Boosting good decisions

Center for Adaptive Rationality

Ralph Hertwig

Four theses about behavioural public policies

Thesis 1. Beyond nudging: Behavioral sciences' evidence strongly suggests more than one class of policy interventions

Thesis 2. Cognitive and motivational competences can be boosted without prohibitive costs

Thesis 3. Competences are a counterweight to 'commercial nudging' and can enable individuals to exercise autonomy and agency

Thesis 4. Boosting and nudging can complement each other

Hertwig, R., & Grüne-Yanoff, T. (2017). Nudging and boosting: Steering or empowering good decisions. *Perspectives on Psychological Science, 12(6),* 973-986.

The error-proneness of human decision making (Thaler & Sunstein, 2008)

- "Humans predictably err" (p. 7)

- "Human forecasts are flawed and biased. Human decision making is not great either" (p. 7)

- "Somewhat mindless, passive decision makers" (p. 37)

- "But we often make mistakes because we rely too much on our Automatic System" (p. 21)

- "Many people will take whatever option requires the least effort, or the path of least resistance … inertia, status quo bias, and the 'yeah, whatever' heuristic" (p. 83)
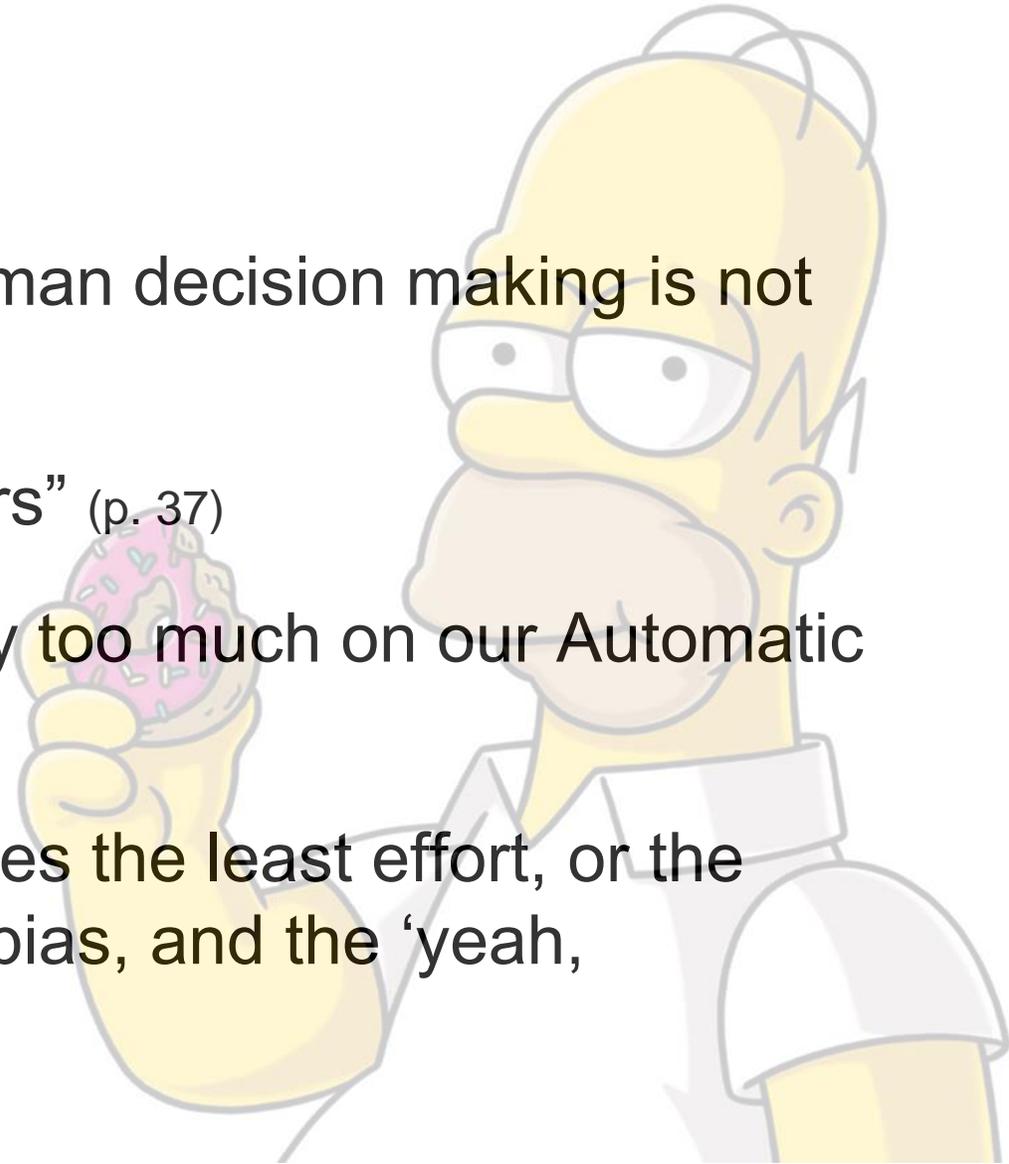
Canon of biases

Overconfidence bias	Correspondence bias
Fundamental attribution error	Halo effect
False consensus effect	False uniqueness effect
Positivity bias	Negativity bias
Confirmation bias	Disconfirmation bias
Justice bias	Male bias
Hot hand fallacy	Gambler's fallacy
Self-protective similarity bias	Hindsight bias
Self-serving bias	"Ultimate" self-serving bias
Optimistic bias	Pessimistic bias
Sinister attribution error	Conjunction fallacy
Ingroup/outgroup bias	Positive outcome bias
Hypothesis-testing bias	Diagnosticity bias
Durability bias	Vulnerability bias
Self-image bias	Labeling bias
Observer bias	External agency illusion
Systematic distortion effect	Intensity bias
Asymmetric insight illusion	Just world bias
Dispositional bias	Romantic bias
Clouded judgment effect	Bias blind spot
Empathy neglect	Empathy gaps

"... mental illusions
should be considered
the rule rather than
the exception"
(Thaler, 1991)

Krueger & Funder (2004). *Behavioral and Brain Sciences*

Cognitive illusions: how stable and irrational are they?

Probabilistic reasoning with frequency and experienced-based formats

E.g., base-rate neglect, conjunction fallacy (Gigerenzer & Hoffrage, 1995; Hertwig & Gigerenzer, 1999; Hoffrage, Lindsey, Hertwig, & Gigerenzer, 2000; Schulze & Hertwig, 2021; Lejarraga & Hertwig, in press)

Fragility of the effects

E.g., loss aversion (Yechiam & Hochman, 2013; Gal & Rucker, 2018; Lejarraga, Schulte-Mecklenbeck, Pachur, & Hertwig, 2019)

Representative design

E.g., overconfidence bias (Dhami, Hertwig, & Hoffrage, 2004; Sedlmeier, Hertwig, & Gigerenzer,1998; Gigerenzer, Hoffrage, & Kleinböltig, 1991; Juslin, Winman, & Olsson, H. 2000)

Ecological rather than coherence-based rationality

E.g., The Modeling Animal Decision Group, 2014; Arkes, Gigerenzer, & Hertwig, 2015

Constrained optimization rather than irrationality

E.g., anchoring & adjustment (Lieder, Griffiths, Huys, & Goodman, 2017)

The fallacy is not a fallacy

E.g., hot hand fallacy (Miller & Sanjurjo, 2018, *Econometrica*)

Beyond the error-proness of human judgment
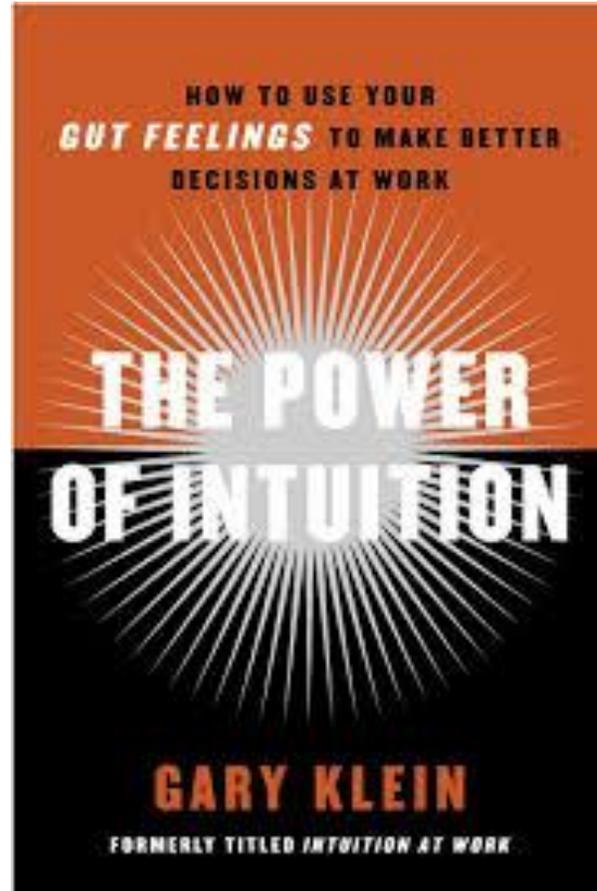
Naturalistic Decision Making
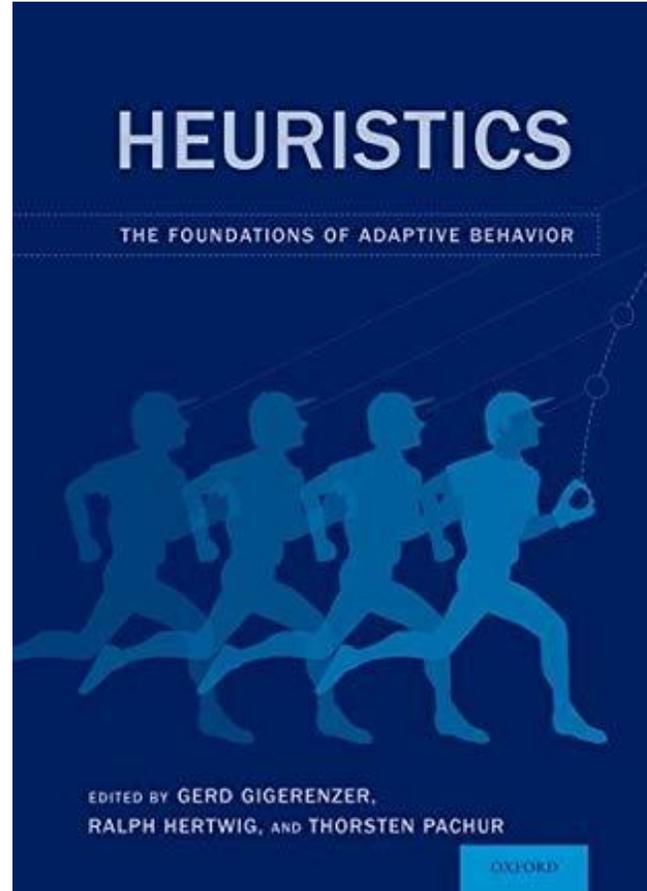
Ecologically rational heuristics
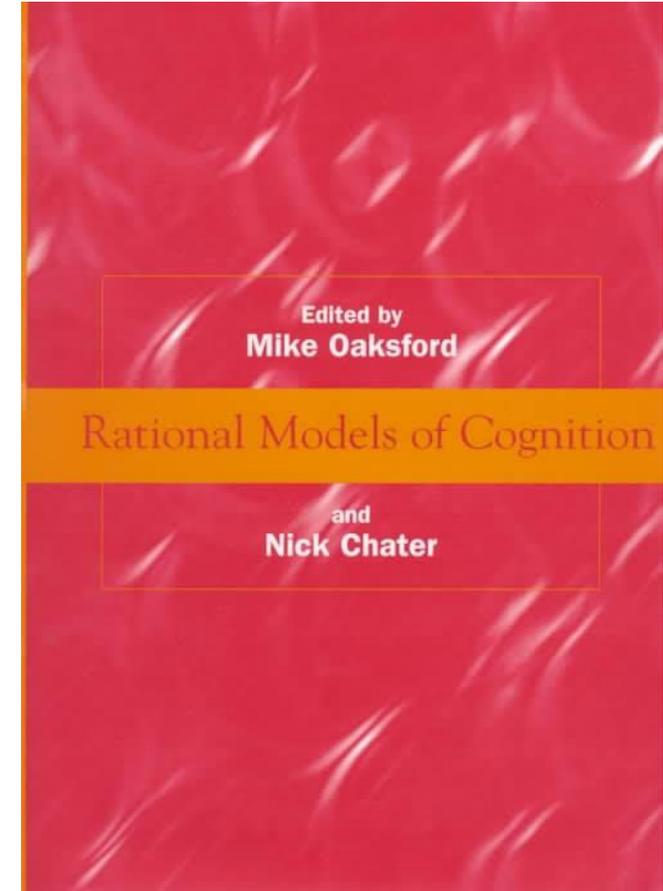
Bayesian models of cognition and reasoning

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An alternative class of interventions in the policymakers' toolbox
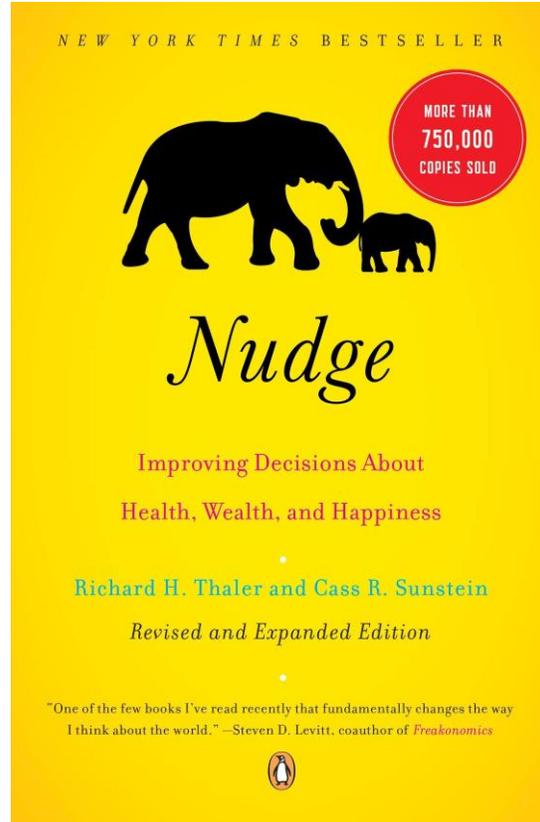
Nudging
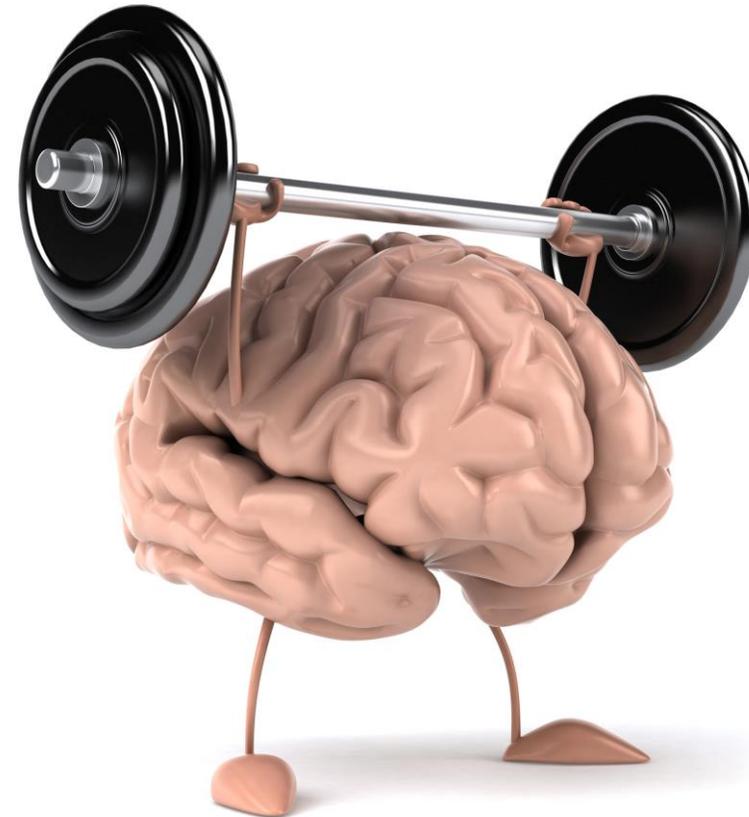
Boosting

Boost interventions

- Target cognitive and motivational competences rather than immediate behavior

- Aim at domain-specific (e.g., financial accounting) and domain-general competencies (e.g., statistical literacy)

- Target human cognition (e.g., decision strategy), the environment (e.g., information representation, choice architecture), or both

- Preserve agency or enable individuals to exercise their own agency

- Are transparent to the boosted individual

Hertwig, R., & Grüne-Yanoff, T. (2017). Nudging and boosting: Steering or empowering good decisions. *Perspectives on Psychological Science, 12(6),* 973-986.

Distinguishing nudging and boosting

Table 1. Seven Dimensions on Which the Nudging (Non-educative) and Boosting (Long-Term) Approaches to Public Policy Can Be Distinguished

Dimension	Nudging	Boosting
Intervention target	Behavior	Competences
Roots in research programs and evidence	Show decision maker as systematically imperfect and subject to cognitive and motivational deficiencies	Acknowledge bounds but identify human competences and ways to foster them
Causal pathways	Harness cognitive and motivational deficiencies in tandem with changes in the external choice architecture	Foster competences through changes in skills, knowledge, decision tools, or external environment
Assumptions about cognitive architecture	Dual-system architecture	Cognitive architectures are malleable
Empirical distinction criterion (reversibility)	Once intervention is removed, behavior reverts to preintervention state	Implied effects should persist once (successful) intervention is removed
Programmatic ambition	Correct momentous mistakes in specific contexts—"local repair"	Equip individuals with domain-specific or generalizable competences
Normative implications	Might violate autonomy and transparency	Necessarily transparent and require cooperation—an offer that may or may not be accepted

Hertwig, R., & Grüne-Yanoff, T. (2017). Nudging and boosting: Steering or empowering good decisions. *Perspectives on Psychological Science, 12(6),* 973-986.
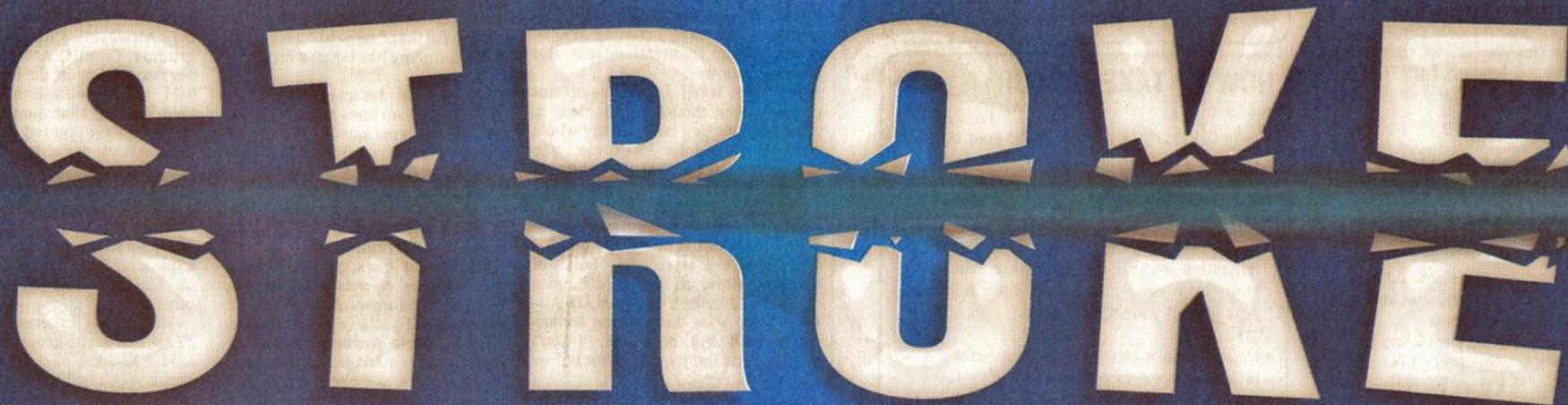
LIPITOR cuts the risk by nearly half.

In patients with type 2 diabetes and at least one other risk factor for heart disease, LIPITOR reduced the risk of stroke by 48%.

A 1-minute boost: Relative vs. absolute risk reduction

Relative risk

Lipitor reduces the chance of stroke by 48%

Absolute risk

Lipitor reduces the chance of stroke from 28 in 1,000 to 15 in 1,000 (i.e., by 13 in 1,000 people, or 1.3%)

Mismatched framing

Using relative risk reductions, benefits are reported in big numbers

Using absolute risk increases, harms are reported in small numbers.

Gigerenzer, Gaissmaier, Kurz-Milcke, Schwartz, & Woloshin (2007). *Psychological Science in the Public Interest*
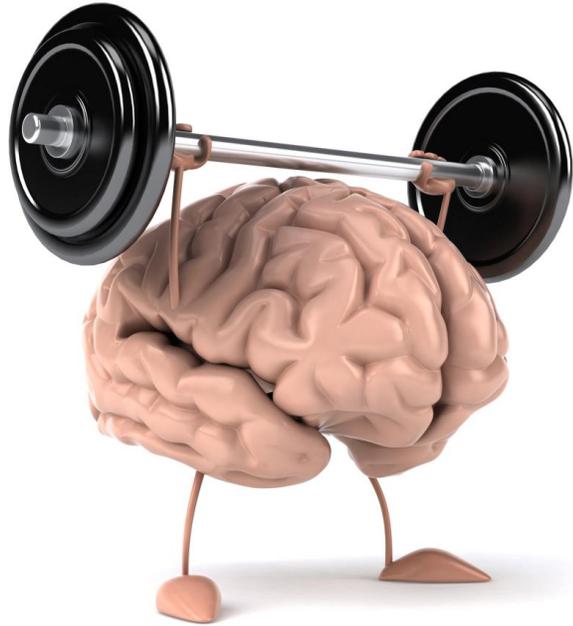
Risk literacy boost

Always ask health statistics to be translated into **absolute numbers**

E.g., Lipitor reduces the chance of stroke from 28 in 1,000 to 15 in 1,000

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Challenge to decision autonomy and informed choice

↓

Persuasive and Manipulative Choice Architectures

Strategic design of online environments and user interfaces that aims to affect people's choices and steer their online behavior in the service of commercial interests (e.g., "dark patterns," default settings that intrude on privacy).

Challenge to decision autonomy and control over information environment

↓

AI-Assisted Information Architectures

AI-powered algorithmic tools that filter and mediate information online (e.g., targeted advertising, personalized recommender systems, algorithmic filtering in search engines, personalized curation of news feeds on social media).

Digital Challenges

False and Misleading Information

Online content (e.g., news items, videos, posts) that is not based on factual knowledge or evidence and that misleads the public by instilling inaccurate beliefs and/or undermining trust in the media.

↑

Challenge to reasoning, discernment of truth, and civility of the public conversation

Distracting Environments

Digital environments optimized to monopolize and commodify human attention and online behaviors.

↑

Challenge to attention and cognitive control

Kozyreva, A., Lewandowsky, S., & Hertwig, R. (2020). Citizens versus the internet: Confronting digital challenges with cognitive tools. *Psychological Science in the Public Interest, 21(3)*, 103-156.

Boosting competences for an adversarial information ecology

Inoculation

BAD NEWS

ALL BADGES

EMOTION   IMPERSONATION   CONSPIRACY

DISCREDIT   TROLLING   POLARIZATION

NEXT
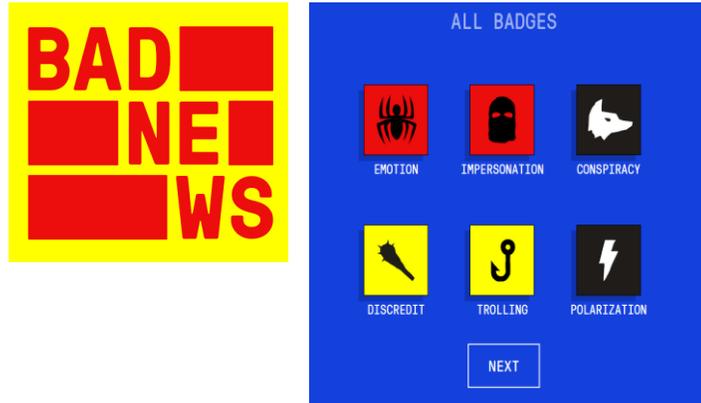
Roozenbeek, J., & Van Der Linden, S. (2019). The fake news game: actively inoculating against the risk of misinformation. Journal of Risk Research.

> **"Tips to Spot False News"**
>
> **Be skeptical of headlines**. False news stories often have catchy headlines in all caps with exclamation points. If shocking claims in the headline sound unbelievable, they probably are.
>
> **Look closely at the URL**. A phony or look-alike URL may be a warning sign of false news. Many false news sites mimic authentic news sources by making small changes to the URL. You can go to the site to compare the URL to established sources.
>
> **Investigate the source**. Ensure that the story is written by a source that you trust with a reputation for accuracy. If the story comes from an unfamiliar organization, check their "About" section to learn more.

Guess, A. M., Lerner, M., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., & Sircar, N. (2020). A digital media literacy intervention increases discernment between mainstream and false news in the United States and India. PNAS.

Simple decision trees (pop-up)

Is the source identifiable (e.g., via clear URL or the 'about' page)?
- No → ⊗ Unreliable
- Yes → Are hyperlinks to external references provided?
  - No → ⊗ Unreliable
  - Yes → Do these links lead to relevant articles from reputable sources?
    - No → ⊗ Unreliable
    - Yes → Can you find other reports of the story in an independent internet search?
      - Yes → ✓ Reliable
      - No → ⊗ Unreliable

Reliable article
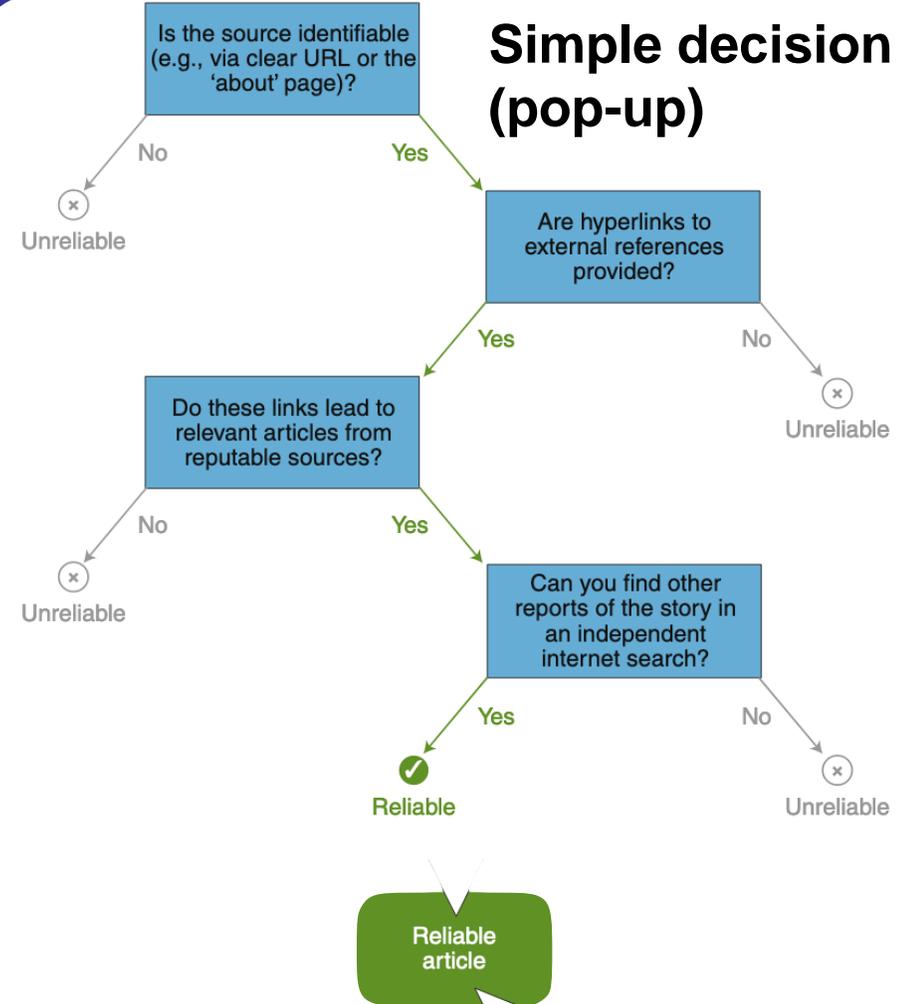
Based on research by the Stanford History Education Group (Sam Wineburg and colleagues)

Kozyreva, A., Lewandowsky, S., & Hertwig, R. (2020). Citizens versus the internet: Confronting digital challenges with cognitive tools. *Psychological Science in the Public Interest, 21(3)*, 103-156.

Boosting competences and social media
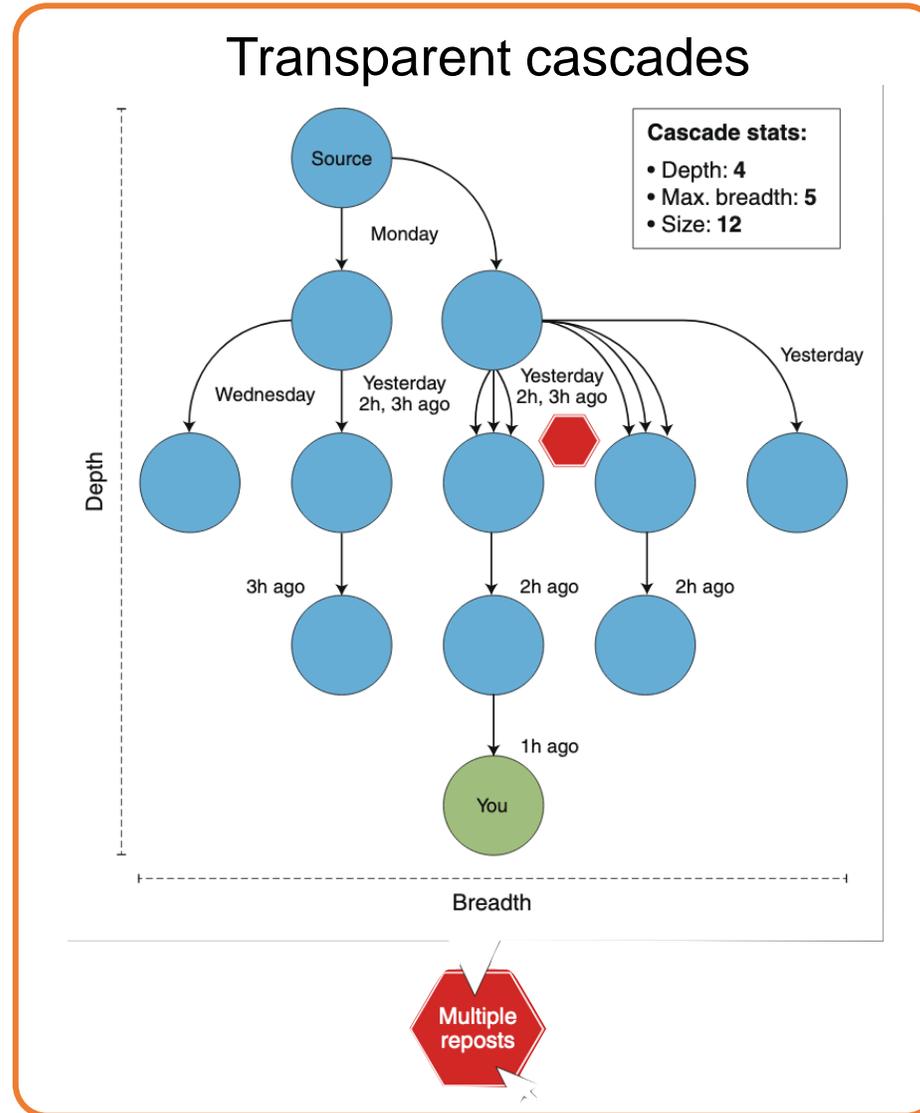
Transparent cascades

Lorenz-Spreen, P., Lewandowsky, S., Sunstein, C. R., & Hertwig, R. (2020). How behavioural sciences can promote truth, autonomy and democratic discourse online. *Nature human behaviour, 4(11)*, 1102-1109.

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When to boost vs. nudge?

Individuals' goals are
- uncertain
- highly heterogeneous, or
- in conflict within the same person

Policy makers' goal is to produce
- generalizable
- lasting, and
- "active" behavior

Nudging
- only works if non-transparent or even invisible
- likely to have detrimental behavioral spillover effects

Toxic choice environment
- defensive decision making or
- relentless and potentially misleading marketing practices

Hertwig, R. (2017). When to consider boosting: some rules for policy-makers. *Behavioural Public Policy, 1(2)*, 143-161.

Self-nudging: boosting control over one's environment
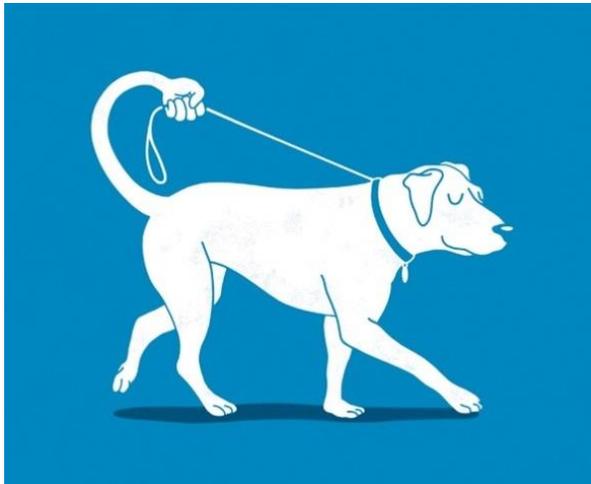
- *Self-nudging* is a way of building competences that also actively enlists the proximate environment
- This tool aims to inform people on how to enlist nudges for purposes of self-regulation.
- The Self-nudger is the choice architect

Reijula, S., & Hertwig, R. (2020). Self-nudging and the citizen choice architect. *Behavioural Public Policy, 1-31.*

Empirical and conceptual comparisons

Empirical

van Roekel, H., Reinhard, J., & Grimmelikhuijsen, S. (2021). Improving hand hygiene in hospitals: comparing the effect of a nudge and a boost on protocol compliance. *Behavioural Public Policy, 1-23*.

Franklin, M., Folke, T., & Ruggeri, K. (2019). Optimising nudges and boosts for financial decisions under uncertainty. *Palgrave Communications, 5(1)*, 1-13.

Bradt, J. (2019). Comparing the effects of behaviorally informed interventions on flood insurance demand: an experimental analysis of 'boosts' and 'nudges'. *Behavioural Public Policy*, 1-31.

Conceptual

DellaValle, N., & Sareen, S. (2020). Nudging and boosting for equity? Towards a behavioural economics of energy justice. *Energy Research & Social Science, 68*, 101589.

Fabian, M. and Pykett, J. (2021). Be Happy: Navigating normative issues in behavioural and well-being public policy. *Online First in Perspectives on Psychological Science*.

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