On the Importance of Experimentation

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On the importance of experimentation

- *The limits of my language are the limits of my world.* (Wittgenstein)

- What do penicillin and the microwave have in common? (Alexander Fleming & Percy Spencer)
  - Failed attempts can also be a source of new knowledge

- We don't experiment enough

- Businesses reluctant to try new approaches
  - Belief that current approach is best
  - Historical circumstances, precedent, status quo, overconfidence
  - New approach might fail – insurance fraud example
  - If it hasn't been done, how do you know it works?

- Trying not the same as implementing
  - FB, Google, Uber, rugby unions, government BIT, Intuit

Experimentation a process of practical discovery

- Allows to stay ahead of the curve
  - Not one-off; allows to learn continuously. E.g. Blood registry
  - Try small, then scale up
  - Control crucial
  - Counterfactual thinking, e.g. pro rata

- Experimentation costly and time consuming, but….

- Cost of not experimenting?
  - Lost opportunities to become a market leader, decreased market share, e.g. Netflix
  - If a new policy implemented and not working, costs astronomical
  - But costs of experiment fixed and limited, and could be budgeted for

Experimenting in personal life

- Again – we don’t experiment enough
- Why?
- Costs vs benefits
  - Cost immediate – foregoing what I like
  - Fear of criticism or failure
  - Benefits, no matter how large, will be reaped far into the future.
  - Since people often care about the future to a lesser degree than about the present, it could be hard to overcome the status quo bias
- Overconfidence (even Yours Truly)
- Airport restaurant example – we learn something either way
- Experimentation not a fishing expedition
- Important: Experiment in both bad and good times, which is perhaps less obvious

- How to start experimenting?
  - Create a habit of experimenting
  - Break up projects into smaller tasks that you have control over
  - New strategies and approaches
  - Create theories/conjectures and test them

- How not to treat scurvy with salt-water
  - Knowing what does work is equally as valuable as knowing what does not work.

Causation in business

- Let’s say that we want to offer a promotion or discount to some of our customers. Our marketing department wants to maximize the delta, in other words, the increase in sales as a result of the promotion. So we need to decide which customers will give us the best return on our investment in the promotion or discount. Do we want to offer it only to our top 10% of your clients? Or the bottom 10%?

- You might assume that the users who drive more sales are the ones more responsible for your business success. However, this assumption could be wrong. The best choice of which customers to offer the promotion to might be totally different. In the absence of valid experimentation or analytics, you don’t have accurate answers to those questions.

Related cognitive biases

- **The illusion of causality.** Putting too much weight on your own personal beliefs, over-confidence, and other unproven sources of information often produce an illusion of casualty. An economic example is the recent housing bubble. Millions of people believed that buying a home for much more than its actual value would continue to result in a return on the investment just because that happened in the past.

- **Money.** You want to sell your product. You might spend more than your return on investment (ROI) on marketing and other business expenses if the desire to make money clouds your logic.

- **Major marketing implications.** Marketing statistics and data are often complicated and confusing. It can be easy to see relationships between changing sales numbers and the many other variables in your business when no causation exists.

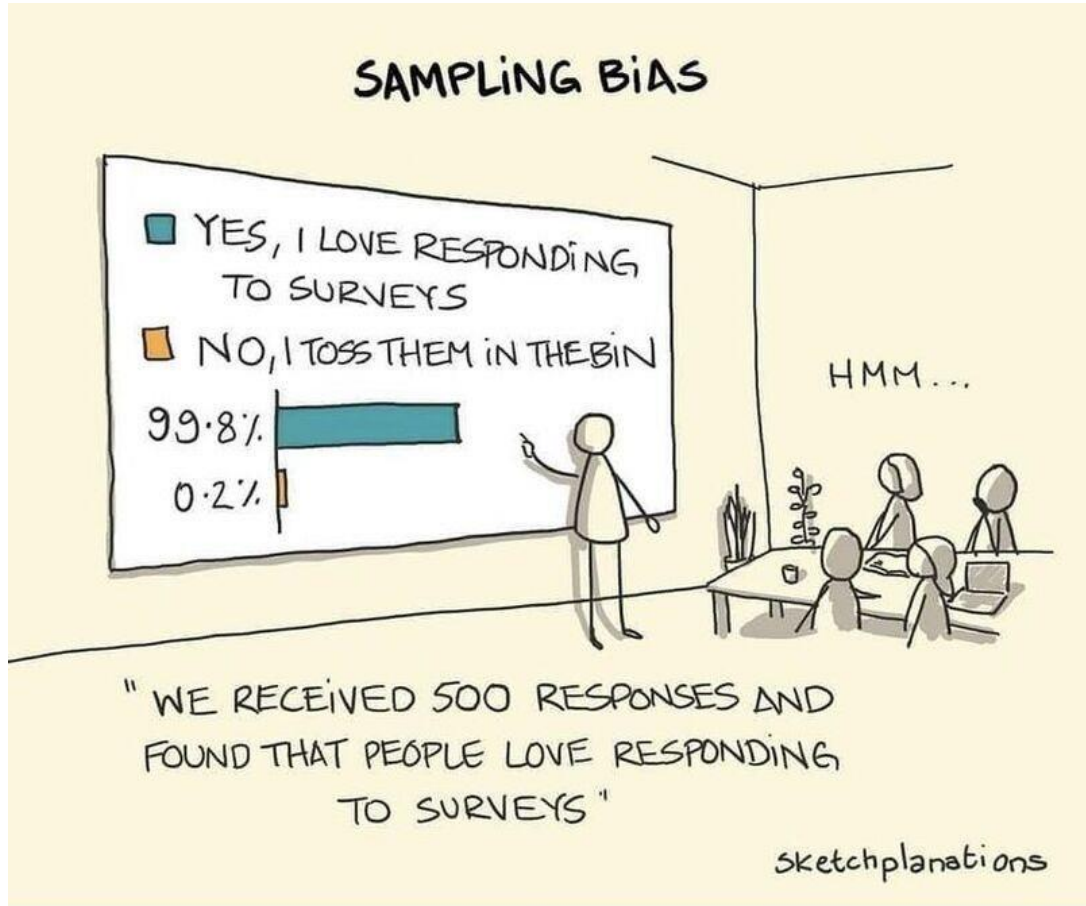
    - Omitted variable problem
    - Reverse causality

- https://towardsdatascience.com/correlation-is-not-causation-ae05d03c1f53

Reverse causality

Meatless Mondays

- Meatless Monday (MM) calls for skipping meat one day a week as a simple first step toward planetary health.
- Investigated the impact of the weekly MM newsletter and how participating in a meatless day influences dietary behaviors related to meat consumption.
- Analyzed responses (n=1,153) from a survey of MM e-newsletter subscribers.
- Participants who were practicing MM were ten times more likely to eliminate meat more than one day/week and twice as likely to eliminate meat entirely; eight times more likely to incorporate more meatless recipes at home; three times more likely to order more meatless meals when eating out. Participants who received the MM newsletter for more than one year were two times more likely to eliminate meat from their diet than those who received the newsletter for less than one.
- **Conclusion:** Eliminating meat one day per week increases the likelihood of further decreasing meat intake and making other dietary changes. MM offers a small-step strategy that leads to additional dietary changes. (!!!)
- https://www.sciencedirect.com/science/article/abs/pii/S1499404623002737



Alternative (and more accurate conclusions)

- People who participate in meatless Mondays also eat less meat on other days of the week: “people who eliminate meat on some days also participate in meatless Mondays“
- Since self-reported: “people who say they eat less meat during the week also say they like meatless Mondays“
- Or even better: People who googled meatless Monday and then signed up to receive a Meatless Monday newsletter and agreed to take a survey in this newsletter say they eat less meat as time goes on…

Experiments help us distinguish between correlation and causation

Experimentation for scientific purposes: Theory testing

- What is experimental economics?
- Methodology in which laboratory and field economies are created in order to conduct economic experiments.

  - Empirical tool that enables economists to understand the extent to which an individual's decision and behavior are affected by various testable factors

  →Data collection (decisions of real people) in a controlled, specifically designed environment in order to address economic research questions.

  - Setting captures essential elements of an economic problem (use theory as guidance)

Reciprocal Responses to Acts of Commission vs. Acts of Omission

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Reciprocity – why important?

- Incomplete contract enforcement device, e.g. labor markets
- Social norms enforcement
- Prevalent in many other social and economic transactions

- Intensity of reactions often depends on the perceived intent

- But intent could be hard to read out from actions
  - In law and culture intent inferred from **acts of commission and omission**
  - Status quo allows to distinguish whether an outcome achieved by taking a deliberate action (acts of commission) or by failing to do so (acts of omission)

- We study the extent of reciprocal reaction to actions that reveal kind or hostile intent versus those that do not
  - Central for understanding of the origins of reciprocal behavior.

Why experiment?

- In most everyday life examples acts of commission differ from acts of omission in some other aspect(s) of behavior
  - E.g. amount of effort necessary to take an action.

- Such confounds can cloud the intuition and make it hard to unambiguously attribute the causality solely to the difference between commission and omission

- Using a laboratory experiment we are able to control for such confounds by holding other aspects of the environment constant

Reciprocal responses & status quo

- *Do acts of commission which overturn the status quo, generate a stronger reciprocal response than acts of omission which uphold it?*

- Scenario 1: Your initial wealth is $100K and John's $100K
  (a) John had an opportunity to give you $10K and did not do so. Would you want to punish him?
  (b) Suppose now that John does give you $10K. Would you want to reward him?

- Scenario 2: Your initial wealth is $110K and John's $90K
  (c) John had an opportunity to take $10K from you but did not do so. Would you want to reward him?
  (d) Suppose now that John does take $10K from you. Would you want to punish him?

Reciprocal responses & status quo

- The two scenarios highlight the relationship between reciprocity and status quo (defined by ownership):

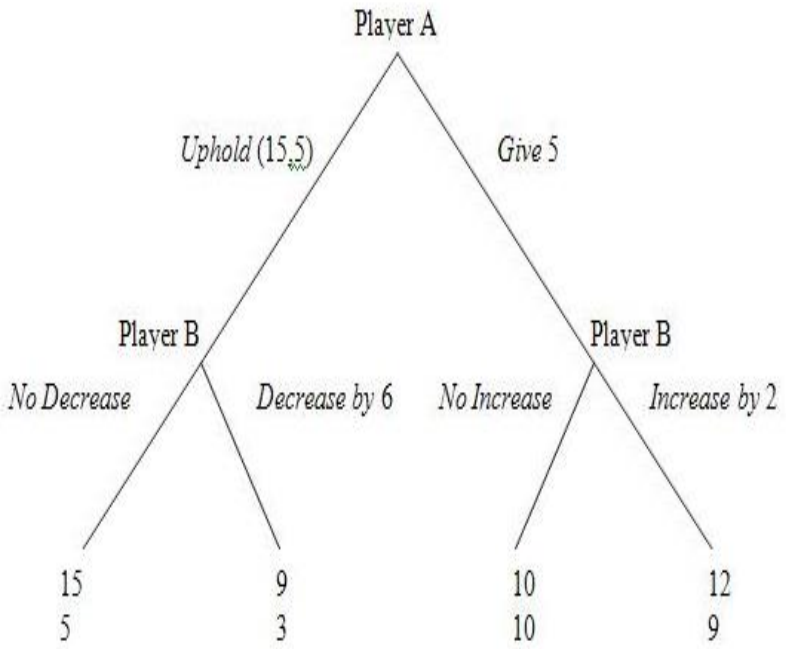
- Scenario 1: Status quo is that you did not own the $10K and John:
  - (a) did not give it to you (an act of omission)
  - (b) did give it to you (an act of commission)

- Scenario 2: Status quo is that you did own the $10K and John:
  - (c) did not take it from you (and act of omission)
  - (d) did take it from you (an act of commission)

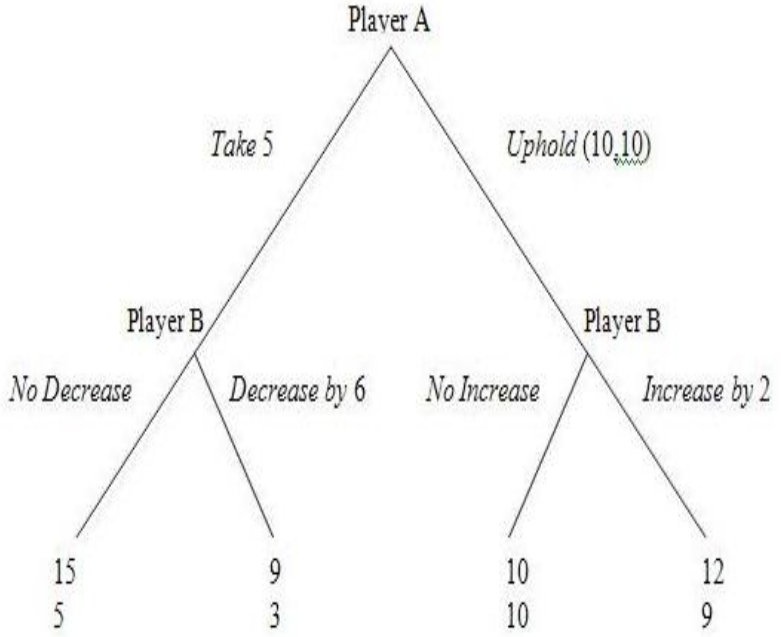
  - Compare 1a with 2d and 1b with 2c.
  - **Reactions to acts of commission that overturn the status quo can reflect concerns with (legitimacy of) notions of property rights. We also explore the effects of strength of attachment to property.**

Status quo treatments

$T_{15,5}$



$T_{10,10}$



What does theory tell us?

- Most models predict no diff. in recip. responses between $T_{15,5}$ and $T_{10,10}$
    - Economic man model
    - Nonreciprocal distributional preference theories
    - Belief-dependent reciprocity models
- Revealed Altruism (Cox, Friedman, Sadiraj, 2008) predicts different reciprocal responses between $T_{15,5}$ and $T_{10,10}$

Revealed altruism theory – Axiom S

- The opportunity sets identical in both treatments, but *the status quo set different*
  - Initial endowments in $T_{15,5}$ less generous to SM than in $T_{10,10}$

- Axiom S: *If the decision made by FM overturns the status quo then the reciprocal response will be stronger than when the status quo is upheld*

- Status quo defined by initial endowments
  - FM upholds status quo by offering SM the initial opportunity set → act of omission
  - FM overturns status quo by offering the other opportunity set → act of commission

→ Axiom S implies that our treatments are not isomorphic

Intuition

- SM will care about how the opportunity set actually chosen by FM compares to the other opportunity sets FM could have chosen and also how the chosen set compares to the status quo opportunity set

  → More rewarding following a kind act of commission

  → More punishment following an unkind act of commission

Implementation of status quo

- The key to testing of Axiom S is a successful implementation of status quo
  - In the field the status quo arises naturally
  - In the lab – stylized decision problems in which subjects often lack clear ex-ante expectations

- We use three design features to induce status quo
  1. Initial endowments – Discuss house money effect
  2. Labeling of actions
     - No change or give 5 in $T_{15,5}$ vs. take 5 or no change in $T_{10,10}$
  3. Entitlements
     - **Exp. #1**: Endowments assigned randomly
     - **Exp. #2** and #3: Strengthened entitlements to initial endowments by making the subjects earn the money in Day 1 laborious task (Tournament and Target)
     - Discuss earning, time, possession

Experiment 1 – RANDOM Endowments

- *Experiment 1 results – Player As*

	RANDOM $T_{15,5}$ (n= 33)		**RANDOM $T_{10,10}$** (n= 34)	
	Give 5	**Uphold (15,5)**	**Uphold (10,10)**	**Take 5**
Frequency	63.6%	36.4%	23.5%	76.5%
Fisher's test	0.001			

Experiment 1 results – All Player Bs

	No Decrease	Decrease by 6	No Increase	Increase by 2
	All Player Bs			
RANDOM $T_{15,5}$ *(n=33)*	78.8%	21.2%	63.6%	36.4%
RANDOM $T_{10,10}$ *(n=34)*	58.8%	41.2%	94.1%	5.9%
Fisher's test	0.004 (two-sided for strategies)			

- Strategies: ND-NI, ND-IB2, DB6-NI, DB6-IB2
- Strong support for Axiom S

Discussion

- Reciprocal people sensitive to acts of commission that overturn status quo

- In Revealed Altruism – status quo imposed exogenously

- Establishing status quo is the key to the empirical bite of Axiom S and the intensity of reciprocal reactions towards acts of commission

- Our experiment develops a procedure that identifies status quo naturally
  - A combination of initial endowments and appropriate labeling of actions that framed the game in terms of monetary transfers.
  - Actions of active behavior, such as giving or taking, stand in stark contrast with inaction

- Think about why the punishment for not carrying out a contract are lower than for violating property rights, e.g. theft

Future research

- Is this all it takes to establish status quo in general environments?
  - Probably not
  - Experience, habits, customs and norms likely to play an important role
  - Subsequent experiments – induce status quo through repeated play

- Thank you!