WHAT IS BEHAVIOURAL ECONOMICS?

- Economists develop theories to describe and explain human behaviour that involves the allocation of scarce resources
- There are different ways we characterise a model/theory in economics

NORMATIVE VS. DESCRIPTIVE

- Normative Theory → captures how people should make decisions
- Descriptive Theory → describes how people in fact make decisions

NEOCLASSICAL VS. BEHAVIOURAL

Neoclassical Model	• Characterised by its commitment to rationality assumptions • Dominates mainstream economics and thus is often referred to as a standard model • Make predictions under assumptions that people are rational
Behavioural Model	• Attempts to increase the explanatory and predictive power of economic theory • By providing it with more psychologically plausible foundations • Changes rationality assumptions to more plausible ones to accurately describe behaviour

NEOCLASSICAL ECONOMISTS vs. BEHAVIOURAL ECONOMISTS

Neoclassical economists believe that:	Behavioural economists believe that:
• People by and large act in the manner that they should • The neoclassical models are both normative and descriptive • Deviations from perfect rationality are so small or so unsystematic → hence can simply neglect them	• The deviations from rationality are large enough, systematic enough and consequently predictable enough • This warrants the development of new descriptive theories • In many cases normativity and adequate descriptivity cannot be embodied in the same theory • Behavioural approach extends rational choice and equilibrium models → does not advocate abandoning them entirely

RESEARCH METHODS

- Laboratory experiments
- Field studies → data collected in real-world environments
- Field experiments → experimentally examine an intervention in the real world
- Laboratory experiments in the field
- Neuroeconomics

LABORATORY EXPERIMENTS

Psychology Experiments	Economics Experiments
• Flat-fee payments • Hypothetical context • Use deception	• Choice-dependent payments • Context-free/neutral • Prohibit deception

THEORETICAL AND EMPIRICAL APPROACHES

Empirical → Theoretical	Use theoretical models to abstract and formalise phenomena observed in empirical studies
Theoretical → Empirical	Use theoretical models to generalise predictions that are testable by empirical studies

Neoclassical Economics and Opportunity Cost

Opportunity Cost = the cost of the most valuable alternative

Imagine that you have $10,000 to invest. You can choose between

1. Stocks → you will receive $11,000 after a year
2. Real estate → you will receive $10,900 after a year
3. Bonds → you will receive $10,150 after a year

If there is no risk or uncertainty involved (we will discuss that later), what is the economic profit of investing in real estate?

Economic profit is -$100 because you subtract the opportunity cost from profit

- Neoclassical economics believe economic profit considers opportunity costs
- Most valuable alternative gives greater return → hence economic profit is negative
- Value of next best alternative refers to the net value → not just the benefit
- However, not all behaviour is motivated by, or considers, opportunity cost

FIELD STUDY: TAXI DRIVERS

- New York City cab drivers operate with a daily income target
- As a result, they work fewer hours on more profitable days (e.g. rainy) and more hours on less profitable days
- Fee is higher on profitable days → fewer hours needed to reach target
- According to concept of opportunity cost they should be doing the opposite
  - Opportunity cost of taking time off is higher on profitable days
  - Hence, should be working more on profitable days

FAILURE TO CONSIDER OPPORTUNITY COSTS

Why do people overlook opportunity costs:

1. It's mentally costly to consider many different alternatives
   - Although, the theory does not say all alternatives have to be considered
2. It's demanding to require that one never choose an alternative when its opportunity cost > benefit

Neoclassical Economics and Sunk Cost

Sunk Cost = a cost that has already incurred and cannot be recovered

Imagine that you paid $100 for a basketball ticket. The ticket cannot be re-sold or given away. Unfortunately, there is a huge snowstorm on the day of the game.

- Would you choose to drive an hour and go to the game?
- Now Imagine that the ticket instead was given to you for free. Would you be more or less likely to go to the game?

Choice between the two shouldn't matter because ticket price is a sunk cost

- Neoclassical economics believe sunk costs don't affect decisions or choices
- Normative theory on how economists think people should behave
- However, it's not exactly how people do behave

EXAMPLE: THE F-35 PROGRAM

- F-35 is the US military's fighter jet
- Project was $160 billion over budget by 2014 and plagued with technical difficulties
- Critics argued it needed to be cancelled
- Officer in charge of program said that they "have no choice but to continue with the program" because of how much they had spent already

Preferences and Choices

- Economists use preferences to understand and analyse people's decision-making process
- Theory of rational choice → specifies what types of preferences are considered to be rational in neoclassical economics

Theory of Rational Choice - (Neoclassical)

PREFERENCES

- A relation that ranks alternatives according to their desirability to the decision-maker
- Alternatives are typically consumption bundles (e.g.) x and y

Weak Preference	$x \succsim y$		"x is at least as good as y"
Strict Preference	$x \succ y$	$x \succ y \iff x \succsim y$ $but\ not\ \ y \succsim x$	• "x is strictly preferred to y" • Equivalent to "x is weakly preferred to y but y is not weakly preferred to x"
Indifference	$x \sim y$	$x \sim y \iff x \succsim y \ \ and \ \ y \succsim x$	• "x is indifferent to y" • Equivalent to "x is weakly preferred to y and y is weakly preferred to x"

RATIONAL PREFERENCES

The preference relation $\succsim$ is rational if it has the following two properties:

Completeness	For all $x, y \in X$ we have that $x \succsim y$ or $y \succsim x$ (or both) • Either weakly prefer x or weakly prefer y or both (indifferent) • A relation between preferences exists and is well-defined
Transitivity	For all $x, y, z \in X$ if $x \succsim y$ and $y \succsim z$ then $x \succsim z$ If x is weakly preferred to y and y is weakly preferred to z, then x must be weakly preferred to z

RATIONAL PREFERENCES: IMPLICATIONS

If $\succsim$ (weak preference relation) is rational then:

$\succ$ strict preference relation is:		**$\sim$ indifference relation is:**	
Irreflexive	$x \succ x$ never holds	Reflexive	$x \sim x$ for all x
Transitive	If $x \succ y$ and $y \succ x$ then $x \succ z$	Transitive	If $x \sim y$ and $y \sim x$ then $x \sim z$
Anti-Symmetric	If $x \succ y$ then $y \succ x$ never holds	Symmetric	If $x \sim y$ then $y \sim x$

INDIFFERENCE CURVES

- Preferences relations are illustrated using indifference curves
- **Indifference Curve** → represents different consumption bundles between which the consumer is indifferent
- Bundles on curves further from origin are strictly preferred to bundles closer to origin
  - Further the curve from origin → greater the preference
  - Only if people prefer more of each good to less
  - Opposite holds if people prefer less of each good

UTILITY

- A numerical value indicating a consumer's relative well-being
- Utility function → mathematical formula that assigns a utility value to each consumption bundle
- Different functions could represent the same preference relation → functions are not unique

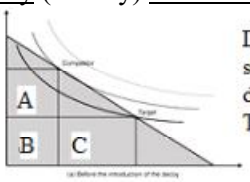
MENU DEPENDENCE AND DECOY EFFECT

Menu Dependence	People exhibit this if their preferences over the same alternatives change as the menu changes
The Decoy Effect (or Attraction Effect)	A product appears to be more attractive to consumers with the presence of a dominated option → an option that is inferior in every dimension • Decoy must be strictly dominated in every situation • Existence of decoy forces consumer preferences to change

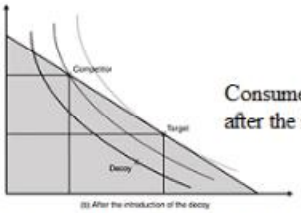
EXAMPLE: DECOY

Decoy must be placed where it is asymmetrically (strictly) dominated by competing product.

Suppose you are trying to market a car called the Target, and another company sells a similar car called the Competitor. They differ along two dimensions/attributes (e.g., speed and safety).
A consumer with the indifference curves below will choose the Competitor. If you want to manipulate the consumer's choice by introducing another product, should you choose along the two dimensions so that it is in the box A, B, or C?



Decoy should be in box C which is strictly dominated by the Target. Hence, decoy will increase attractiveness of Target but not of Competitor.



Consumer's indifference curves change after the introduction of the decoy

Indifference curves should be tangent with the consumer's most preferred choice, but also pass through the other choice

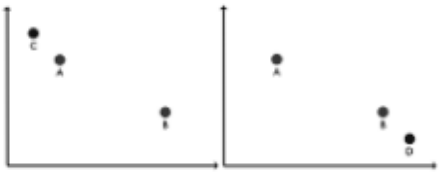
MENU DEPENDENCE AND COMPROMISE EFFECT

Another form of menu dependence is the compromise effect which is sometimes described as a result of extremeness aversion.

The Compromise Effect	People's tendency to choose an alternative that represents a compromise or middle option in the menu
Extremeness Aversion	A tendency for people to avoid options at the extremes of the relevant dimension

EXAMPLE: ELECTRONIC STORES

- Electronic stores often stock very expensive items that very few people will purchase, and avoid stocking very cheap items
- One reason is to make fairly expensive items look like a safe middle option



- C and D are extreme options that are rarely chosen.
- However, with the presence of C, A is more likely to be chosen.
- With the presence of D, B is more likely to be chosen.

EXPLANATION: REVEALED OR CONSTRUCTED PREFERENCE?

- Neoclassical model assumes preferences are complete/well-defined and revealed from people's choices
- Alternatively, maybe some people have no clear preferences over some options and their preferences are constructed as part of the choice
- Preferences can potentially be constructed as part of the decision-making process
- Not a violation of revealed preferences or rational choice → preferences constructed at same time as choice

Base-Rate Neglect

The judgement we make in situations should reflect three different factors:

- The base rate;
- The evidence;
- The conditional probabilities that we would see the evidence when the hypothesis is true and when it is false

BASE-RATE NEGLECT/FALLACY

- Committed when failing to take the base rate properly into account
- If presented with related base rate information and specific information, the mind tends to ignore the former and focus on the latter
- Leads to neglecting of the base rate → widely overestimates probability

EXAMPLE: TERRORIST IDENTIFICATION

Assume that 10 out of 10 million people in London are terrorists. Assume also that police officers are extraordinarily competent, so that their assessments are correct 99.9% of the time. What is the probability that a randomly selected Londoner, identified by the police as a terrorist, in fact is a terrorist?

$$
\begin{aligned}
&\Pr(\text{Terrorist}|\text{Id}) \\
&= \frac{\Pr(\text{Id}|\text{Terrorist}) \times \Pr(\text{Terrorist})}{\Pr(\text{Id})} \\
&= \frac{\Pr(\text{Identified}|\text{Terrorist}) \times \Pr(\text{Terrorist})}{\Pr(\text{Id}|\text{Terrorist}) \times \Pr(\text{Terrorist}) + \Pr(\text{Id}|\text{NonTerrorist}) \times \Pr(\text{NonTerrorist})} \\
&= \frac{0.999 \times 0.000001}{0.999 \times 0.000001 + 0.001 \times 0.999999} \\
&\approx 0.001
\end{aligned}
$$

Confirmation Bias

WASHING OUT OF THE PRIORS

- Probability theory → represents a hopeful picture of human nature
- When rational people are exposed to the same evidence, over time they come to agree regardless of their starting point
- If presented with the same evidence over time → will reach the same conclusion in the end

CONFIRMATION BIAS

The tendency to search for, process, interpret and recall information in a way that confirms one's prior beliefs.

- Biased search for information
- Biased interpretation
- Biased memory

Confirmation bias can explain a whole range of phenomena (e.g.) why racist and sexist stereotypes persist over time, why conspiracy theories survive

Biased Search for Information	People tend to test hypotheses in a one-sided way, by searching for evidence consistent with their current hypothesis
Biased Interpretation	Even if two individuals have the same information, the way they interpret it can be biased
Biased Memory	People may remember evidence selectively to reinforce their expectations, even if they gather and interpret evidence in a neutral manner

EXAMPLE: UPDATING WITH CONFIRMATION BIAS

- Bayensian updating predicts that the priors wash out as people are exposed to more evidence (left)
- In the presence of confirmation bias, people's beliefs change as they are exposed to more evidence (right)