

# Behavioural Science 101

ROSA Workshop Series #1

ROSA

# Content.

1. Intro & background.
2. Behavioural Science – An Overview.
3. Prospect Theory.
4. Common Biases.
5. Practical application.
6. Scientific methodology.
7. Frameworks.
8. Spillovers.



### Maddie Quinlan

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Maddie is a behavioural scientist with expertise spanning private, public, and not-for-profit organizations, focussing primarily in the areas of health, financial wellness, communications, and risk management. In a rapidly changing world, she believes in relentless betterment and radical authenticity.

- Director & Co-founder of Salient, Head of Membership for the Global Association of Applied Behavioural Scientists
- Specializes in behavioural science intervention design and implementation, strategy and research application methodology across a multitude of sectors
- Appears in the Globe & Mail, Financial Post and SAGE Journal of Research methods, among other publications & podcasts
- Research investigates the impact of mindfulness meditation on financial decision-making
- Holds an MSc in Behavioural Science, internationally recognized CFA Charter, and Bachelor degrees in both Finance (B.Comm) and Psychology (B.A.)

# Salient.

- We combine rigorous behavioural science with industry expertise to develop impactful solutions to decision-making and behaviour change projects
- Many individuals and institutions hold the mistaken belief that humans behave fully rationally, but we know humans act *arationally*
- We work with leading experts and renowned academics from top tier institutions and also conduct our own primary research
- Integral to our approach is rigorous testing and measurement of our designed solutions to ensure they are relevant, meaningful and impactful for our clients

# Previous work



Corporations

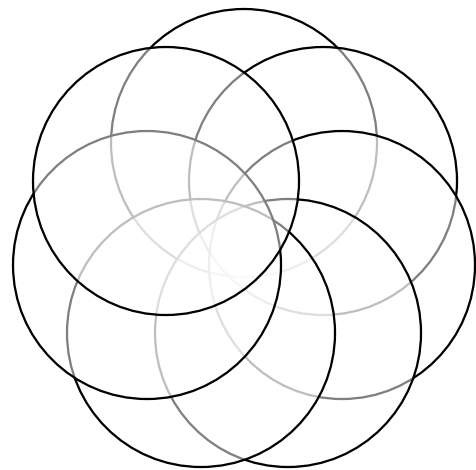
Non-profits

Startups



Academics

Technology



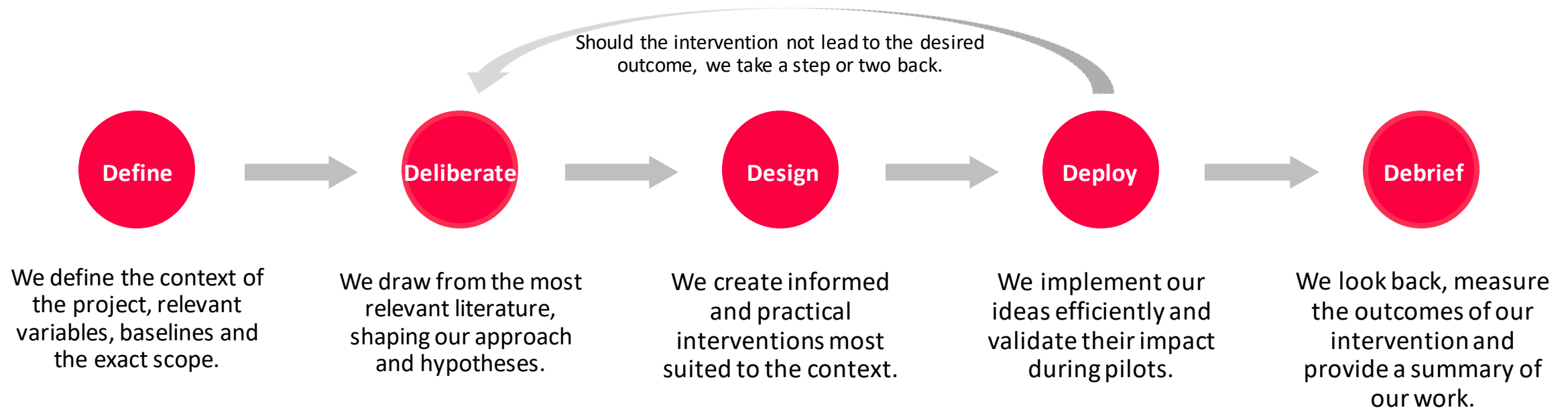
Government

Regulators



# 5D™ project framework.

- Our five dimensional project framework allows us to incorporate scientific rigour into our work to deliver actionable insights and create impactful solutions

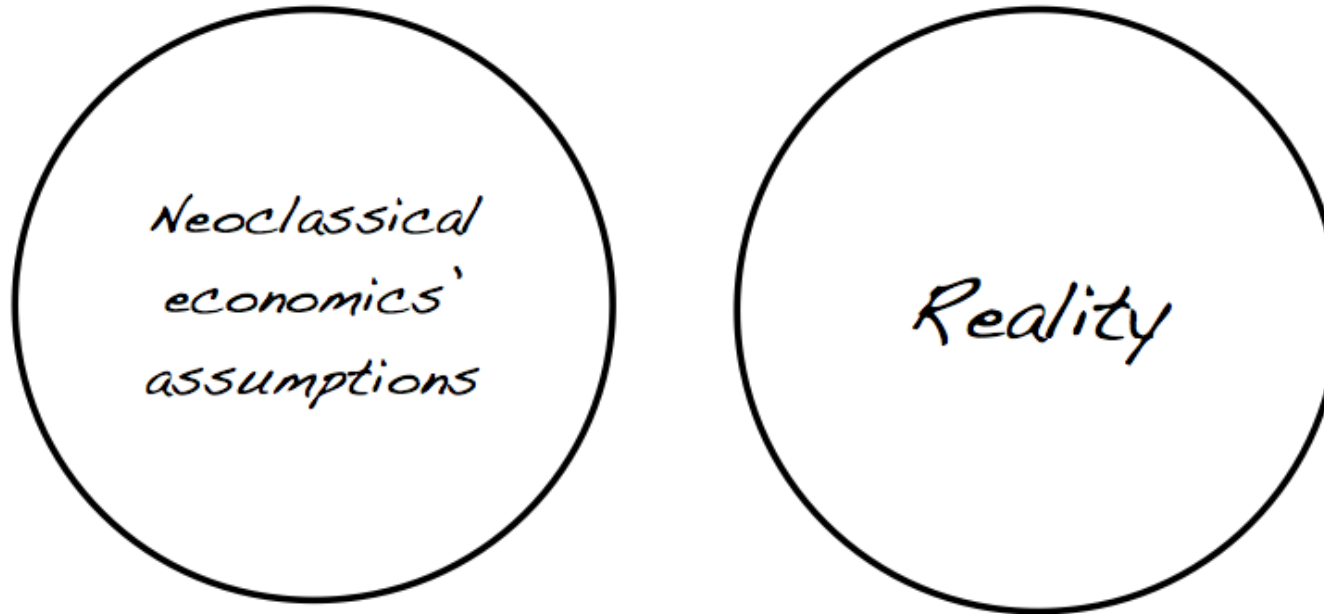


# Today.

- We make many decisions each day, and take mental shortcuts and use *heuristics* because cognitive resources are scarce
- This can lead to *bias*, can impair judgement, lead to suboptimal decision-making
- Behavioural science studies deviations from rationality, attempting to explain and mitigate their impact in a systematic way
- There are many applications and contexts to use these insights, and throughout all these sessions, we'll touch on those most relevant

# Model assumptions of economics.

*Venn diagrams for our times*



*Murphy*



# Behavioural Science: An Overview.

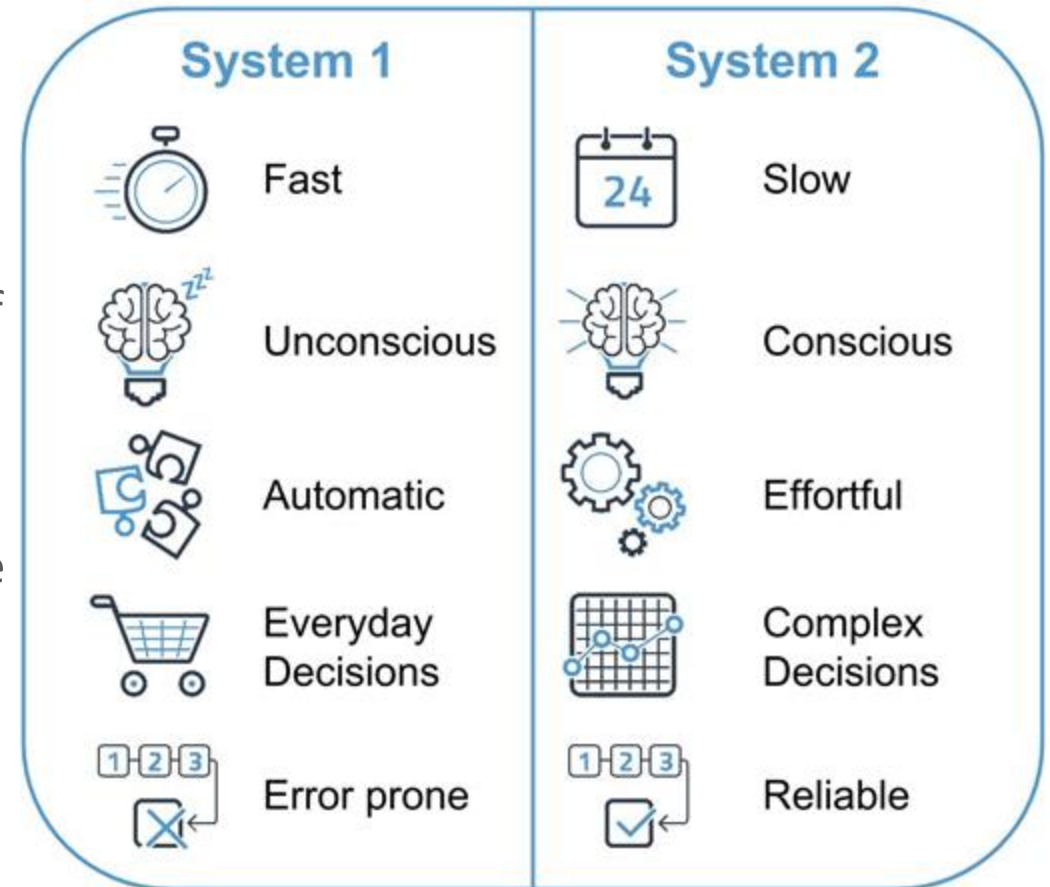
- Inter-disciplinary field drawing from psychology, economics and decision sciences
- Helps to understand, predict, and shape behaviour and decision-making in an impactful way
- Behavioural science uses descriptive models to capture actual observed behaviour
- This is in contrast to a traditional economic approach based on prescriptive normative models
  - Assumptions about human rationality, utility maximisation and perfect information are often violated in reality

35,000

Number of  
decisions an adult  
makes per day.

# Cognitive capacity.

- The human mind is very complex. *Dual-process theory* helps us to better understand the decision making process
- Our cognitive capacity is limited and we make use of two interrelated 'systems' often called System 1 and System 2 to make decisions
- As a result, we do not fully weigh up our choices, we take mental shortcuts and act **arationally**



# Exercise.

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Which is more probable?

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A) Linda is a bank teller.

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- B) Linda is a bank teller and is active in the feminist movement.


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Good luck  
with those  
implicit  
biases


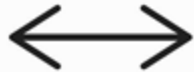
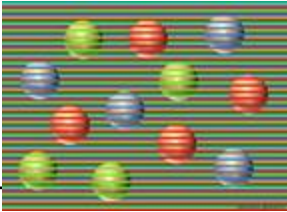


We take in  
**11,000,000** pieces of  
information per  
second.

We can consciously  
process **FORTY**.



# System 1 versus System 2.

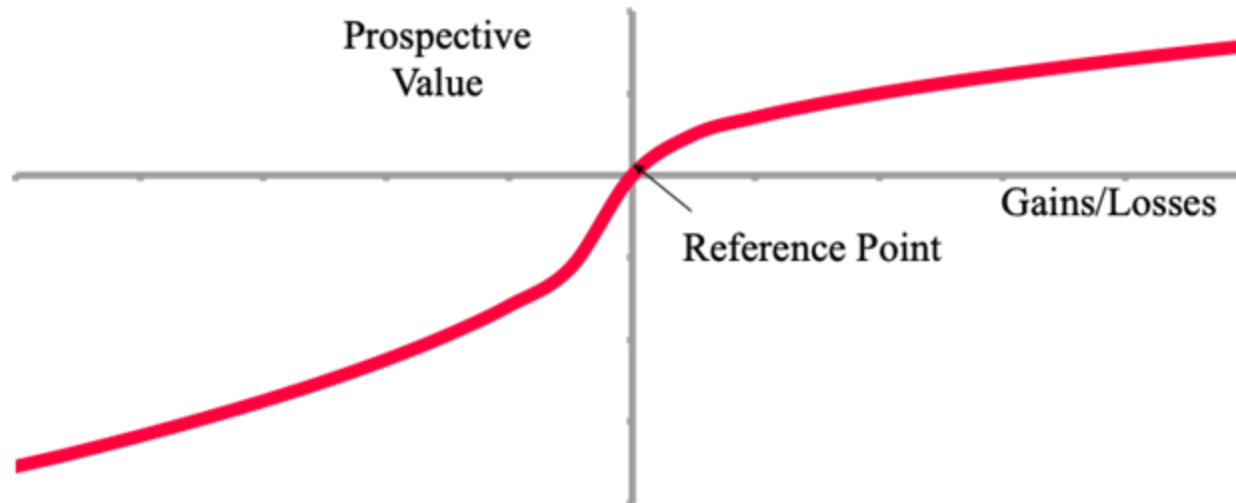
Example	System 1	System 2
Calculations	$2 \times 2 = ?$	$17 \times 23 = ?$
Driving a car	Experienced driver	Learner
A baseball bat and a ball cost a total of \$1.10. The bat costs \$1 more than the ball. How much does the ball cost?	\$0.10	\$0.05
Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Which is more probable?  Linda is a bank teller. Linda is a bank teller and is active in the feminist movement.	B	A
Which horizontal line is longer A or B? A)  B) 	A	Equal length
What is the colour of the balls? 	Red, green, blue	Brown

“People think about life in terms of changes, not levels. They can be changes from the status quo or changes from what was expected, but whatever form they take, it is changes that make us happy or miserable.”

- *Richard H. Thaler*

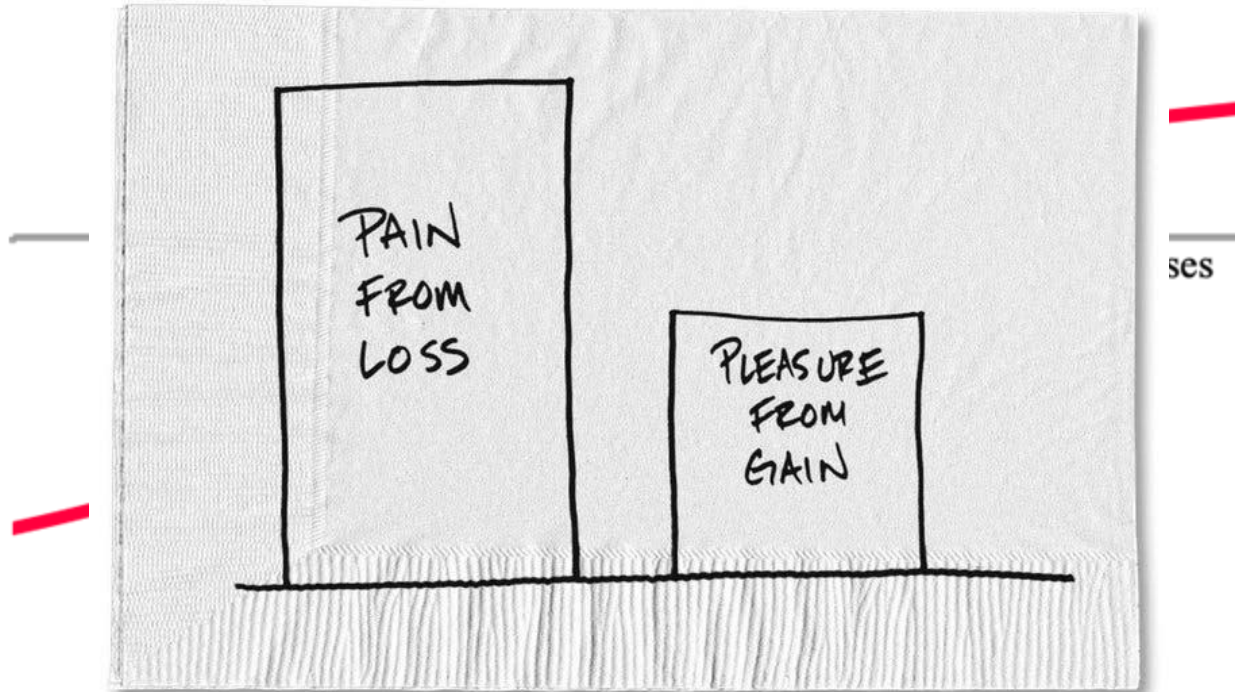
# Prospect Theory.

- Prospect Theory was developed by Kahneman and Tversky (1979) to describe decision-making under uncertainty



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# Cognitive bias.

A cognitive bias is a systematic pattern of deviation from norm or rationality in judgment and decision-making

Very different from error which is random deviation with no systematic pattern



Bias



Error

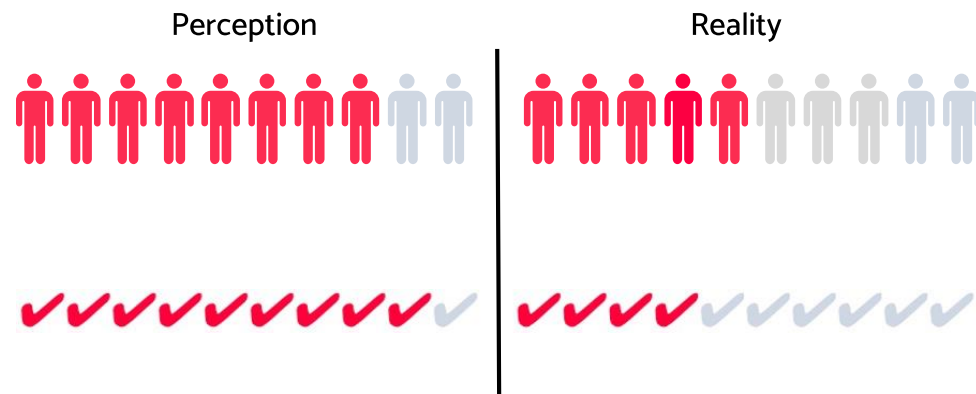
# Common Biases.

**How many of you  
think you are an  
above average  
driver?**



# Over- confidence.

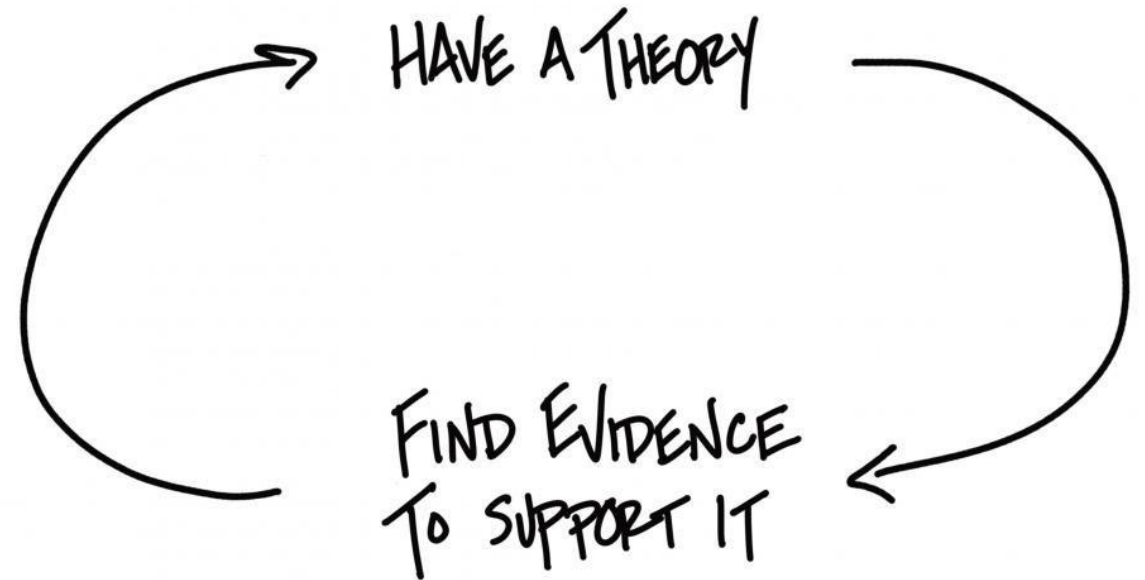
- Overconfidence is widespread and can be divided into overconfidence in one's ability and overconfidence in the accuracy of one's knowledge:
  - Driving skills
    - 80% believe to be above median drivers
  - Accuracy of knowledge
    - 90% confidence intervals for knowledge questions, turn out to be 40% confidence
- Overconfidence in traders is associated with excessive trading and excessive risk-taking, it can also lead to a false sense of certainty for price predictions and project outlook





# Confirmation bias.

Confirmation bias can lead to 'belief perseverance', 'irrational primacy effect' and 'illusion correlation'.



BEHAVIOR | GAP

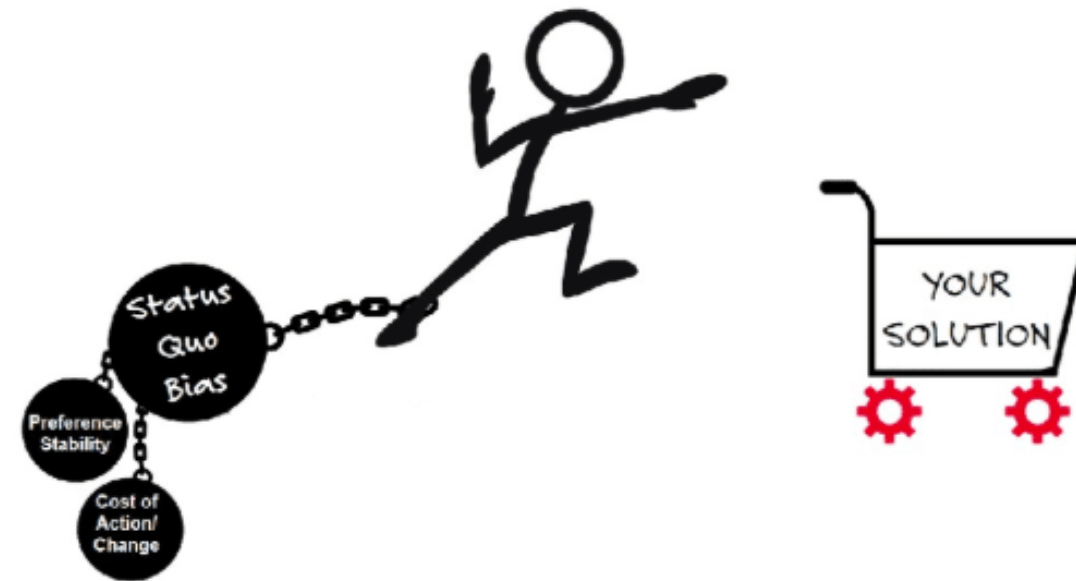
# Status-quo bias.

Based on inertia

The preference to do nothing/not make decisions

Problem for:

- i) Making any change at all
- ii) Being blind to the need for new skills, approaches
- iii) Replacing a leaver with someone who resembles them
- iv) Cause of 'Not invented here bias'
- v) Not recognizing destructive behavior or opportunities change



# Endowment effect.

The *endowment effect* is people's tendency to value something more highly when they own it than when they don't

Example: the mug experiment

Half the participants were given mugs available at the campus bookstore for \$6

The other half were allowed to examine the mugs

Each student who had a mug was asked to name the lowest sale price

Each student who did not have a mug was asked to name the highest purchase price

Supply and demand curves were constructed and the equilibrium price was obtained

Trade followed

There were four rounds of this

**Table 13.3**  
**The Endowment Effect**

Round	Equilibrium Price	Median Nonowner Value	Median Owner Value
1	\$4.25	\$2.75	\$5.25
2	4.75	2.25	5.25
3	4.50	2.25	5.25
4	4.25	2.25	5.25

Source: Daniel Kahneman, Jack L. Knetsch, and Richard H. Thaler, "Experimental Tests of the Endowment Effect and the Coase Theorem," *Journal of Political Economy* 98, December 1990, pp. 1325–1348. The subjects were undergraduates at Cornell University.

# Risk assessment.

Write down the two products causing *most* injuries and the two with *least* injuries.

- 
- Beds/mattresses
  - Chainsaws
  - Hammers
  - Playground equipment
  - Power saws
  - Scissors
  - Stoves
  - Toilets

# Risk assessment.

- Beds/mattresses **456,559**
- Playground equipment **248,372**
- Power saws **91,771**
- Stoves **44,824**
- Toilets **44,335**
- Hammers **41,518**
- Scissors **30,290**
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**Why does  
all of this  
matter?**

# Implications.

- The ways individuals interact within any community, the way messages are framed, can be greatly impacted by behavioural biases, and this has enormous implications. Luckily, there is hope!

**Awareness of behavioural biases and the use of interventions are just the starting point, impacting your initiatives, your teams, and ultimately the performance of any and all research, intervention, or strategy for behaviour change.**

**Real-world  
applications.**

# Improving antibiotic prescribing.

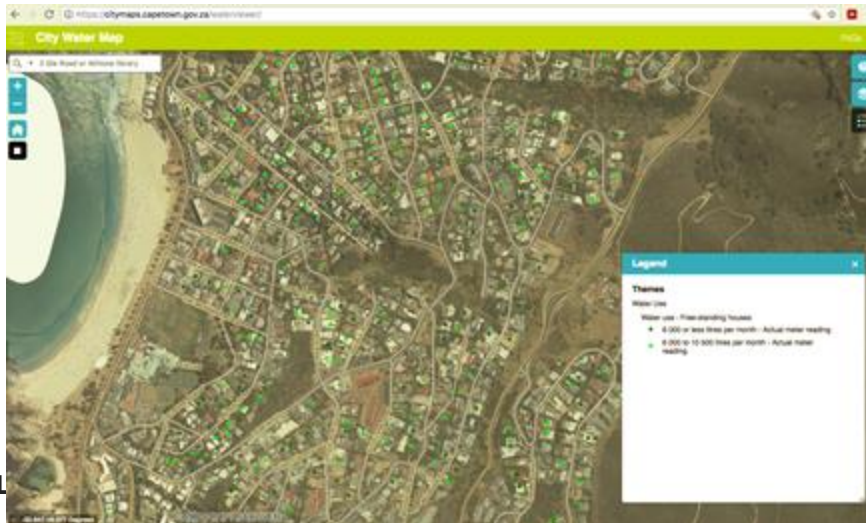
- Unnecessary antibiotic prescribing contributes to antimicrobial resistance. One study aimed to reduce unnecessary prescriptions of antibiotics by general practitioners in England.
- They find that *social norm* feedback from a high-profile messenger can substantially reduce antibiotic prescribing at low cost and at national scale making it a worthwhile addition to antimicrobial stewardship programmes.
- The authors estimate their feedback intervention would equate to a **0.85% reduction in antibiotic items prescribed** nationally during the study period.
- This example has also been directly translated into the context of targeting veterinarians and/or agrovets to help fight antimicrobial resistance in livestock in developing countries.

# Cape Town water crisis - Day Zero.

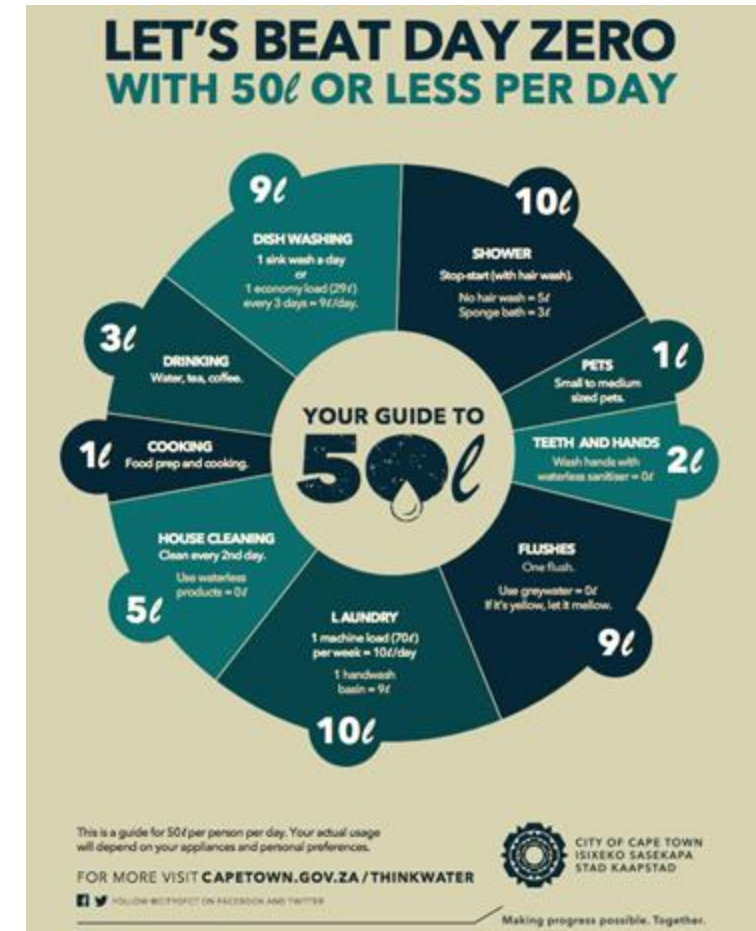
- In early 2018 the city of Cape Town was on the brink of becoming the first metropolitan city in the world to run out of water – the day for this unimaginable occurrence was termed “Day Zero”
- As infrastructure projects would take too long to complete, drastic demand side management was the only feasible solution
- In February 2018 daily water consumption was restricted to 50 liters per person per day (average use in the US is 300 liters)

# Day Zero.

- A memorable and salient event name: “Day Zero” (un-**Attractive**)
- Helping people better understand what 50 liter usage per day means in practical terms (eg. planning poster) (**Easy**)
- Making consumption more expensive: Increased water tariffs and fines for high- consumption households
- *The use of social norms* (eg. water usage map)



Behavioural Science 1



# Day Zero.

- Good news!
  - Thankfully, Day Zero was **averted** – albeit narrowly.
  - A memorable and salient event/disaster name makes the threat more 'real'
  - Planning prompts can help people to translate their intentions into actions and might be a great addition to risk communication as part of offering a guide for the implementation



# Day Zero.

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  - A memorable event/disaster name makes the threat more 'real'
  - Planning prompts can help people to translate their intentions into actions and might be a great addition to risk communication as part of offering a guide for implementation
- Bad news.
  - What was the individual impact of intervention?
  - Unfortunately, we don't know the answer as no thorough testing was done due to the emergency of the situation
  - Using social norms are powerful but the City of Cape Town removed the 'red dots' for extremely high usage households as it lead to unintended 'social' consequences, highlighting the importance of monitoring the impact of interventions and amending them where necessary

**Direct  
impact of  
SBC in  
Action.**

# Iron and folic acid consumption.

## Descriptive norms

- People's perceptions about the prevalence of a behaviour.<sup>8</sup> When people believe most other people engage in a particular behaviour, descriptive norms are said to be high. Conversely, descriptive norms are low when people believe a particular behaviour is uncommon.

## Injunctive norms

- Social pressure people feel to conform. When people believe that other people expect them to behave in a certain way, injunctive norms are said to be high. So-called peer pressure is another term used to describe injunctive norms.<sup>8</sup>

## Collective norms

- The actual prevalence of a behaviour.<sup>9</sup> Whereas descriptive and injunctive norms relate to people's perceptions and beliefs, collective norms describe the extent to which a particular behaviour is common in an area. High collective norms signify a high proportion of people in an area engaging in the particular behaviour.

To bring about change in descriptive norms – “**more and more women** were beginning to consume iron and folic acid to reduce anaemia”.

To bring about change in injunctive norms – materials depicted **the level of support** that women of reproductive age could expect to receive from others in their communities

# Iron and folic acid consumption.

315% increase in iron and folic acid consumption!

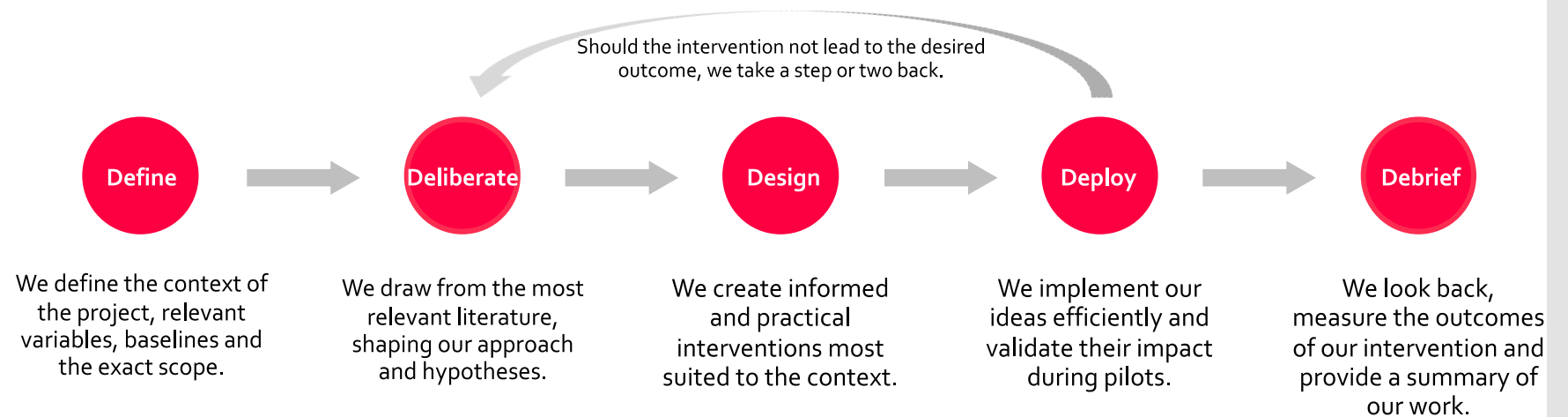
Social norms can be significantly improved to elicit positive behavioural change for health and nutrition

By using a seemingly small messaging or communication change around social norms (descriptive and injunctive), a very large impact can result.



# The importance of process.

- Our five dimensional project framework allows us to incorporate scientific rigour into our work to deliver actionable insights and create impactful solutions



# Experimentation.



# Nudging with MINDSPACE.

<b>M</b> essenger	We are heavily influenced by who communicates information to us
<b>I</b> ncentives	Responses to incentives are shaped by mental shortcuts e.g. avoiding losses
<b>N</b> orms	We are strongly influenced by what others do
<b>D</b> efaults	We 'go with the flow' of pre-set options due to inertia
<b>S</b> alience	Our attention is drawn to what is novel and relevant to us
<b>P</b> riming	Our behaviour is influenced by sub-conscious cues
<b>A</b> ffect	Emotional associations can powerfully shape our actions
<b>C</b> ommitment	We seek to be consistent with our public promises and reciprocate acts
<b>E</b> go	We act in ways that make us feel better about ourselves



Don't forget  
the last 'D'!



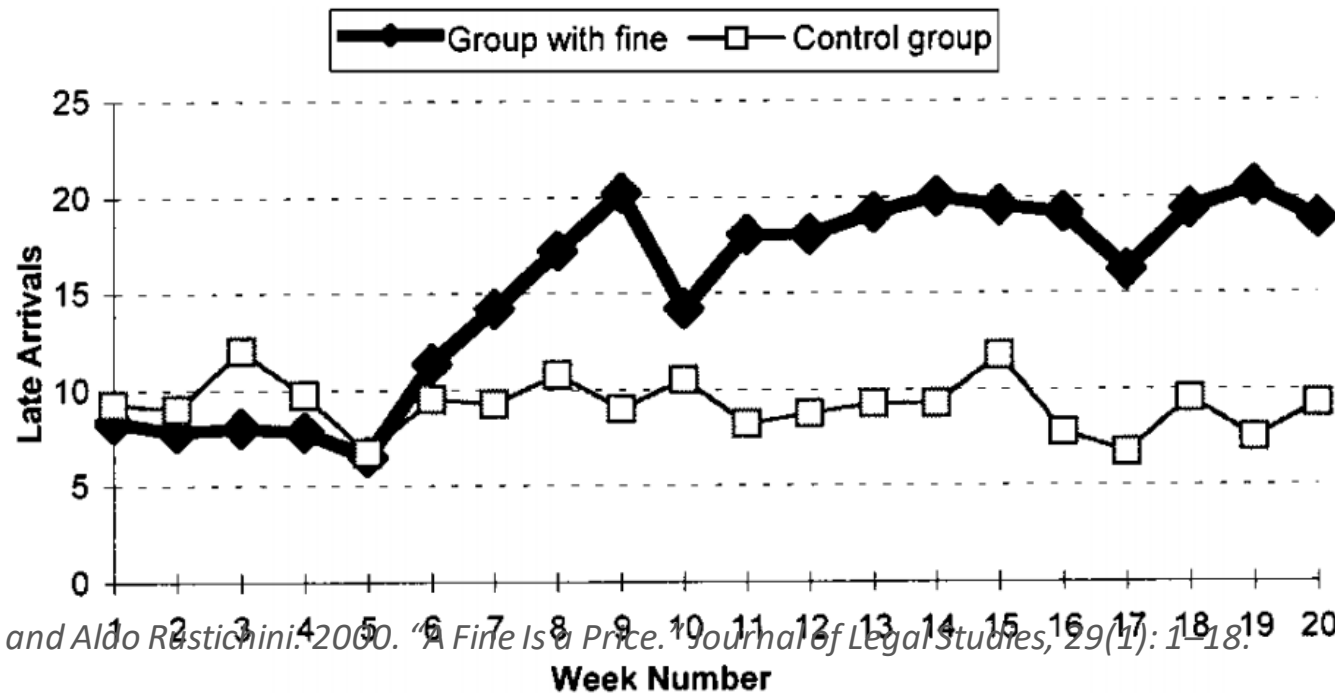
# Israeli day care study.

- Gneezy and Rustichini (2000) conducted a study in Israeli day care
- The aim was to reduce the number of parents arriving late to pick up their children from day care
- The intervention was very simple: Introduce a late arrival fee

What do you think happened?

# Israeli day care study.

- Shortly after introducing the late arrival fine the number of parents arriving late to pick up their children *increased*



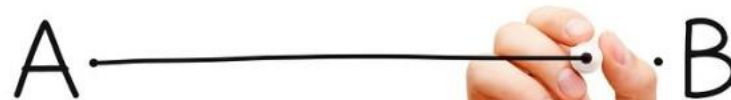
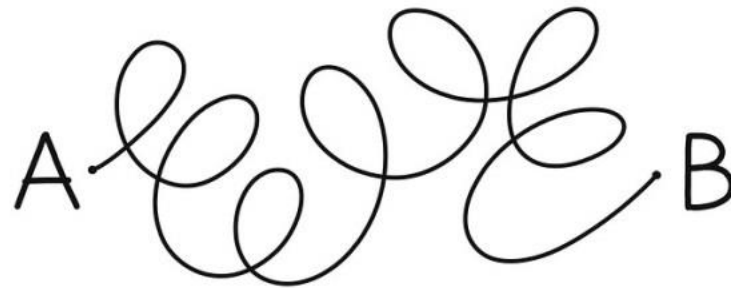
Source: Gneezy, Uri, and Aldo Rostichini. 2000. "A Fine Is a Price." *Journal of Legal Studies*, 29(1): 1-18.

# Spillover effects.

- Look at how one behaviour affects the next
- Spillovers are everywhere...
  - And have major implications
- In a universe of stakeholders – lots of room for unintended consequences or “spillovers”

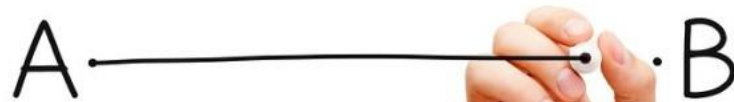
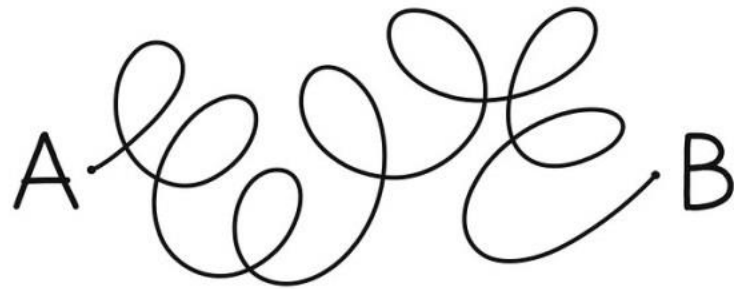
**Good to  
great.**

- The world of research, communication, and prosocial work is changing
  - Particularly significant for the ways we measure impact
  - Experimentation is being done in thousands of organisations, and communication teams have been doing this in some way, for ages



**Good to  
great.**

Every day, as consultants, we direct teams to where improvements must be made and improving measurable outcomes is the greatest application of the methods and processes of behavioural science. But these insights can be used to better understand yourself as well.



**ROSA**