Nutritional policy design: insights from the lab

Session 2A: Consumer behavior: rationality, biases & behavioral change

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Al Roth

*Many experiments (. . .) fall on an imaginary continuum somewhere between experiments associated with testing and modifying formal economic theories ("***Speaking to Theorists***"), and those associated with having a direct input into the policy-making process ("***Whispering into the Ears of Princes***").*

Al Roth, *Laboratory Experimentation in Economics* (1986)

So. . . how do we do that?

The consumer as . . .

Rational decision maker

- Preferences + budget constraint
- Rationality
- Completeness
- Transitivity
- Independence

Human being

- Evolution
- Cognition
- Limited attention
- Biases
- Emotions

Rational decision maker: implications

...if all these axioms hold, then...

- Consumer choice should be stable over time
- impacted only by *relevant additional information* (smoke $\Rightarrow$ Cancer)
- *optimal consumption* at all times (as information allows)
- Give them more info!
- Design incentive-compatible institutions & mechanisms!

...but do these axioms really hold?

The consumer as a **human being**

(predictably) irrational

(real) consumers deviate from the axioms in predictable ways

- not only mistakes (which would be OK: random mistakes cancel out)
- But *consistent* errors, in precise directions
- simplifying choice problems via *heuristics*
- consistent deviations – *biases*

Why?

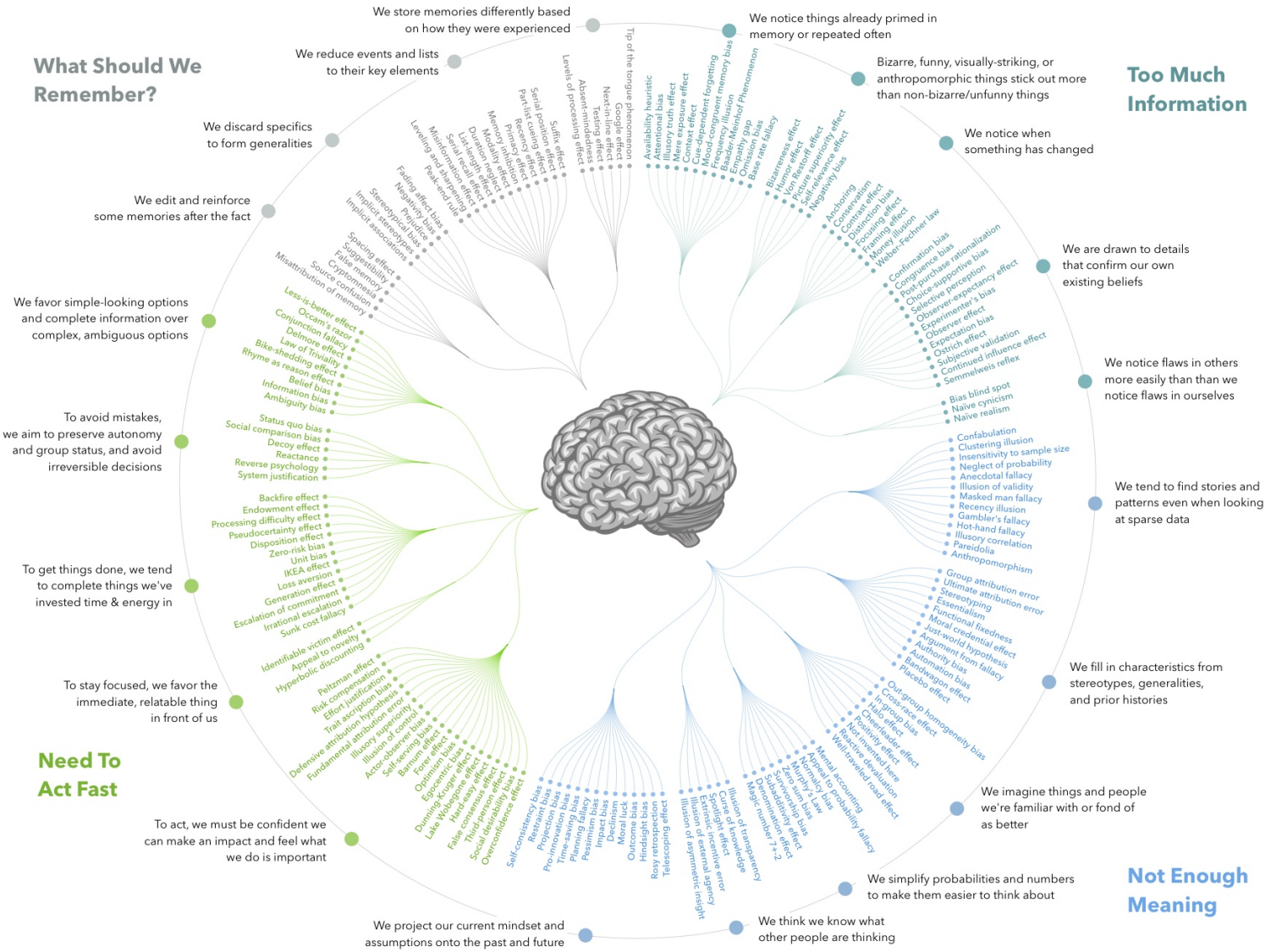
Consider evolution

- evolution is not top-down, but bottom-up
- it solves local problems, one at a time
- the end result *might* approach rationality but might as well not
- it's a *good enough* dynamics

Consider AI

- also bottom-up
- impressively good at some things, impressively bad at others
- approaching rationality rather than assuming it ex-ante

COGNITIVE BIAS CODEX



DESIGNHACKS.CO · CATEGORIZATION BY BUSTER BENSON · ALGORITHMIC DESIGN BY JOHN MANOOGIAN III (JM3) · DATA BY WIKIPEDIA

Navigating the codex

- What should we remember?
  Biases that affect our memory for people, events, and information
- Too much information
  Biases that affect how we perceive certain events and people
- Not enough meaning
  Biases that we use when we have too little information and need to fill in the gaps
- Need to act fast *Biases that affect how we make decisions*

Some biases

Confirmation bias

Looking for or overvaluing information that confirms our beliefs or expectations

...have you got examples?

False consensus bias

Thinking that our characteristics are widespread in the population, whereas they are not

...have you got examples?

Gambler's fallacy

Tendency to believe that something will happen because it hasn't happened yet

...have you got examples?

Group attribution error

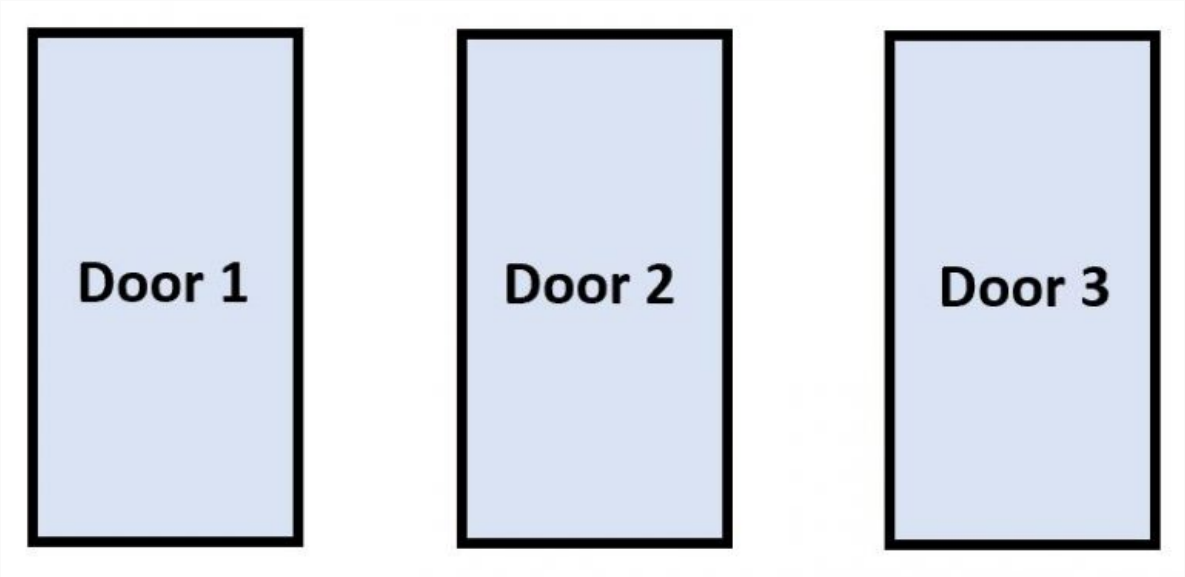
Tendency to overgeneralize how a group of people will behave based on an interaction with a few persons from that group

...have you got examples?

The Monty Hall problem /1

You see three doors. Behind one of these doors there is a prize. Behind the other two, nothing.

please choose a door



The Monty Hall problem /2

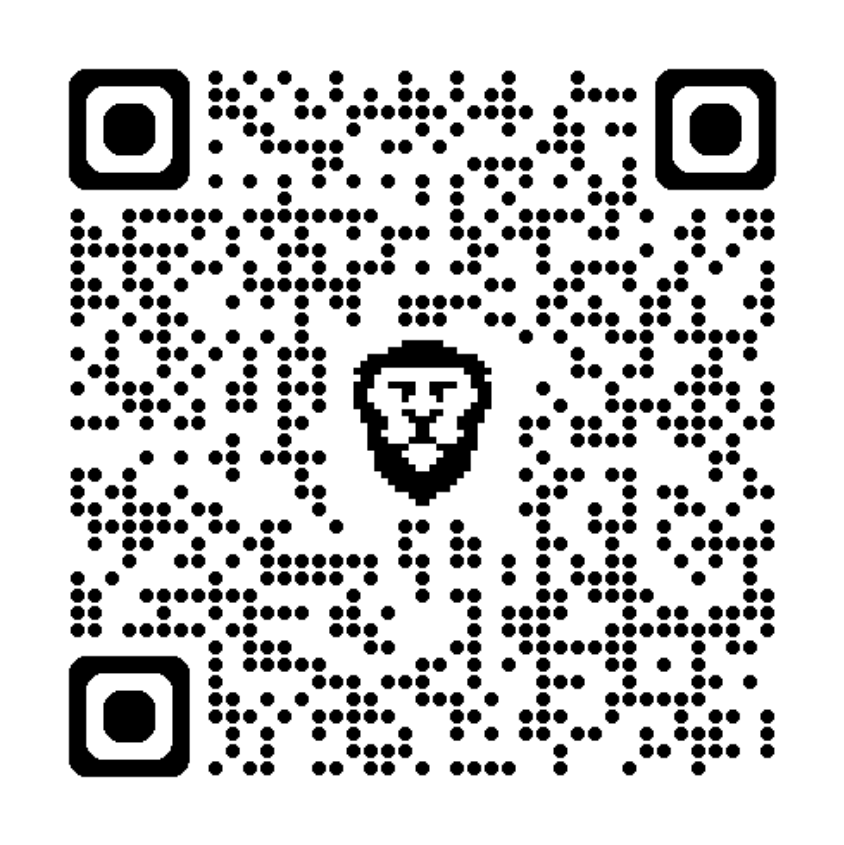
Now Monty opens a door you have not chosen and that does not hide the prize

Now, would you

- Switch to the other door
- Stick to the door you chose
- Are indifferent between switching and sticking

What woudl you do?

QR code



An online simulator

https://www.mathwarehouse.com/monty-hall-simulation-online/

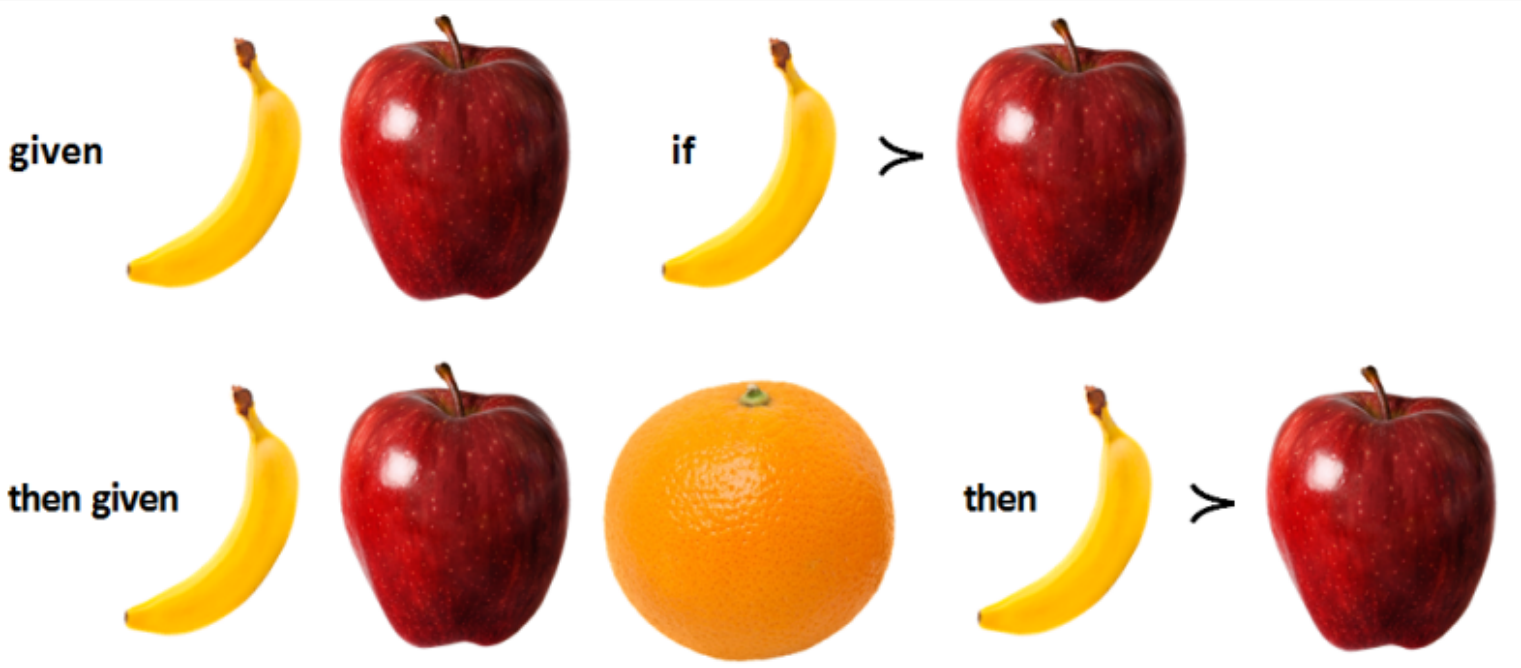
A little explanation

- try with 100 doors
- consider what *you* know and what *Monty* knows.
- consider the codex: what kind of bias is this?

Failure of the independence axiom: the Attraction Effect

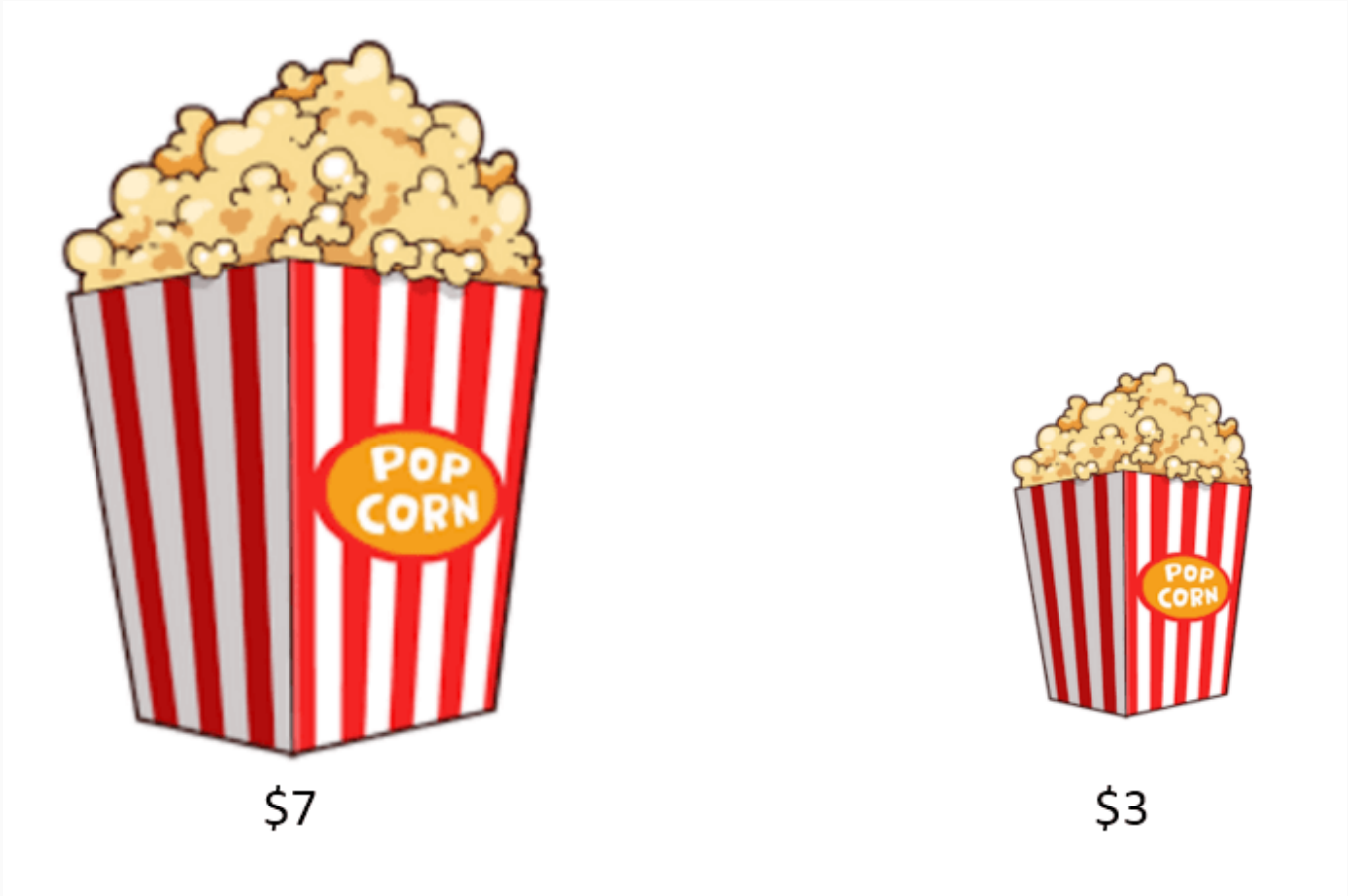
Independence

Independence assumes that if I give you an irrelevant alternative, you shouldn't change your order of preferences



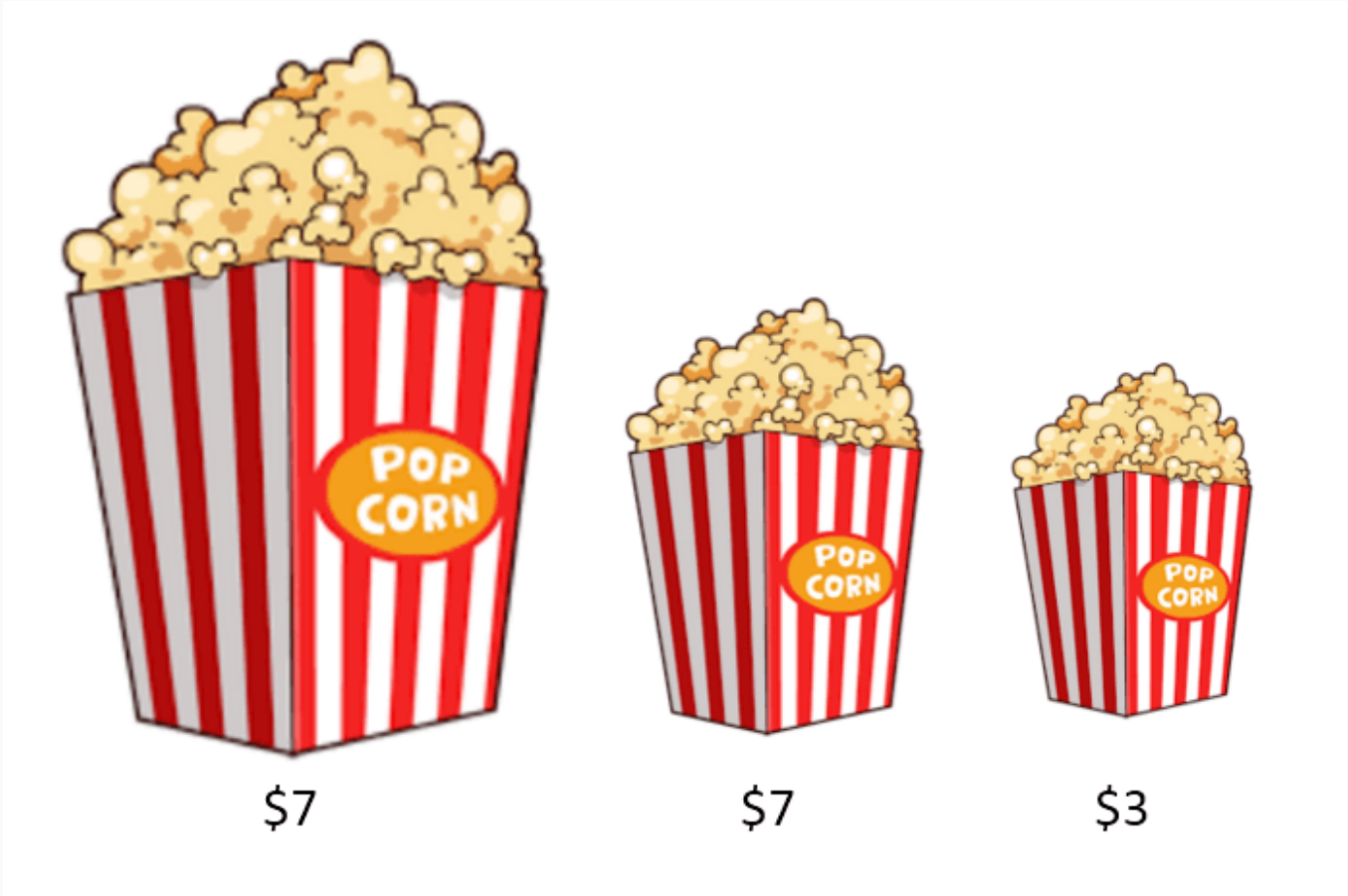
Choosing pop-corn, 1

Please choose

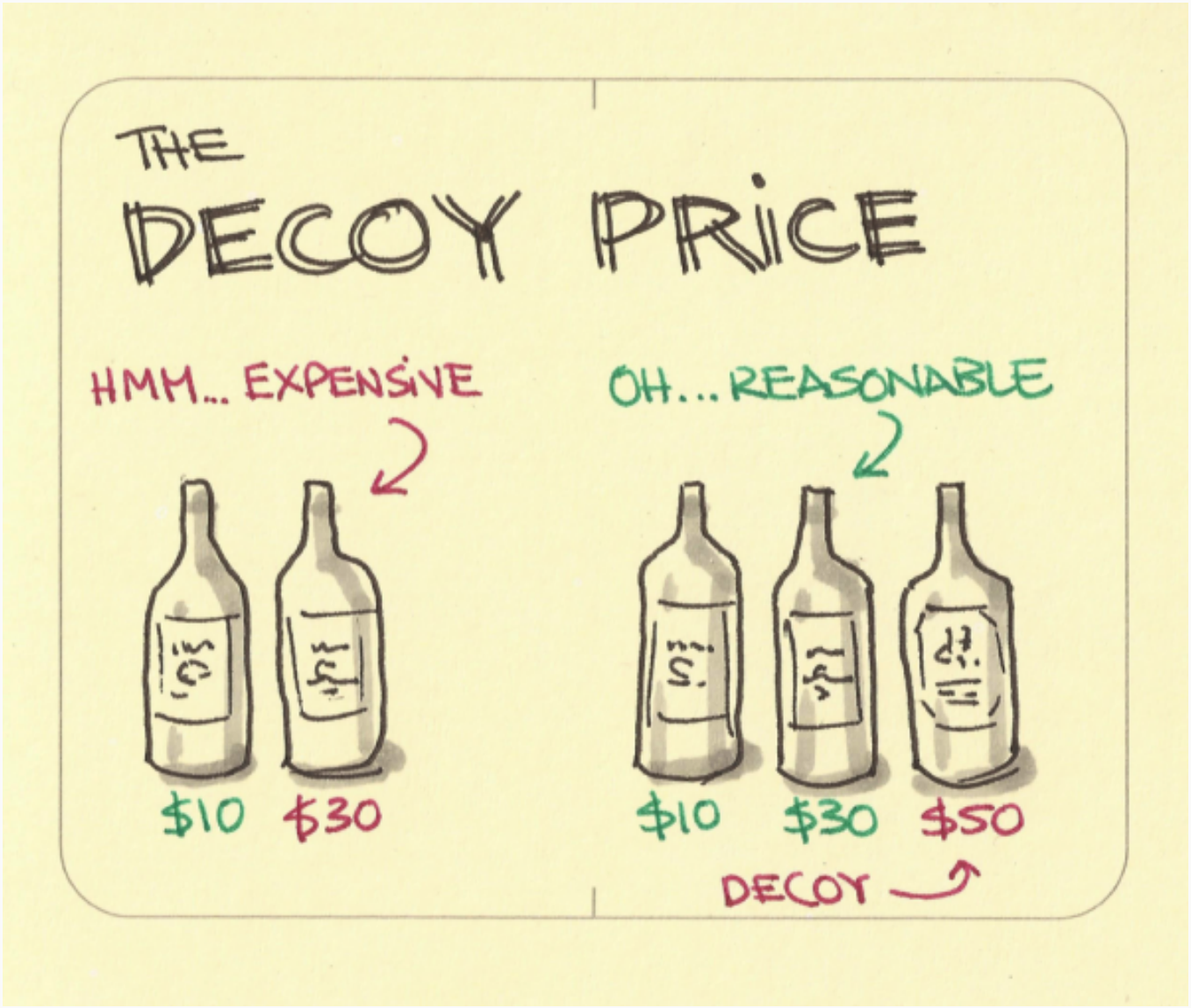


Choosing pop-corn, 2

Please choose *again*



The decoy/attraction/asymmetric dominance effect



Why is this a problem?

ADE is a **violation** of the Independence to Irrelevant Alternatives axiom of rational choice.

Under I.I.A, if in the set

$$\{target, competitor\} \Rightarrow competitor \succcurlyeq target,$$

then in a set

$$\{target, competitor, decoy\} \Rightarrow target \not\succ competitor.$$

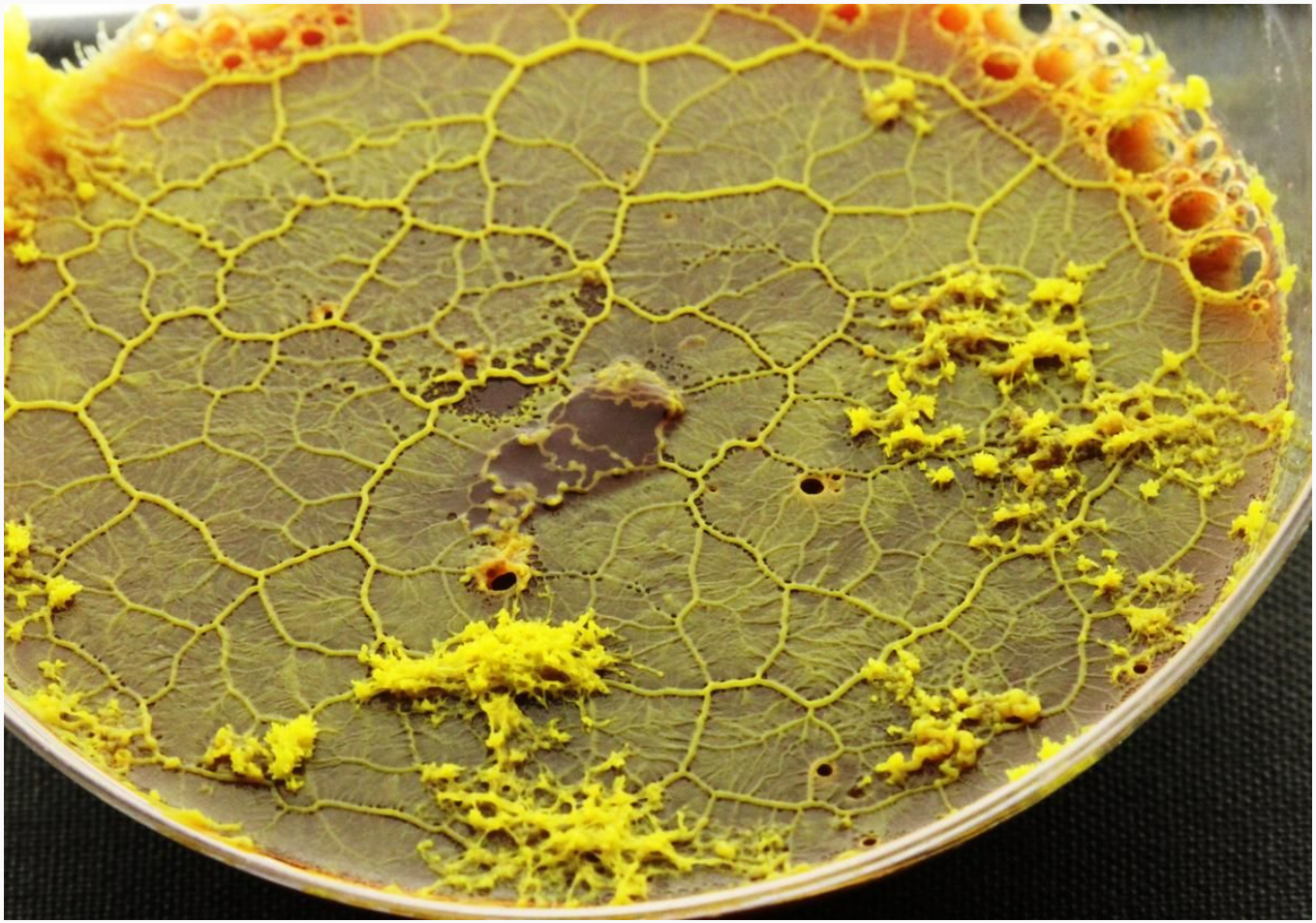
At the aggregate level, this implies regularity

$$Pr(target)\{target, competitor\} \leq Pr(target)\{target, competitor, decoy\}$$

That is, preferences are **context-independent**: changing the choice set should not affect choice

Evidence for ADE

- The ADE has been found in **product** choices among products:
  - beer 6-packs (quality *vs.* price) [Huber et al.]
  - cars (ride quality *vs.* gas mileage) [Huber et al.]
  - restaurants (distance *vs.* quality) [Huber et al.]
  - dates (good looking, bad looking twin, other) [Ariely et al.]
  - televisions (resolution *vs.* durability) [Pan and Lehman]
  - apartments (size *vs.* location) [Pan and Lehman]
  - Good vs Bad looking boys & girls [Ariely]
- **Herne** also found ADE in **political** opinions in Finland
- Curiously, the effect has been observed in **animals** (honeybees, gray jays: Shafir et al)



Limits to ADE

- ADE has shown to be **less prevalent** or absent when
  - products carry **brand name** [Ratneshwar et al., 1987]
  - product **description** is very **precise** [Mishra et al., 1993]
  - **visual** rather than numerical dimensions [Frederick et al., 2014]
  - **away** from **indifference** [Crosetto and Gaudeul 2016]
  - in **real-world** choices [Trendl et al., 2018]

- It is instead **amplified** when
  - subjects asked to **justify** choices [Simonson, 1989]
  - **dominance** is made more **focal** [Mishra et al., 1993; Król and Król, 2019]

How to participate

1. go to classex.de
2. "Login"
3. Institution: INRAE
4. Class: EXEC UNITO
5. password: unito

A simple experiment on retirement plans

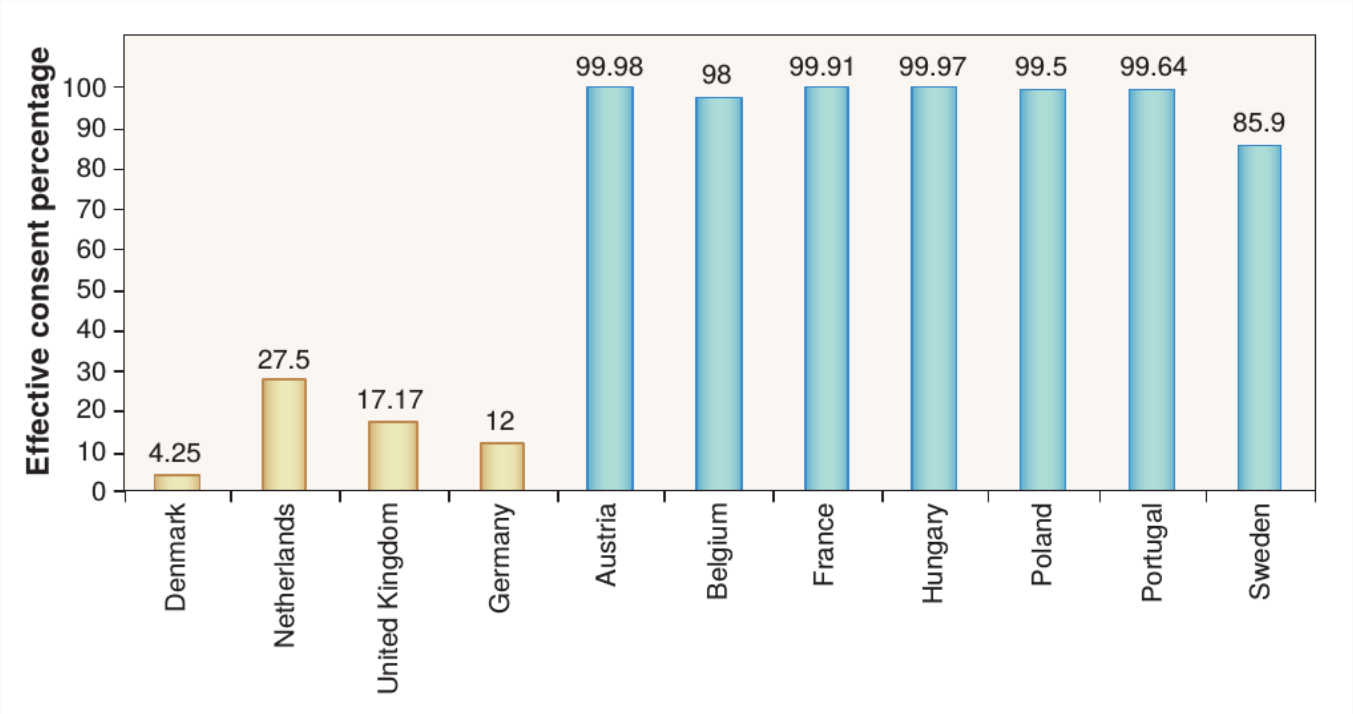
Consider this situation:

You are an employee and you have signed a contract of employment with an annual gross salary of 48.000 €. Your employer offers you a yearly bonus, if you sign up for a company retirement plan. You will get an additional 500 € per year and agree to save 5.000 € per year. These savings will be used for the expansion of the firm and pay a fixed interest rate of 1.5% per year and are hedged by a renowned insurance company in case of bankruptcy of the firm.

Do you **refuse** or **accept** the plan? (ClassEx)

The power of the default

% of consent to organ donation across countries



How to explain this? Culture? Economic development? Religion?

this is due to the default option (opt-in vs. opt-out [Johnson and Goldstein, Science 2003])

Default bias: why?

- inertia and laziness : the *status quo* is the choice that takes the least amount of effort
- uncertainty: when we are not sure what to do and lack expertise in the area in question, we consider the default as a form of advice
- loss aversion: switching away from the default requires a willful action: it might bring to mind what we could lose by switching, which may make us reluctant to change
- procrastination: I'll do it for sure tomorrow...

A simple set of trivia quiz

on ClassEx, we will have fun with trivia!

Anchoring effect

A simple chocolate question

on ClassEx, we will have a say about chocolate!

Nutri-Score and Bio products

Halo-effect

Halo effect: when *one* trait of a product is used to derive an overall judgment of the product – or a judgment on *other* unobserved traits of the product.

- Sweets sold in pharmacies
- Junk food at Naturalia
- Good-looking people also thought to be smarter
- ...

Rational decision makers and timed consumption

Imagine a phone subscription

- Do you prefer to pay day-by-day according to your consumption (sms, calls, internet)
- Or to have a flat fee?

think again: do you *really* use up your flat fee? If not, then you are *paying not ot use your phone*.

Paying not to go to the gym

- Study of data from three American Gyms
- Type of tickets:
  - Single entry 12$
  - 10 entries 100$ (10$ each)
  - Monthly fee 85$
  - Yearly fee 850$
- Cancellation policy:
  - Single and 10x no cancellation
  - Monthly: need to cancel by the 10th of the month, else pay next month as well
  - yearly: automatically cancels at the end of the year

A rational decision maker should go for monthly only if he visits at least 7 times a month; monthly gives the freedom to opt-out should one fail to do so, so we should see things adjust after a few months.

Paying more to go less!

TABLE 5—PRICE PER AVERAGE ATTENDANCE AT ENROLLMENT

	Sample: No subsidy, all clubs		
	Average price per month (1)	Average attendance per month (2)	Average price per average attendance (3)
	Users initially enrolled with a monthly contract		
Month 1	55.23	3.45	16.01
	(0.80)	(0.13)	(0.66)
	$N = 829$	$N = 829$	$N = 829$
Month 2	80.65	5.46	14.76
	(0.45)	(0.19)	(0.52)
	$N = 758$	$N = 758$	$N = 758$
Month 3	70.18	4.89	14.34
	(1.05)	(0.18)	(0.58)
	$N = 753$	$N = 753$	$N = 753$
Month 4	81.79	4.57	17.89
	(0.26)	(0.19)	(0.75)
	$N = 728$	$N = 728$	$N = 728$
Month 5	81.93	4.42	18.53
	(0.25)	(0.19)	(0.80)
	$N = 701$	$N = 701$	$N = 701$
Month 6	81.94	4.32	18.95
	(0.29)	(0.19)	(0.84)
	$N = 607$	$N = 607$	$N = 607$
Months 1 to 6	75.26	4.36	17.27
	(0.27)	(0.14)	(0.54)
	$N = 866$	$N = 866$	$N = 866$
	Users initially enrolled with an annual contract, who joined at least 14 months before the end of sample period		
Year 1	66.32	4.36	15.22
	(0.37)	(0.36)	(1.25)
	$N = 145$	$N = 145$	$N = 145$

Paying not to go to the gym: main results

- Users who choose (...) a flat-rate contract pay a price per average attendance of over \$17 in the monthly contract and over \$15 in the annual contract.
- The average forecasted number of monthly visits, 9.50 (s.e. 0.66), is more than twice as large as average attendance, 4.17.
- On average, 2.31 full months elapse between the last attendance and contract termination for monthly members, with associated membership payments of \$187.
- The survival probability after 14 months for the monthly contract is 17 percent higher than for the annual contract.

Paying not to go to the gym: why?

- Risk aversion
- Overconfidence over future attendance
- Procrastination / default bias for monthly ticket holders

Social norms

Social norms

Choices do not happen in a vacuum! Others are around

- You might care about what the others think of you [social conformity]
- You might care about what example you want to set
- You might want to be at least as good as someone else [keeping up with the Jones's]
- You might want to keep your face, show high morals, be a good citizen [social norms vs. market norms]
- You might have little information, and use other people's choices as cues [information-driven conformism]
- You might just like to do like the others do [preference-driven conformism]
- ...

Social norms vs. market rules

- School close at 4pm, but parents are frequently late
- Delays are costly for the school: need to pay teachers, etc
- what can be done?

Experiment (Gneezy et Loewenstein 2000)

Control group
- Observations over 20 weeks
- No intervention

Treatment
- 4 weeks: no intervention
- 12 weeks: fine of 10 NIS (3 euro)
- 4 weeks: no intervention

Results, I

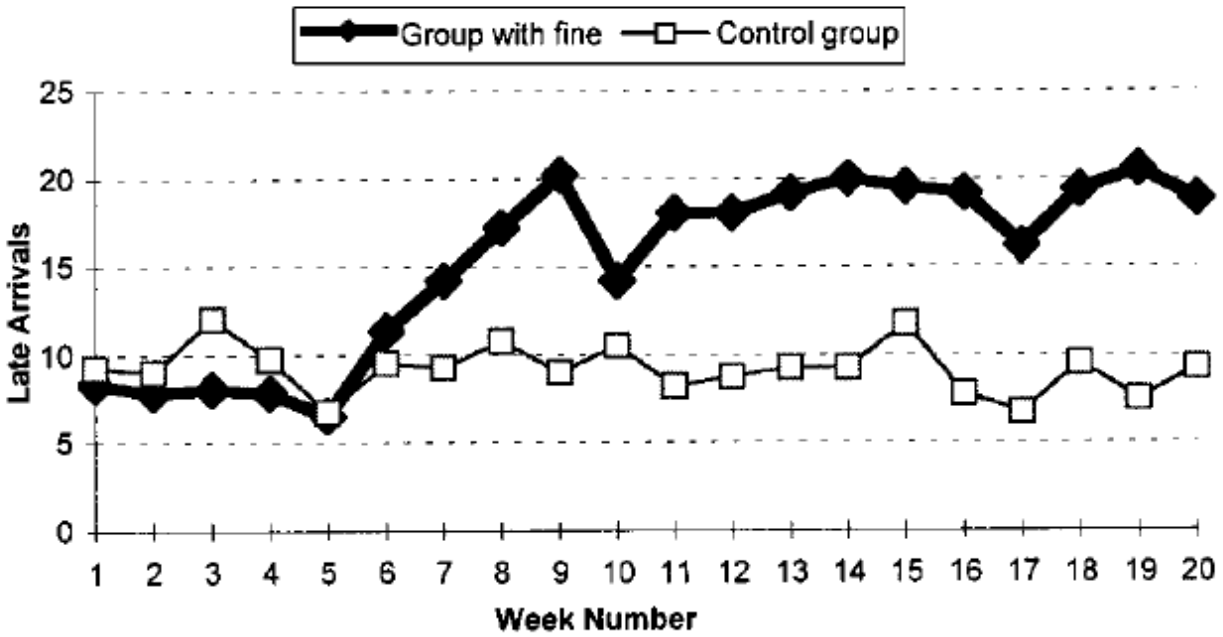


FIGURE 1.—Average number of late-coming parents, per week

Results, II

The fine has pushed the numbers of parents arriving late up. Why?

A fine is a price

- *Crowding out*: l'argent déplace la norme sociale
  - On passe de 'il faut le faire'...
  - ...à 'je vais le faire mais c'est OK: je vais payer'
- *Information*: l'amende est un prix
  - Avant l'amende, les parents avaient des croyances relatives à l'ampleur du cout généré par leur retard
  - L'amende (qui n'est pas énorme, à 3 euros) donne une valeur au retard
  - Cette valeur est assez basse: on peut donc bien croire que notre temps à nous vaut plus que ça

Take-home: faites payer assez, ou ne faites pas payer du tout

Keeping up with the others

Many peple care about being not too different from the others

- Especially upwards: if everyone has a sporty nice car, you want one too
- *Keeping up witht he Joneses*: keep your social status near to the one of the people you want to be associated to

This can (and has been) used to move people towards lower energy consumption

- Opower in the UK: compare consumption to the one of others
  https://goo.gl/G4FyRg

Behavioral change

Exploiting biases to nudge change

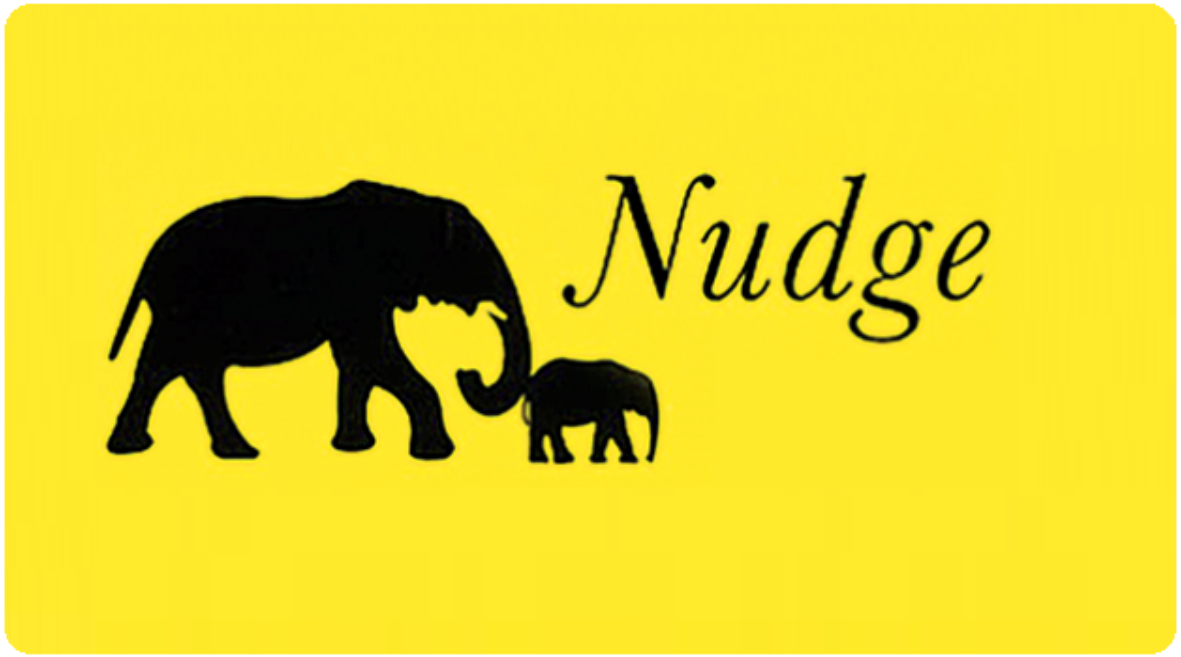
These (and other!) biases exist. Can they be exploited for policy purposes?

- The list is long: https://en.wikipedia.org/wiki/List_of_cognitive_biases
- they have largely been used by marketing and advertisement
- could they be used for policy?

Biases can allow a new policy instrument

- Old: prohibition
- Old: tax and regulate
- Old: cap and trade
- New: *behavioral change*

Nudging



'soft paternalism'

- A nudge is not a formal regulation but a small change in the context, the setup, the choice environment that makes people change behavior
- It is often not perceived as limiting the freedom of choice in a formal way – it just exploits our biases for policy purposes
- the 'choice architect' can 'nudge' choice towards a desirable outcome

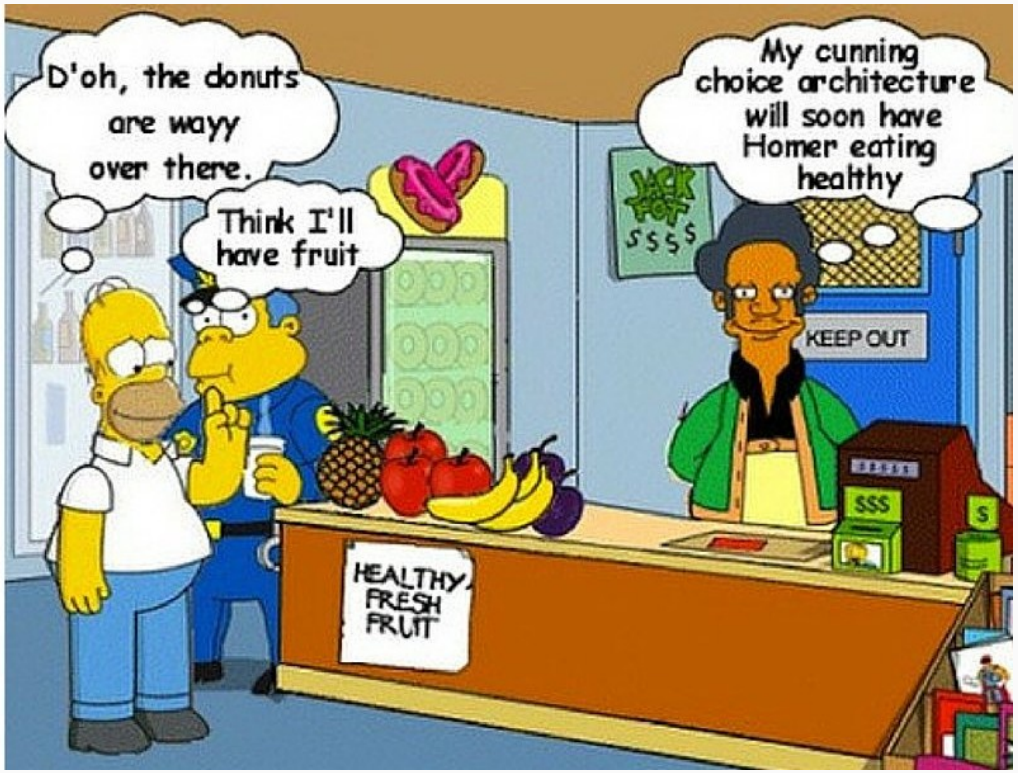
Some famous examples

- Organ donation defaults
- Cafeteria position of meals
- Opower 'see what the others do' energy meter
- Study in the UL (London) about gas / energy consumption and social norm nudging (moodle)
- To incentivise public transport: lottery but not for car riders (regret)
- ...

How do nudges work?

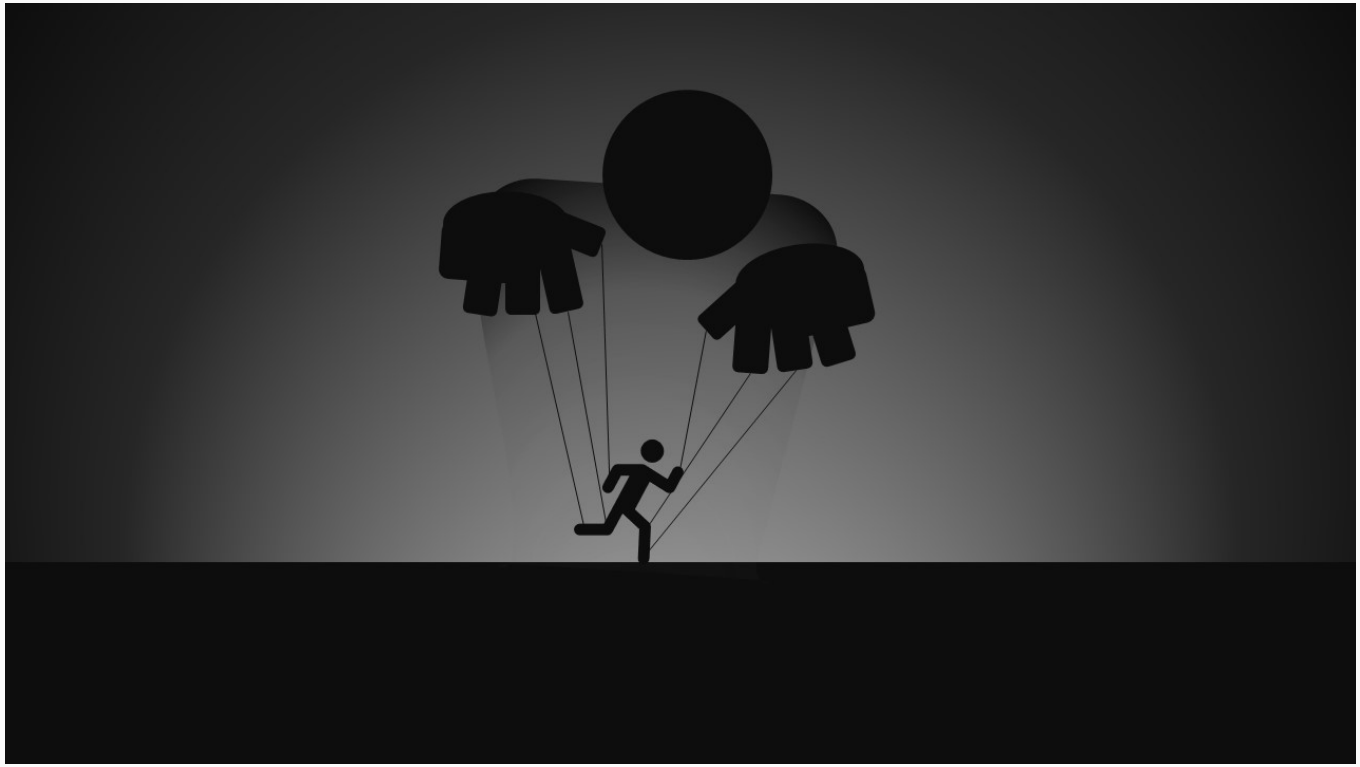
Exploiting your bias

- unawareness?
- indifference?
- long-term effect?



The bad sides of nudges

The same mechanism that allows good can allow bad uses...



Black nudges or sludges

Some black nudges

- bad defaults
- switching costs & hurdles
- snacks by the cashier
- nearly *anything* at `booking`, `ryanair`...

Long-term effects: a nudge lullaby

What happens when the nudges stop?

- if we nudge people without informing them
- we get short term change
- but what happens in the long term?
- some effect, return to normal, or even worse?

A nudge lullaby: setup

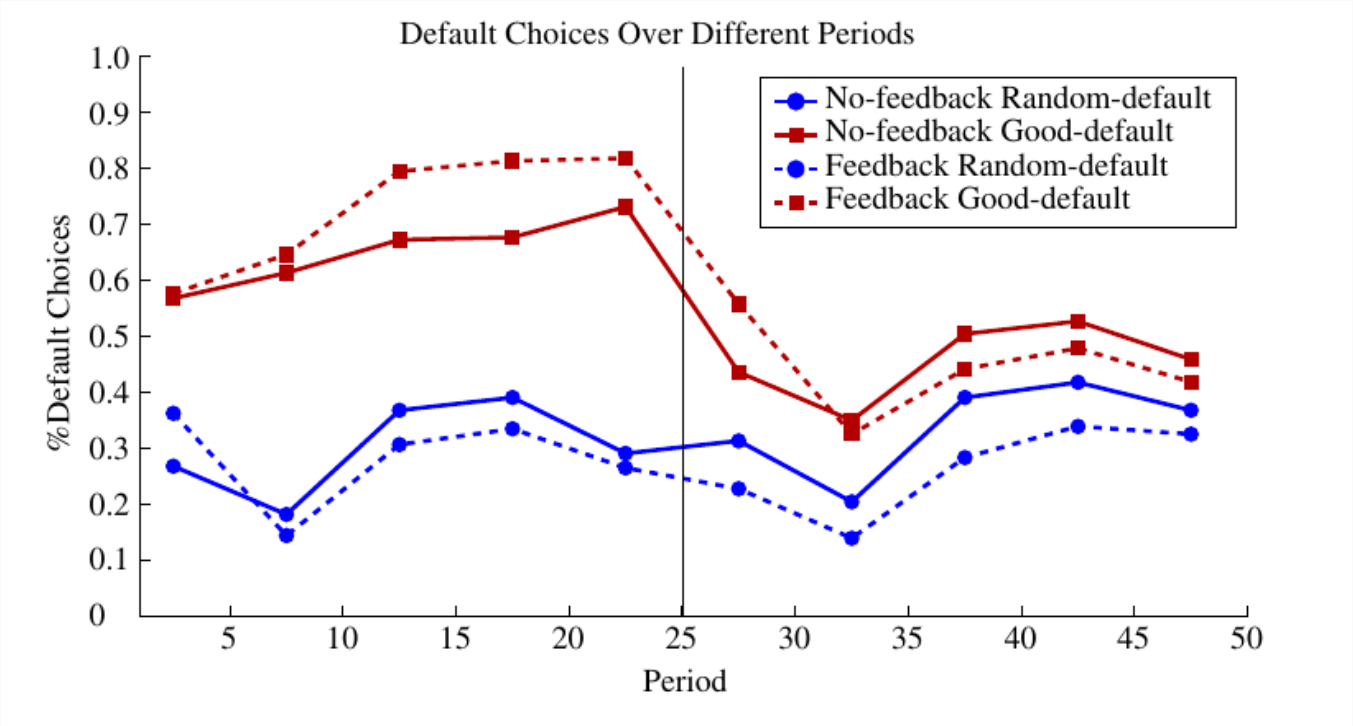
De Haan and Linde, Economic Journal 2016

Choice Task 48						
TIME: 39 BONUS: 20						
Choices	Weight = 6	Weight = 5	Weight = 4	Weight = 3	Weight = 2	Price
○ Option 1	12	8	10	4	3	102
○ Option 2	1	13	11	28	19	138
○ Option 3	4	9	29	39	13	122
◉ Option 4	5	20	49	7	13	271
○ Option 5	28	5	13	21	12	109
○ Option 6	42	22	6	4	3	348
Make Choice						

- find the highest-value row
- with pre-selected default
- period 1: default is good or random (treatment)
- period 2: default is random

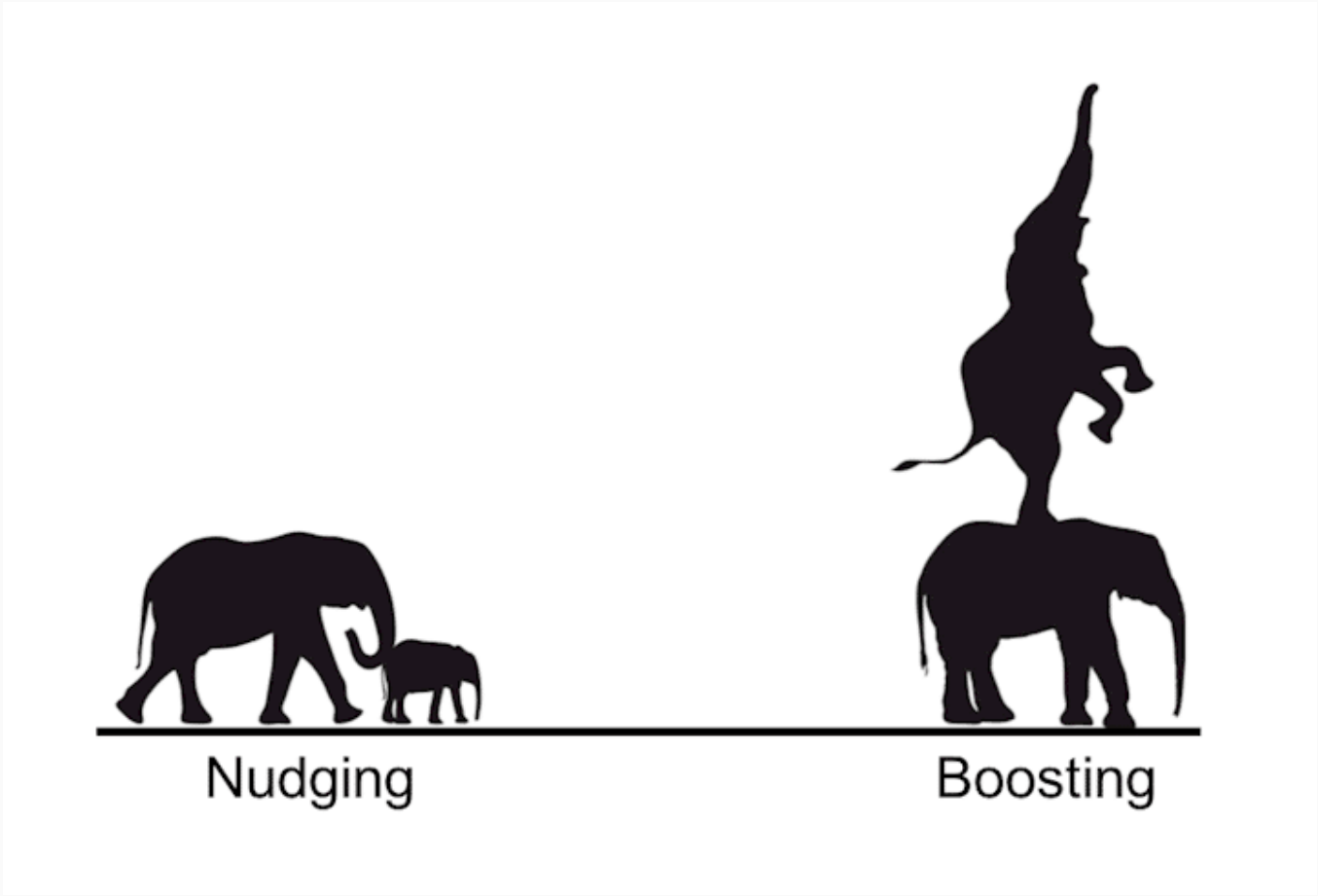
A nudge lullaby: results

De Haan and Linde, Economic Journal 2016



- people get used to nudges
- and stick to them even when it is not informative any more

An alternative approach: boosts



Some boosts

Empower people through simple behavioral rules

- "*For your health, eat 5 fruits and vegetables a day*"
- "*Do not trust your first impressions: think twice before deciding*"
- "*Check your sources*"
- Simple ways to be a bayesian
- ...


KEEP
CALM
it's
QUESTION
TIME