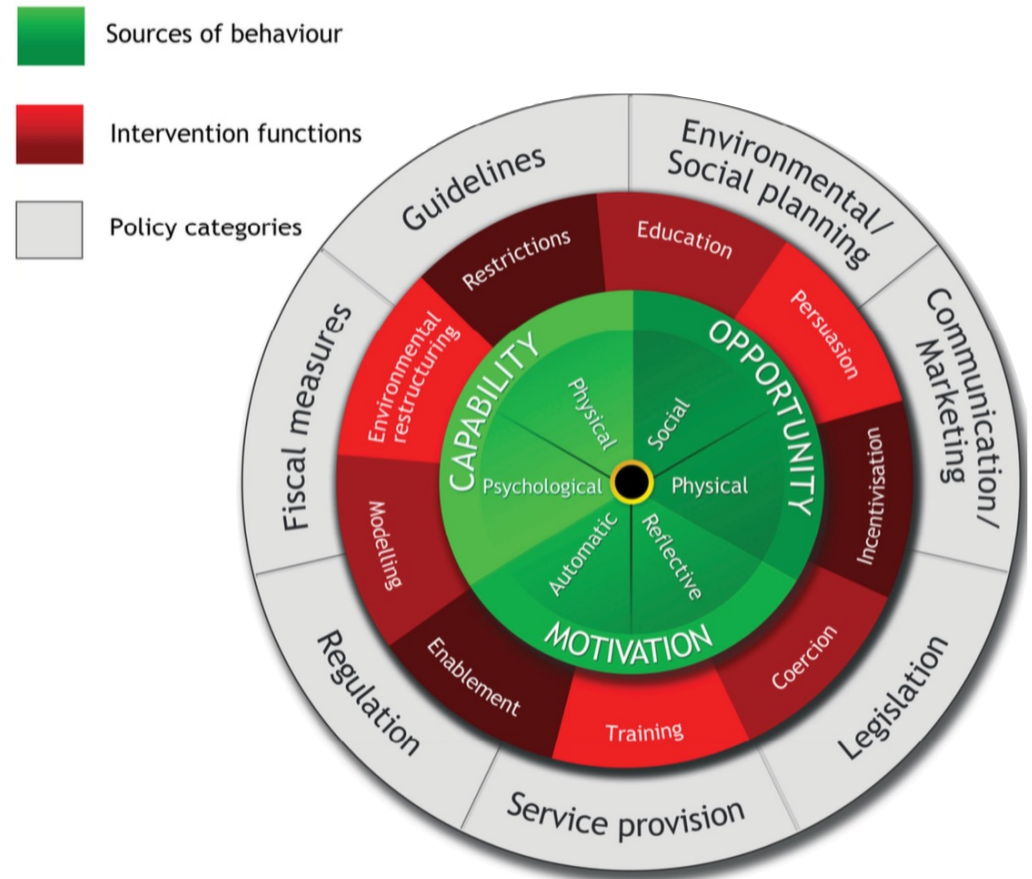
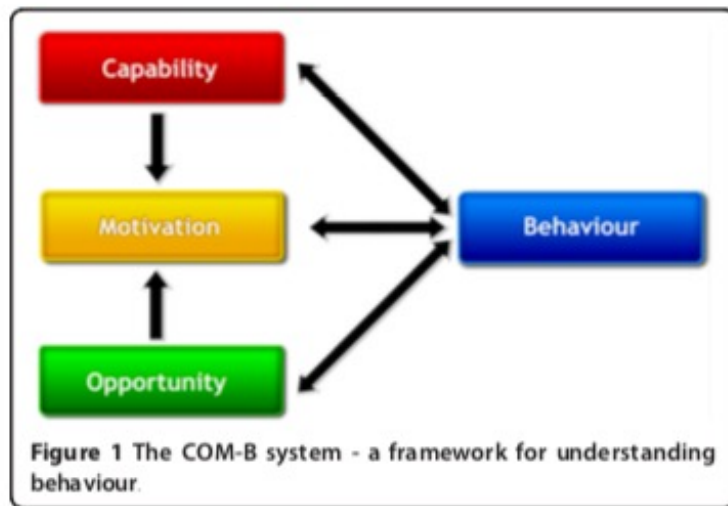
We assemble a unique data set of 126 RCTs covering 23 million individuals, including all trials run by two of the largest Nudge Units in the United States. We compare these trials to a sample of nudge trials in academic journals from two recent meta-analyses. In the Academic Journals papers, the average impact of a nudge is very large—an 8.7 percentage point take-up effect, which is a 33.4% increase over the average control. In the Nudge Units sample, the average impact is still sizable and highly statistically significant, but smaller at 1.4 percentage points, an 8.0% increase. We document three dimensions which can account for the difference between these two estimates: (i) statistical power of the trials; (ii) characteristics of the interventions, such as topic area and behavioral channel; and (iii) selective publication. A meta-analysis model incorporating these dimensions indicates that selective publication in the Academic Journals sample, exacerbated by low statistical power, explains about 70 percent of the difference in effect sizes between the two samples. Different nudge characteristics account for most of the residual difference.

Cost-benefit analysis

Article	Intervention type	Treatment	Impact	Cost	Relative effectiveness
Carroll, Choi, Laibson, Madrian, & Metrick (2009)	Nudge	New employees at a company were required to indicate their preferred contribution rate in a workplace retirement-savings plan within their first month of employment.	\$200 increase in savings-plan contributions per employee ^a	\$2 per employee for distributing the form and for following up with employees who did not respond	\$100 increase in savings-plan contributions per \$1 spent ^a
Chetty, Friedman, Leth-Petersen, Nielsen, & Olsen (2014)	Traditional (financial incentive)	The Danish government changed the tax deduction for contributions to one type of pension account for the roughly 20% of earners who were in the top tax bracket.	\$540 (27) change in contributions to the affected pension account per person affected	\$195 change in government revenue per person affected	\$2.77 (0.14) change in contributions to the affected pension account per \$1 spent
Duflo & Saez (2003)	Traditional (education)	Monetary inducements were offered to employees of a large university for attending a benefits fair where they would receive information about the retirement savings plan.	\$58.95 increase in savings-plan contributions per employee ^a	\$4.04 per employee for monetary inducements	\$14.58 increase in savings-plan contributions per \$1 spent ^a
Duflo, Gale, Liebman, Orszag, & Saez (2006)	Traditional (financial incentive)	Clients preparing a tax return at offices in low- and middle-income neighborhoods in St. Louis, Missouri, were offered 20%, 50%, or no matching contributions for the first \$1,000 of additional contributions to a retirement savings account.	20% match: \$93.6 (9.0) in incremental contributions per person; 50% match: \$244.5 (12.8) in incremental contributions per person	20% match: \$16.70 in matching dollars per person; 50% match: \$82.40 in matching dollars per person	20% match: \$5.59 (0.54) increase in contributions per \$1 spent; 50% match: \$2.97 (0.16) increase in contributions per \$1 spent
Duflo, Gale, Liebman, Orszag, & Saez (2007)	Traditional (financial incentive)	The U.S. federal government increased the tax credit on the first \$2,000 of retirement savings from 20% to 50% when adjusted gross income dropped below a specified threshold.	\$11.6 (1.00) increase in retirement-account contributions per person	\$9.35 increase in tax credits per person	\$1.24 (0.11) increase in retirement-account contributions per \$1 spent

Benartzi, S., Beshears, J., Milkman, K. L., Sunstein, C. R., Thaler, R. H., Shankar, M., et al. (2017). Should Governments Invest More in Nudging? *Psychological Science*, 28(8), 1041–1055. <http://doi.org/10.1177/0956797617702501>

Beyond nudges: The behaviour change wheel



Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42.

Beyond nudges: The behaviour change wheel

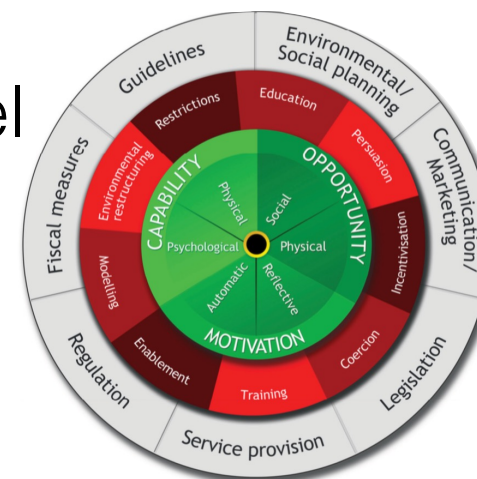


Table 1 Definitions of interventions and policies

Interventions	Definition	Examples
Education	Increasing knowledge or understanding	Providing information to promote healthy eating
Persuasion	Using communication to induce positive or negative feelings or stimulate action	Using imagery to motivate increases in physical activity
Incentivisation	Creating expectation of reward	Using prize draws to induce attempts to stop smoking
Coercion	Creating expectation of punishment or cost	Raising the financial cost to reduce excessive alcohol consumption
Training	Imparting skills	Advanced driver training to increase safe driving
Restriction	Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviours)	Prohibiting sales of solvents to people under 18 to reduce use for intoxication
Environmental restructuring	Changing the physical or social context	Providing on-screen prompts for GPs to ask about smoking behaviour
Modelling	Providing an example for people to aspire to or imitate	Using TV drama scenes involving safe-sex practices to increase condom use
Enablement	Increasing means/reducing barriers to increase capability or opportunity ¹	Behavioural support for smoking cessation, medication for cognitive deficits, surgery to reduce obesity, prostheses to promote physical activity

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42.

Beyond nudges: The behaviour change wheel

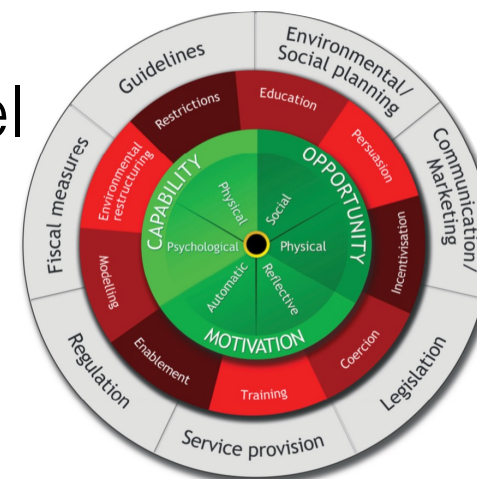


Table 2 Links between the components of the 'COM-B' model of behaviour and the intervention functions

Model of behaviour: sources	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental restructuring	Modelling	Enablement
C-Ph					✓				✓
C-Ps	✓				✓				✓
M-Re	✓	✓	✓	✓					
M-Au		✓	✓	✓			✓	✓	✓
O-Ph						✓	✓		✓
O-So						✓	✓		✓

1. Physical capability can be achieved through physical skill development which is the focus of training or potentially through enabling interventions such as medication, surgery or prostheses.
2. Psychological capability can be achieved through imparting knowledge or understanding, training emotional, cognitive and/or behavioural skills or through enabling interventions such as medication.
3. Reflective motivation can be achieved through increasing knowledge and understanding, eliciting positive (or negative) feelings about behavioural target.
4. Automatic motivation can be achieved through associative learning that elicit positive (or negative) feelings and impulses and counter-impulses relating to the behavioural target, imitative learning, habit formation or direct influences on automatic motivational processes (e.g., via medication).
5. Physical and social opportunity can be achieved through environmental change.

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42.

Efficacy isn't everything...

Table 1 Characteristics of Efficacy vs. Effectiveness Trial Designs (after [8])

	Efficacy Trial	Effectiveness Trial
Validity Priority	Internal > External	External \geq Internal
Population and Sample	<ul style="list-style-type: none"> • Highly selected for condition of interest, narrowly defined • Few comorbidities • Willing and motivated participants 	<ul style="list-style-type: none"> • Selected for condition of interest, reflecting presentation in source population • Comorbidities resemble those in population to which results will be applied; only those who cannot practically or ethically participate are excluded
Intervention	<ul style="list-style-type: none"> • Intervention staff are highly qualified • Training may be intensive • Fidelity monitoring may be similarly intensive 	<ul style="list-style-type: none"> • Staff selection, training, and fidelity monitoring resemble those likely to be feasible in target sites outside of the protocol proper
Outcome Measures and Data Collection	<ul style="list-style-type: none"> • Outcome measurements can be extensive, casting a wide net for potential secondary effects, moderators and mediators, or adverse effects • Since subjects are motivated, respondent burden less of a concern 	<ul style="list-style-type: none"> • Outcome batteries minimize respondent burden (in terms of both frequency and length of assessments) since subjects are heterogeneous in their willingness and capability to participate • Accordingly, outcome measures chosen carefully to target fewer outcomes, and must be simple to complete
Data Analysis	<ul style="list-style-type: none"> • Standard statistical approaches suffice, and data-intensive analyses may be feasible 	<ul style="list-style-type: none"> • Analyses to account for greater sample heterogeneity • Analyses account for more missing data and data not missing at random

Bauer, M. S., Damschroder, L., Hagedorn, H., Smith, J., & Kilbourne, A. M. (2015). An introduction to implementation science for the non-specialist. *BMC Psychology*, 3(1), 65–12. <http://doi.org/10.1186/S40359-015-0089-9>

Efficacy isn't everything...

Table 2 Types of Studies to Address Blockages in the Implementation Process

Implementation Process Gap	Types of Studies
Limited external validity of efficacy/effectiveness studies	<ul style="list-style-type: none"> • Design clinical interventions ready for implementation earlier in the research pipeline, emphasizing tools, products, and strategies that mitigate variations in uptake across consumer, provider, and or organizational contexts
Quality gaps across systems due to variations in organizational capacity (e.g., resources, leadership)	<ul style="list-style-type: none"> • Assess variations and customize implementation strategies based on organizational context • Data infrastructure development to routinely capture or assess implementation fidelity, patient-level processes/outcomes of care, and value/return-on-investment measures • Further refinement of implementation strategies involving organizational and/or provider behavior change • Development of provider/practice networks to conduct implementation studies or evaluation of national programs
Frontline provider competing demands (e.g., multiple clinical reminders)	<ul style="list-style-type: none"> • Refinement of implementation strategies using cross-disciplinary methods that address provider behavior/organizational change (e.g., business, economics, policy, operations research, etc.) • Positive deviation or adaptation studies especially to improve implementation at lower-resourced, later-adopter sites
Misalignment with national or regional priorities	<ul style="list-style-type: none"> • National policy/practice roll-outs • Randomized evaluations of national programs or policies

Bauer, M. S., Damschroder, L., Hagedorn, H., Smith, J., & Kilbourne, A. M. (2015). An introduction to implementation science for the non-specialist. *BMC Psychology*, 3(1), 65–12. <http://doi.org/10.1186/S40359-015-0089-9>

Efficacy isn't everything...

Relevance	To what extent are the programme objectives justified in relation to needs?
Efficiency	Have the objectives been achieved at the lowest cost?
Effectiveness	To what extent has the outcome been achieved?
Sustainability	Are the results and impacts, including institutional changes, durable over time?
Impact	Are the results still evident after the intervention is completed?

World Health Organization (2013). *WHO evaluation practice handbook*.

Summary

“Nudges” is an heterogeneous (ill-defined?) category of interventions that arose from the collaboration between psychology and economics (i.e., techniques that help decision makers achieve a desired goal by using features over which people claim not to care about; in line with libertarian paternalism by leading to reversible decisions);

Qualitative and quantitative reviews support efficacy and favourable cost-benefit ratios of nudges, yet the academic literature does not seem to provide an accurate depiction of their efficacy...

The behavioural change wheel presents a broader taxonomy of behavioural interventions, which may encompass “nudges” but provide a larger tool-kit of interventions.

Efficacy of interventions (nudges or otherwise) isn't the only criterion on how to decide about their use/implementation. Considerations of effectiveness, but also costs—benefit, etc. are key!

Q&A

Session 2

- What is policy capturing?
- What are paramorphic models?
- What is bootstrapping in the context of the lens model?

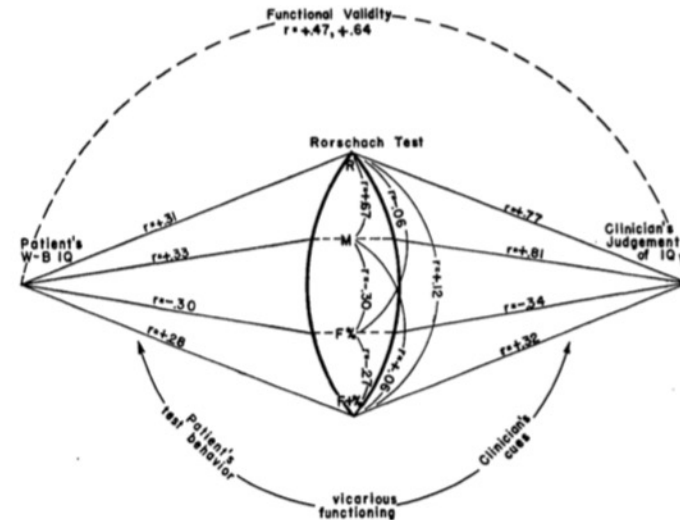
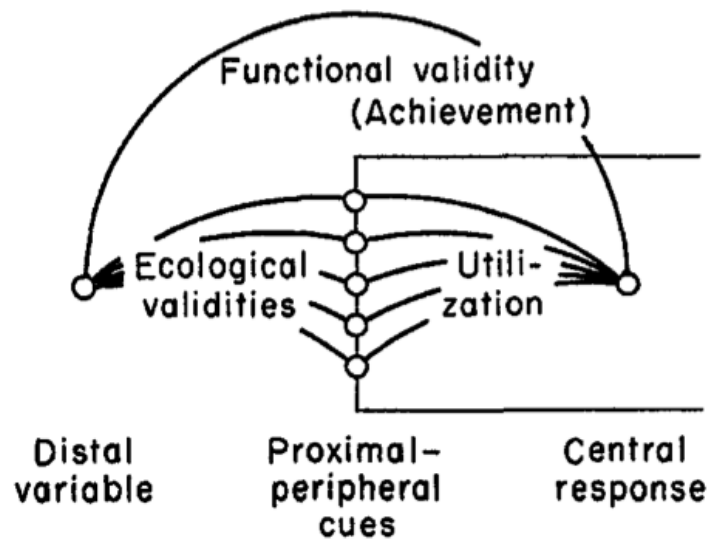


FIG. 1. Functional validity and mediating factors in clinicians' judgments of IQ from the Rorschach test.

The lens model is a framework developed by Brunswik to explain how individuals make judgments based on cues from the environment. Policy capturing is related to the lens model in that it operationalizes Brunswik's theory - policy capturing studies aim to understand the weight or importance that decision-makers assign to different cues in the environment.

Paramorphic models are the result of statistically analyzing the weights or importance that individuals assign to different cues when making judgments. They provide a way to capture the "policy" that individuals use to make decisions, without necessarily making assumptions about the specific cognitive processes involved.

"bootstrapping" (akin to "pulling oneself up by one's bootstraps") is about improving decision-making using the decision-maker's own judgment policy – the model uses the judge's judgments to estimate the judge's weights given to each cue - because the model applies the weights consistently, it often results in better decision-making than the decision-maker might achieve on their own...

Session 3

- How is overfitting defined?

Limitations of actuarial judgment: Overfitting

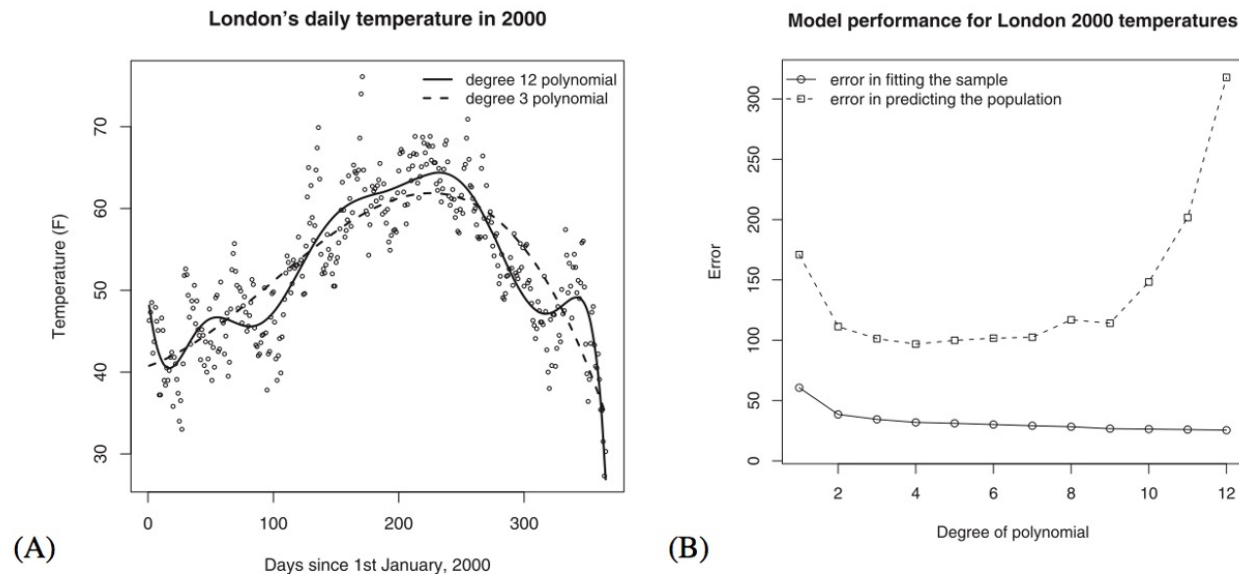


Fig. 3. Plot (A) shows London's mean daily temperature in 2000, along with two polynomial models fitted with using the least squares method. The first is a degree-3 polynomial, and the second is a degree-12 polynomial. Plot (B) shows the mean error in fitting samples of 30 observations and the mean prediction error of the same models, both as a function of degree of polynomial.

Gigerenzer, G., & Brighton, H. (2009). Homo Heuristicus: Why biased minds make better inferences. *Topics in Cognitive Science*, 1(1), 107–143. doi:10.1111/j.1756-8765.2008.01006.x

Overfitting is a concept in machine learning where a model is excessively complex and captures not only the underlying pattern in the data but also the random noise. This leads to a model that performs well on the training data but poorly on new, unseen data (i.e., it has poor generalization performance).

In the context of predicting temperature over a year using polynomials of different degrees, overfitting might occur if you use a polynomial of a very high degree. A high-degree polynomial could closely fit all the temperature data points from the training set, including their random fluctuations, leading to a model that appears to have good predictive power. However, because this model also captures the random noise in the training data, it is likely to perform poorly when used to predict temperatures in a different year, or in out-of-sample validation.

Session 4

- Delphi: How can we avoid social pressure when the outliers must justify their forecast?

Focus groups	Face-to-face discussions between human forecasters on a predefined forecasting topic under the supervision of a moderator.	The advantages of this method are the simplicity of setting up the group, fast and easy sharing of information, and supposedly high acceptance of the group opinion by individual forecasters. The method suffers from several downsides, including susceptibility to groupthink, due to reliance on face-to-face discussions, a desire to be accepted, and incongruences due to the social status of group members. The method does not define how individual judgements are to be combined and the choice of the combination rule depends on the moderator and the social dynamics of the group. The method violates the forecasting principle of independent generation of a forecast by each group member.
Nominal Group Technique	Structured method can be divided into five steps: first, the moderator poses the forecasting question. Then each forecaster individually produces a forecast, which is then explained to other members of the group to generate debate. These forecasts are subsequently anonymously assessed and ranked by each individual, before being combined by the moderator, commonly using a linear opinion pool.	In contrast to a focus group, the nominal group technique follows a clear structure and is not as prone to groupthink and social pressure. It is better than Delphi when it comes to stimulating creativity and tends to be less time consuming because it does not involve multiple iterations. Nevertheless, several studies suggest that the nominal group technique is less accurate and reliable than Delphi.
Delphi Method	The key features are anonymity, iteration, controlled feedback and statistical combination of the group response. Anonymity is ensured by giving forecasters a questionnaire containing the forecasting problem, whose responses the other judges cannot discern. This is supposed to prevent social pressures from changing a forecaster's judgement. The anonymous responses are then statistically analysed, and the mean and variance are supplied to all the forecasters to update their prior belief. If someone's update is an outlier, the forecaster usually has to provide a reason. The process is then repeated for several rounds. To combine the individual judgements, the Delphi method often employs a linear opinion pool. There exist several variations of this technique. For example, the first round can be unstructured to not constrain the forecaster, or structured to make the procedure simpler for the monitoring team.	Studies comparing forecasts produced by the Delphi method with individual human forecasts have shown an improvement in accuracy and reduction in variance, favouring the former approach. Despite anonymity in eliciting judgements, a main criticism of the Delphi technique is the inherent pressure to conform to group opinion after the first round of iteration. Psychological studies have found that the forecasting accuracy of the Delphi method benefits from emphasizing reasoning, if judges have to provide detailed explanations for their judgement. The provided reasons could then be used in the feedback process, making it more convincing to other judges who tend to be biased toward their own assessments.

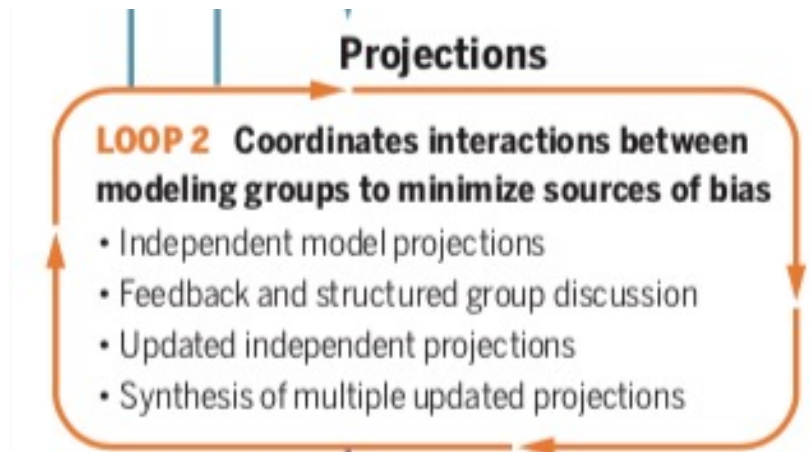
Perhaps using a facilitator, avoiding direct comparisons, reinforcing value of diversity... Note that results of the “good judgment project” suggest that exchanging REASONS rather than simply forecasts can be a good strategy...

Session 5

- p.26 Could explain the combination of deliberate and staticized groups in the context of the graphic on slide 26?
- p.27: Is the journal peer review part of the registered report process?

p.26

p.27



INVESTIGATE	DISCUSS	ESTIMATE	AGGREGATE
All experts privately answer elicitation questions and provide rationales for their judgements.	<ul style="list-style-type: none">• Experts are shown anonymous answers and a visual summary of other participants' responses.• Experts engage in (facilitated) discussion, focused on exploring the underlying reasoning, <i>not</i> on consensus.	All experts provide a 2 nd private answer to the elicitation questions, accompanied by rationales for any changes in their judgements.	<ul style="list-style-type: none">• Aggregated estimates are calculated, with the option of individual weightings (e.g. based on expertise, prior performance).• Experts can review and discuss individual and aggregate estimates and correct residual misunderstandings.

Fig. 1 The IDEA protocol for structured expert judgement elicitation (adapted from [20])

Session 7

- p.7 Can these 6 bullet points be understood as counterfactuals?
- p. 9 How are testing & instrumentation, the two points mentioned on p 8, answered through the two graphs on page 9?

Quasi-experimental designs

Before-and-after measures

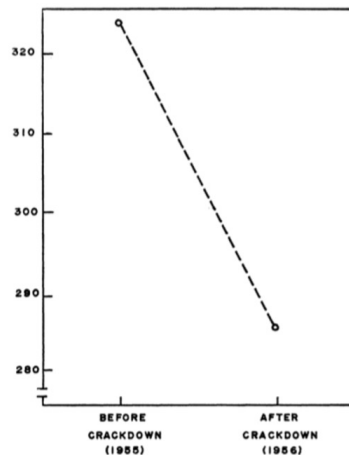


Figure 1. Connecticut Traffic Fatalities, 1955-1956

- was 1956 a dry year? (history)
- overall trends in road safety? (maturation)
- did publicising of death rates have an effect? (testing)
- were fatalities counted differently? (instrumentation)
- was this a big decrease? (instability)
- was 1995 an extreme year? (regression)

Campbell, D. T., Ross, H. L. (1968). The Connecticut crackdown on speeding: Time-series data in quasi-experimental analysis. Law and Society Review, 3(1), 33. <http://doi.org/10.2307/3052794>

A counterfactual in quasi-experimental designs refers to the hypothetical state of what would have occurred to the participants in the treatment group if they had not received the treatment; the bullet points refer to (in Campbell's terms) sources of invalidity... thus questioning the validity of the chosen COUNTERFACTUAL (before vs. after)

Quasi-experimental designs

Multiple time series

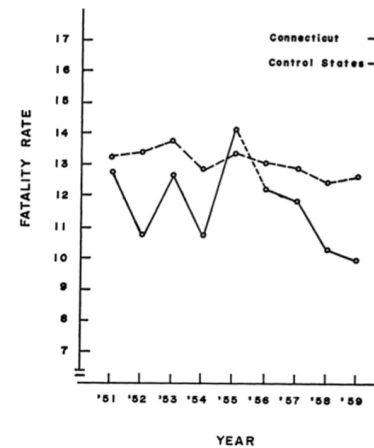


Figure 3. Connecticut and Control States Traffic Fatalities, 1951-1959 (per 100,000 population)

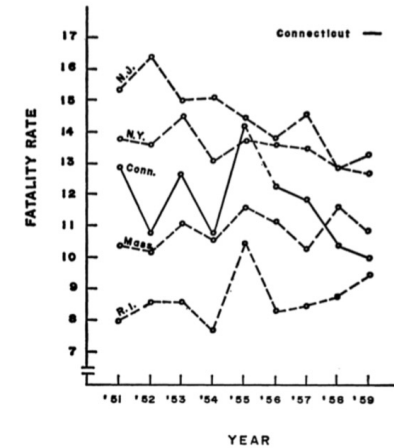


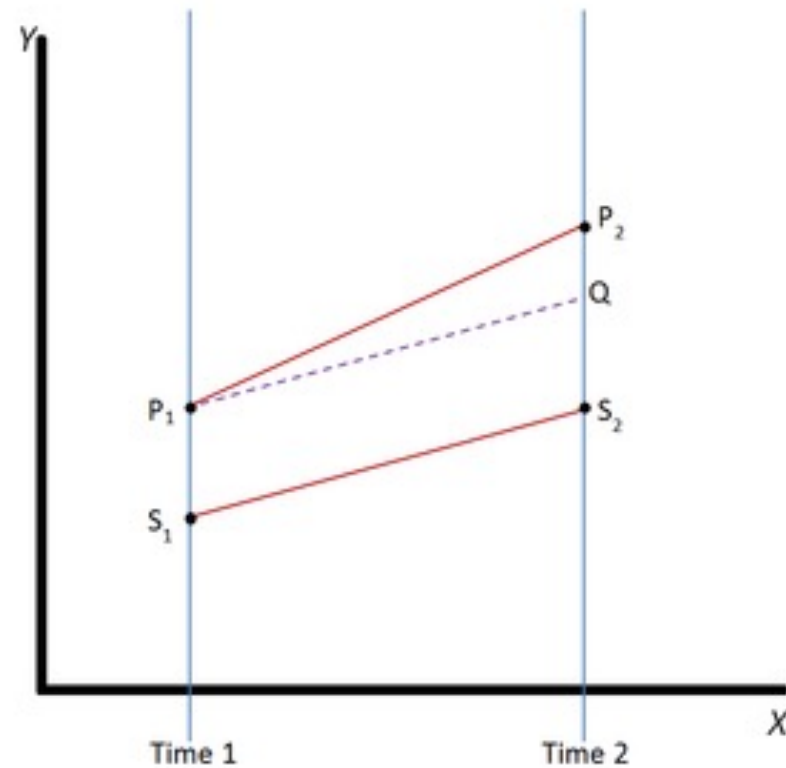
Figure 4. Traffic Fatalities for Connecticut, New York, New Jersey, Rhode Island, and Massachusetts (per 100,000 persons)

Campbell, D. T., Ross, H. L. (1968). The Connecticut crackdown on speeding: Time-series data in quasi-experimental analysis. Law and Society Review, 3(1), 33. <http://doi.org/10.2307/3052794>

To the extent that testing and instrumentation vary differently across states, comparing those provide answers to whether those factors had an impact on the trajectories

Session 7

- p 23 Could you explain the problem of differences in differences? Is this correct: We cannot assume that the change of the control group would be comparable to untreated treatment group participants.



The fundamental idea behind the DiD design is to control for time-invariant differences between the treatment and control groups that might otherwise confound the estimate of the treatment effect. So, if there are differences between the treatment and control groups that are constant over time, the DiD design controls for those differences - if the treatment and control groups have different trends in the outcome variable prior to the treatment then there would be a problem... typically this is addressed by, for example, careful selection or matching of the treatment and control groups or, if possible, examining pre-treatment trends for the treatment and control groups.

EXAM

Multiple choice questions (correct combination of answers):

- In this type of question, each answer can be either correct or incorrect; that is, 0, 1, 2, 3 or 4 answers can be correct (marked with a cross) or incorrect (no cross marked) respectively.
- A choice must be made for each alternative answer.
- If participants have checked or not checked the correct combination of answers, they receive full points (1). If only one check is not correctly placed, the participant will not receive any points (0) for the entire question.
- The exam contains 25 questions. A maximum of 1 point can be earned per question (thus a maximum of 25 points can be earned for the exam).

Zugang zur Evaluation:

1. Via Transaktionsnummer: GWQDJ. Eingabe
unter: <https://k11331.evasys.de/evasys/online/>.