Beautiful Mind or Sleepy Hollow?

Your predictably irrational thinking
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Your predictably irrational thinking

Optical illusion as an analogy

- You know these three …
- But you still “see” the illusions
- And need to “forcibly correct” for it
- Once aware of behavioural biases there’s a chance of overcoming

Inspirations for our ideas

Books ... and colleagues

THINKING, FAST AND SLOW
DANIEL KAHNEMAN

PREDICTABLTY IRATIONAL
DAN ARIELY

Winners of the Nobel Prize in economics

The Hidden Forces That Shape Our Decisions
Behavourial Economics
Economics gradually reinventing itself

Previous economics orthodoxy:
- Rational and self-interested agents
- Only asymmetry of information or power matters
- Natural optimisation assumed within the constraints

“*The radical insight of behavioural finance is that people are human*”
  – Werner De Bondt

“I have learned from my mistakes, and I am sure I can repeat them exactly”
  – Peter Cook

Increasingly:
- Heuristic and biases
- Consistent, predictable irrational behaviour
- Now not just “what” but more “why”

Inattentive blindness
Working memory capacity

A short video
- Many examples on YouTube
  - Colour changing card trick
  - Person-change door study
Kahneman’s Two Systems
Seems we’ve all got them!

**System 1**
**FAST**
- Automatic
- Frequent
- Emotional
- Intuitive
- Subconscious

Happens to you

**System 2**
**SLOW**
- Effortful
- Infrequent
- Logical
- Calculating
- Conscious

You do it

More on System 1
Rolling whenever we’re awake

- “Normality” model - quickly senses items out of context/norm
- Associative, detects simple relationships - “these are all alike”
- Seeks coherence (eg Taleb’s narrative fallacy)
- First impressions accepted as simple truth (plus the halo effect)
More on System 1

Rolling whenever we’re awake

- After few repetitions, experience feels normal (law of small numbers)

- Assumes the information available is complete (WYSIATI)

- Ambiguous or missing info automatically filled by something similar

- Skill- and intuition-based

More on System 1

Rolling whenever we’re awake

- Incapable of conscious doubt - making an unconscious choice
- Doesn’t keep track of alternatives rejected (or that alternatives existed)

Maintaining multiple incompatible alternatives at the same time requires mental effort
More on System 1

Rolling whenever we’re awake

“If you can’t solve a problem, then there is an easier problem you can solve: find it”
– George Pólya

<table>
<thead>
<tr>
<th>Target Question</th>
<th>Substitute Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>How happy are you with your life these days?</td>
<td>What is my mood right now?</td>
</tr>
<tr>
<td>How should financial advisors who prey on the elderly be punished?</td>
<td>How much anger do I feel when I think of financial predators?</td>
</tr>
<tr>
<td>How much would you contribute to save an endangered species?</td>
<td>How much emotion do I feel when I think of dying dolphins?</td>
</tr>
</tbody>
</table>

A modern metric for global significance

Toilet Paper Orientation Index (TPOI)

“Toilet Paper Orientation” has 21 Wikipedia Pages (Define TPOI=1.00)
Other TPOIs: “General Insurance” 0.05, “Actuary” 0.52
“GIRO” (as we know it) 0.00
The Survey
We'll be showing some results

- **Purpose**: to attempt to recreate results from previous studies
  - To back up Behavioural Finance theories
  - To show that LCP’s staff and friends are also susceptible

- 13 questions
  - Often an (a) and (b) variety eg Q1(a), Q1(b), ...
  - Randomised so that each person received one variety of each question

- Question order randomised

- 50 respondents – both Actuaries and non-Actuaries

Availability

TPOI: 0.33
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 antinuclear demonstrations. Which do you think is the most likely?

1. Linda is a bank clerk

2. Linda is a bank clerk and is active in the feminist movement

- % Option 2: 30%
Availability

The theory

- People will often give a higher probability to a scenario that they find easier to imagine
- People don’t like negative events
- Strong link to WYSIATI
- Confidence increases once an estimate has been made

Examples

- Terrorism vs all risk
- Plural of “anecdote” is assumed to be “data”
- Media coverage distorts perception of true probabilities

Anchoring

TPOI: 0.33
Anchoring

The questions ...

- **Group A**: Is the average maximum UK temperature in August more or less than 30 degrees Celsius? What do you think the true value is?

- **Group B**: Is the average maximum UK temperature in August more or less than 10 degrees Celsius? What do you think the true value is?

Anchoring

The results

- **Group A**: Is the average maximum UK temperature in August more or less than 30 degrees Celsius? What do you think the true value is?
  - Average response: **24.2**

- **Group B**: Is the average maximum UK temperature in August more or less than 10 degrees Celsius? What do you think the true value is?
  - Average response: **19.7**
Anchoring

Distribution of results

Distribution of temperature estimates

- Group A
- Group B

People struggle to deviate from a number recently seen
- Theory holds even when the number is unrealistic or unrelated

Examples
- German judges
- Estate agents
- Capping benefits (or insurance pay-outs)
- Starting negotiations
Framing

The questions...

- **Group A**: Choose from the following:
  1. A 100% chance of losing £50
  2. A 25% chance of losing £200, and a 75% chance of losing nothing

- **Group B**: Choose from the following:
  1. An insurance premium of £50
  2. A 25% chance of losing £200, and a 75% chance of losing nothing
Framing
The results

- **Group A**: Choose from the following:
  1. A 100% chance of losing £50
  2. A 25% chance of losing £200, and a 75% chance of losing nothing

  - % Option 1: 22%

- **Group B**: Choose from the following:
  1. An **insurance premium** of £50
  2. A 25% chance of losing £200, and a 75% chance of losing nothing

  - % Option 1: 38%

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Distribution of Risk Aversity

<table>
<thead>
<tr>
<th>Risk averse</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Loss</td>
<td>30%</td>
</tr>
<tr>
<td>Insurance</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>50%</td>
</tr>
</tbody>
</table>
Framing
The theory

- How questions are presented can have a profound impact on the thought processes and answers given
- Equivalent questions can yield entirely different answers

Examples

- Surgery: chance of survival vs chance of death
- 99% fat-free vs 1% fat

Prospect Theory

TPOI: 0.24
Prospect Theory

The questions ...

- **Group A**: Choose from the following options:
  1. A 100% chance of **winning** £3,000
  2. An 80% chance of **winning** £4,000, and a 20% chance of **winning nothing**.

- **Group B**: Choose from the following options:
  1. A 100% chance of **losing** £3,000
  2. An 80% chance of **losing** £4,000, and a 20% chance of **no loss**.

Prospect Theory

The results

- **Group A**: Choose from the following options:
  1. A 100% chance of **winning** £3,000
  2. An 80% chance of **winning** £4,000, and a 20% chance of **winning nothing**.
     - % Option 1: **83%**

- **Group B**: Choose from the following options:
  1. A 100% chance of **losing** £3,000
  2. An 80% chance of **losing** £4,000, and a 20% chance of **no loss**.
     - % Option 1: **37%**
Prospect Theory

*The results*

**Distribution of Risk Aversity**

- **Risk averse**
  - **Gain**
  - **Loss**

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Prospect Theory

*The theory*

- Tendency to be risk averse in choices involving sure gains …
- … and risk seeking in choices involving sure losses
- Evaluation relative to a “reference level”
- Perceive outcomes as gains and losses, rather than final states of wealth or welfare
Prospect Theory
One for you to consider ...

The possible outcome of a 50:50 gamble will leave you £100 worse off.

How much upside do you need to take the bet?

Studies show most people desire an upside between £150 and £250

Mental Accounting

TPOI: 0.09
Mental Accounting

**The questions ...**

- **Group A:**
  - Imagine that you have decided to see a play where admission is £10 per ticket. As you enter the theatre you discover that you have lost a £10 note. Would you still pay £10 for a ticket to the play?

- **Group B:**
  - Imagine that you have decided to see a play and paid the admission price of £10 per ticket. As you enter the theatre you discover you have lost the ticket. The seat was not marked and the ticket cannot be recovered. Would you pay for another ticket?

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Mental Accounting

**The results**

- **Group A:**
  - Imagine that you have decided to see a play where admission is £10 per ticket. As you enter the theatre you discover that you have lost a £10 note. Would you still pay £10 for a ticket to the play?
  
  - % Buy: 96%

- **Group B:**
  - Imagine that you have decided to see a play and paid the admission price of £10 per ticket. As you enter the theatre you discover you have lost the ticket. The seat was not marked and the ticket cannot be recovered. Would you pay for another ticket?

  - % Re-buy: 71%
Mental Accounting

The theory

- People set up “mental” accounts and attribute losses and gains
- A decision associated with one account may alter if the same decision is associated with a separate account

How people make choices
Making choices

An example

Overconfidence

TPOI: 0.33
Overconfidence
The questions ...

For each of the following, provide an upper bound and lower bound such that you are 80% confident that the true value falls within your range

- The height of Mount Kilimanjaro in metres
- How many GPs work for the NHS
- The average UK property price in 1945
- The population of the United Kingdom in 1900
- The average number of deaths caused by Influenza each year, worldwide
- The number of people employed by Burger King worldwide in 2011

Overconfidence
The results (1)

For each of the following, provide an upper bound and lower bound such that you are 80% confident that the true value falls within your range

<table>
<thead>
<tr>
<th>% Confidence Intervals containing correct answer</th>
<th>Correct answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The height of Mount Kilimanjaro in metres</td>
<td>52%</td>
</tr>
<tr>
<td>How many GPs work for the NHS</td>
<td>42%</td>
</tr>
<tr>
<td>The average UK property price in 1945</td>
<td>33%</td>
</tr>
</tbody>
</table>
Overconfidence

The results (2)

For each of the following, provide an upper bound and lower bound such that you are 80% confident that the true value falls within your range

- The population of the United Kingdom in 1900: 28% confidence interval containing correct answer: 38,000,000
- The average number of deaths caused by Influenza each year, worldwide: 27% confidence interval containing correct answer: 375,000
- The number of people employed by Burger King worldwide in 2011: 21% confidence interval containing correct answer: 34,248

Comparing to a Bin(7,0.8) distribution
Overconfidence
The theory

- People have too much confidence in their expertise
- Studies show that overconfidence INCREASES with expertise!
- Heuristic and skill-based confidence feel indistinguishable

Theory extension

- Hindsight bias
  - Events occurring will be thought of as having been predictable prior to the event

- Confirmation bias
  - The tendency to favour information that confirms your initial preferences

Summary & Sign-Off
Summary & Sign-Off

- We think your mind is amazing
- … but also subject to the heuristics and biases we’ve discussed

- The System 1 and System 2 framework is compelling and helps explain:
  - Availability, Anchoring, Framing, Prospect Theory, Mental accounting, Making choices, Overconfidence, … and lots more

- We hope you’ve found this session interesting and that you:
  - … might remember some of it,
  - … may wish to find out more, and
  - … could even make some “better” future decisions as a result(!)

- May the TPOI be with you

Ideas of other things to read

Lots of other Good Books, including:

- The International Bestsellers
  - the art of thinking clearly
  - Fooling by Randomness
    - The Hidden Role of Chance in Life and in the Markets
  - Undercover Economist
  - Freakonomics
  - Superfreakonomics