

Behavioral economics **methods**:

Theory and Experiments

Experiments are crucial for testing predictions of models (**Theory**).

Theory gives understanding of experimental finding and allows us to derive novel predictions to test experimentally.

What really makes an experiment good?

A good design:

- Is **simple compared to reality** and even simpler than relevant models.
- Is **designed to test specific hypothesis** or set of hypotheses.
- **Tests or controls for alternative hypotheses.**

Experimental design:

- **different treatments to compare with a control.**
- **Subjects:** undergraduates/ professionals/individuals in their natural context.
- **Direct control, Randomization or Matching**
- **Within-subject design:** participants make decisions in all treatments.
- **Between-subject design:** different participants make decisions in each treatment.
- **More Design Choices:** One round versus many rounds? (With implications for learning!).
- **Incentive-compatibility using money. Pay one (randomized) round or all rounds?**
- Use language that is neutral.
- Instructions and Anonymity.
- **Replication**

Types of experiments

- **Lab experiments:** is one that employs a standard subject pool of students, an abstract framing, and an imposed set of rules;
- **Field experiments** (Harrison & List, 2004):
 - **Artefactual field experiments:** is the same as a conventional lab experiment but with a nonstandard subject pool;
 - **Framed field experiments:** is the same as an artefactual field experiment but with field context in either the commodity, task, or information set that the subjects can use;
 - **Natural field experiment:** is the same as a framed field experiment but where the environment is one where the subjects naturally undertake these tasks and where the subjects do not know that they are in an experiment.

Lab experiment

- **Individual Decision Experiments:** Risk Attitudes and Stochastic Choice → Methods of measuring individual risk attitudes
- **Game experiment:**
 - Games of cooperation like Prisoner Dilemma or Public Good Games → Methods of measuring *Cooperation and Altruism*
 - Dictator Game, Ultimatum Game, coordination games → methods of measuring *bargaining*: whether and to what extent players in experimental games behave according to the predictions of the conventional game theory
- **Market experiments** are policy-oriented experiments and explore whether and how experimental markets reach equilibrium.
- **Experimental Herding:** Analyse the herding behaviour in the laboratory.
- **Neuro-Economics:** Neuro-Biological basis of human behaviour, based on laboratory experiments.

Let us see the theory and the predictions that we are testing with this experiment: they come from standard game theory.

Prisoner Dilemma

		Player 2	
		Not confess	betrays
Player 1	Not confess	-1,-1	-3,0
	betrays	0,-3	-2,-2

Nash Equilibrium

Nash equilibrium is the most common way to define the solution of a non-cooperative game involving two or more players. In a Nash equilibrium, each player is assumed to know the equilibrium strategies of the other players, and no one has anything to gain by changing only one's own strategy.

If this were not the case, then we might expect that someone would change the strategy to increase the payoff.

The Nash equilibrium requires then that:

$$u_i(s_i, s_{-i}) \geq u_i(s, s_{-i})$$

for any person i where s_i is the strategy they do choose, and s is any other strategy they might have chosen.

Pareto Efficiency

We say that an outcome is Pareto efficient if no one could be made better off without making someone worse off (formalize something that is desirable vs something that is not desirable).

Simple heuristics for complex choices

Chapter 2

The complexity of everyday choices

- *Should she purchase the cereal she typically buys?*
- *Should she consider trying a new cereal that the store has recently introduced?*
- *Is it a good idea for her to buy the cereal on special offer?*
- *Will the cereal she usually purchases be on special offer next week?*
- *Is it cheaper in another store?*
- *Should she be enticed by the cereal with a chance to win a Caribbean holiday?*



A **heuristic** is any ‘rule of thumb’ or simple rule of behavior by which a person solves a problem.

Why are heuristics more realistic than a standard maximization process?

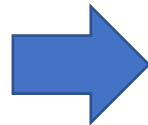
Utility Maximization

People want to **maximize utility**, where *utility measures how much satisfaction/happiness someone gets from a particular combination of money and goods*.

Example: Anna deciding what breakfast cereal to buy

$$U(x, TQ, HQ) = 20\sqrt{x} + 2TQ + HQ$$

Product	Price	Taste	Health
Budget	\$1	1	1
Nutty	\$3	2	2
Honey	\$4	3	2
Superior	\$6	3	3



Choice	Wealth	TQ	HQ	Utility
No cereal	\$100	0	0	200
Budget	\$99	1	1	202
Nutty	\$97	2	2	203
Honey	\$96	3	2	204
Superior	\$94	3	3	203

Why may we not use maximization?

The maximization process doesn't consider constraints of time, knowledge, and computational capacities that real humans face.

In the example, maybe consumer has never tried Budget or Superior, or maybe she/he did try them once but has forgotten what they tasted like, her/his preferences have changed, or the manufacturers have subsequently improved the quality.

On many occasions there might be too many options or the situation might be too complex for our computational capacity, and an eventual proper maximization, if possible, would take a lot of time.

Utility and Search

Consider a consumer that doesn't know what goods to consume in order to maximize utility: she/he does not know the quality of goods, or her/his utility function, then she/he can gather more information in order to become better informed.

This means she needs to search.

“**Search heuristic**” is a simple *rule for searching new information when choosing*.



Heuristic processes can be defined as **problem-solving methods** which *tend to produce efficient solutions to difficult problems by restricting the search through the space of possible solutions*.

Search heuristics

- **Try them all**

This does not minimize the cost of search in terms of forgone utility, money, time

A good search heuristic needs to trade off the benefits of acquiring more information with these costs.

Search heuristics

- **Satisficing** (*Simon, 1955*)¹

Try different goods until you find one that meets your aspiration level.

This relaxes the objective from finding the optimal choice, to merely finding a choice that is good enough. This avoids excessive search. However, how close satisficing comes to the optimum will depend on the aspiration level: how it is set and updated.

Limit: What should I try next if the aspiration level is not satisfied?

¹Simon, H. A. 1955. "A Behavioral Model of Rational Choice." Quarterly Journal of Economics, 69: 99–118.

Search heuristics

- **Directed cognition**

A person treats each chance to gather information as if it is the last such chance before they have to make a choice.

Cognitive resources should be allocated just like other scarce resources. Cognitive operations include the different thought processes that agents use to deepen their understanding of a given problem.

Search heuristics

- **Elimination by aspects**

This considers the aspects of possible choices one by one and sequentially eliminates choices that fall below some aspiration levels.

- **Search for x minutes**

Give certainty how long search will last

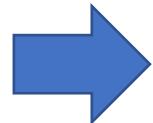
Five search heuristics

Heuristic	What it does well	What it does not do so well
Try them all	Make the person well informed	Minimize the cost of search
Satisficing	Say when to stop search	Say what choice to try next
Directed cognition	Suggest what choice to try next	Give a forward looking plan of search
Elimination by aspects	Say what choices not to try	Say when to stop searching
Search for x minutes	Give certainty how long search will last	React to success or failure in search

Choice arbitrariness

- When involved in search a person's choice will often be arbitrary. But arbitrary does not mean random.
- Conflicting versus non-conflicting choice
 - Get violation of the regularity condition, i.e. irrelevant (e.g. dominated) options should not affect choices.
- Trade-off contrast hypothesis
 - A product with a desirable quality appears cheaper if contrasted with a product where the quality is more expensive.

Product	Price	Taste	Health
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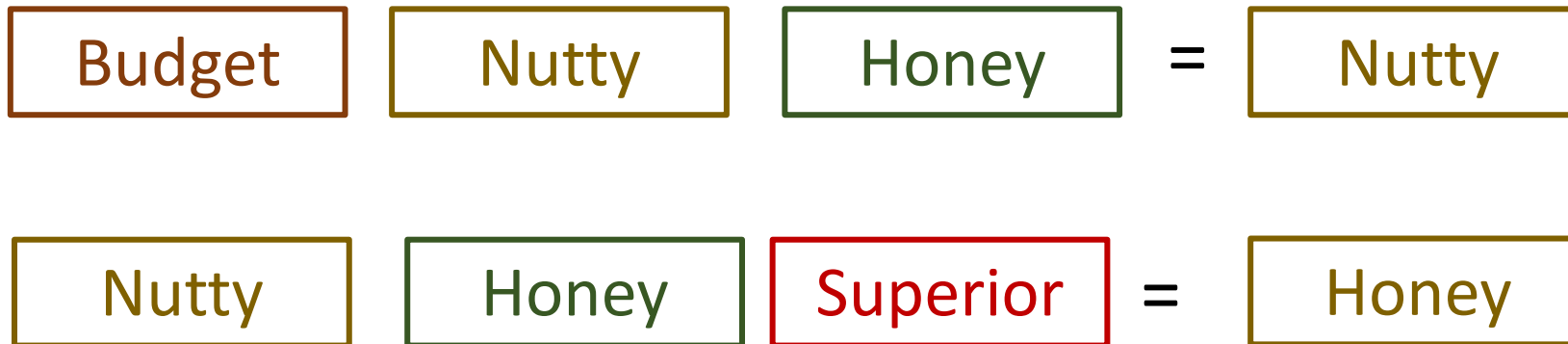


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Trade-off contrast hypothesis

A product with a desirable quality will appear cheaper if contrasted with a product where that desirable quality is more expensive.

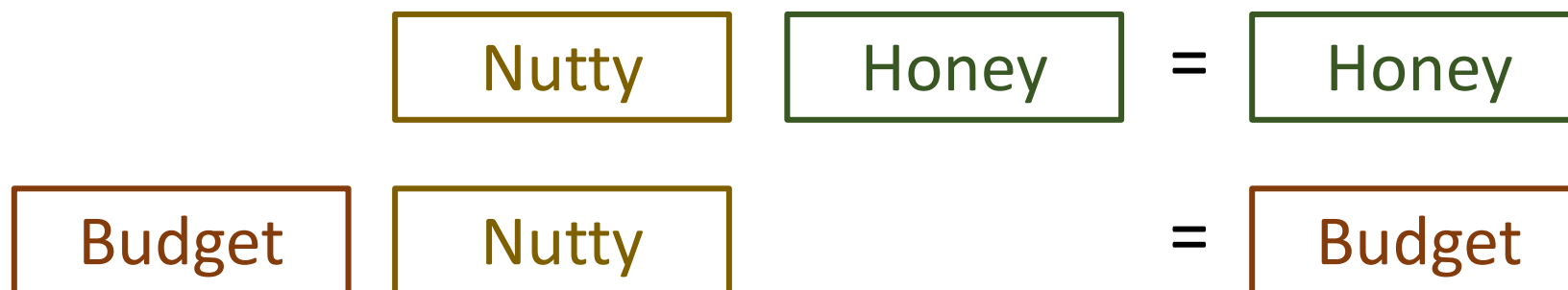
If all products are displayed, buy the one 'in the middle'.



Extremeness aversion with compromise

(B=cheap, H=tasty, N= compromise)

- In a straight choice would buy a product at the extreme

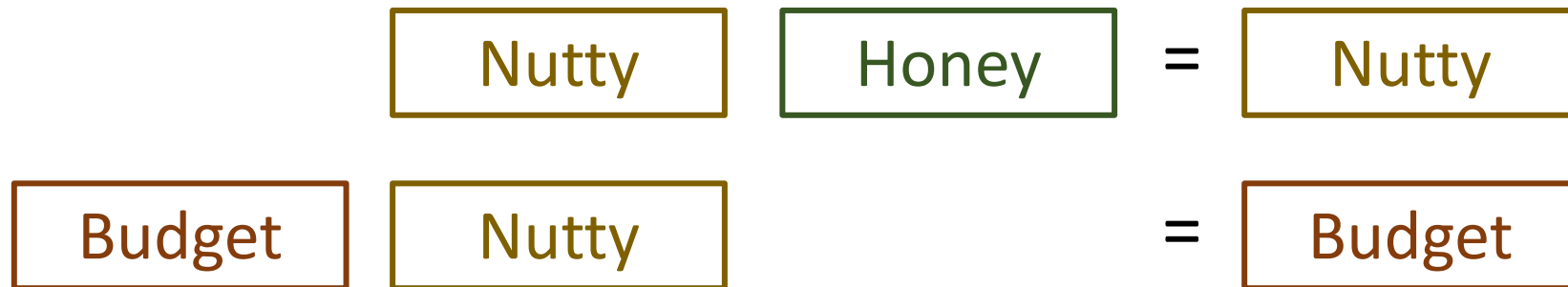


- If all products are displayed, buy the one 'in the middle'.



Extremeness aversion with polarization

- In a straight choice would buy a product in the middle or lower end



- If all products are displayed, buys the one at the extreme.



Choice-reject discrepancy

- If asked to choose what to do a person may choose the option that 'stands out'.
- If asked to choose what not to do a person may choose the option that 'stands out'.
- But, this means a person may choose to not do the same thing as he chooses to do!
- This is a violation of procedural invariance.

Anchoring effect

- A person's thoughts on a particular product are influenced by some prior event.

Context and framing effects

- An external factor like the choices on offer or the way things are framed can influence choice.
- The context and frame influence initial perceptions and intuition which influences reasoning.

Perception

System 1: intuition

System 2: reasoning

These systems are fast, automatic, effortless and may depend on current emotions. Thoughts come to mind spontaneously and generate impressions of the attributes of objects.

This system is slow, effortful, deliberate and not so dependent on emotion. It can generate impressions and judgments.

Contingent valuation

- There are different techniques for estimating the value of something.
- Willingness to pay: How much someone is willing to pay to get an extra unit of the good.
- Willingness to accept: How much someone would accept rather than have one more unit of the good.
- Because of the endowment effect $WTA > WTP$.

Endowment effect: *people are more likely to retain an object they own than acquire that same object when they do not own it.*

Efficiency vs Correct Judgment

We have learned a bit more about the **structure of heuristics: how we actually think.**

Heuristic processes can be defined as problem-solving methods which tend to produce efficient solutions to difficult problems by **restricting the search through the space of possible solutions.**

The same restriction on search which increases efficiency may, at times, result in individuals **ignoring or misusing information in reaching a judgment** or achieving a solution to a problem. (vs ecological rationality)

We will now focus on **the consequences of heuristics: bias.**