

# St Mark's Word of the Week



# Heuristic

Are you familiar with this word?

What does it mean?

Can you use it in a sentence?



# Heuristic (noun)

## Definition

A process or shortcut for solving a problem

Where does the word come from? What is its etymology?

**Heuristic**



**From the Ancient greek:  
Heuriskien**



**To find**

A way of finding a  
solution to a problem



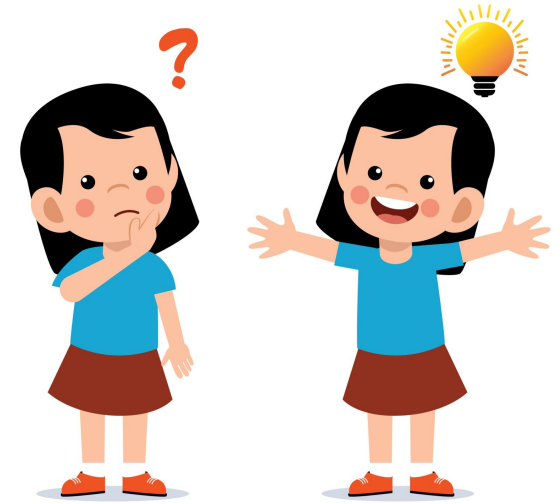
# Heuristic (noun)

## Definition

A process or shortcut for solving a problem

Heuristics come in two forms:

Things humans have invented and use deliberately



Things that human brains do automatically



# Heuristic (noun)

## Definition

A process or shortcut for solving a problem

The most basic heuristics humans use deliberately are:

- Trial and error      Try something and if it doesn't work, try something else.
- Use a rule of thumb      Base what you do on previous practical experience
- Make an educated guess      Base what you do on stuff you already know linked to the problem

What do these mean?



# Heuristics in school

Your teachers will teach you heuristics to help you solve problems and communicate ideas.

You may have been taught initialisms to help you answer questions with your writing. For example:

PEE      Point Evidence Explanation

PEA      Point Evidence Analysis

PEACE    Point Evidence Analysis Context Evaluation

Do you know for what these stand?



# Heuristics in school

In science you may have been taught a heuristic for calculations:

Find the gravitational potential energy stored when an apple of mass 0.23kg, 65m above the Earth's surface. Assume  $g$  is 9.8 N/kg

$$E_{gp} = ?$$

$$m = 0.23 \text{ kg}$$

$$h = 65 \text{ m}$$

$$g = 9.8 \text{ N/kg}$$

$$E_{gp} = mgh$$

$$= 0.23 \times 65 \times 9.8$$

$$= \underline{\underline{146.51 \text{ J}}}$$



# Heuristics in the brain

The world is very complex and so your brain automatically takes shortcuts when making decisions to deal with that complexity.

Daniel Kahneman & Amos Tversky developed a whole area of psychology based on finding out about these shortcuts.

Here are some examples they found, see whether you recognise any in how you think.





# Heuristics in the brain

When asked to calculate the answer to these sequences of multiplications in a limited time:

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10$$

$$10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

People, on average estimated lower numbers for the top sequence than the bottom sequence

This is because the human brain's thoughts are *anchored* by the first bits of information it receives and so that will have a bigger influence on any adjustment it makes.

The tendency of the brain to do this is called the:  
'Anchoring heuristic'

Maybe this is why first impressions matter...



# Heuristics in the brain

When judging what they thought of something, people's brains focus on the most intense part of that experience and the end of it.

This is what will inform their judgment of the whole experience.

This is called:

## THE PEAK END RULE



# Heuristics in the brain

Do more words have 'k' as their first letter or their third letter?

'K \_\_\_\_\_'  
'\_k \_\_\_\_\_'

If you said third you are right, but very few people do, why is this?

It is much easier to think of words that start with 'k' than it is to think of words which have 'k' as their third letter.

There are in fact twice as many words with k as their third letter as their first.

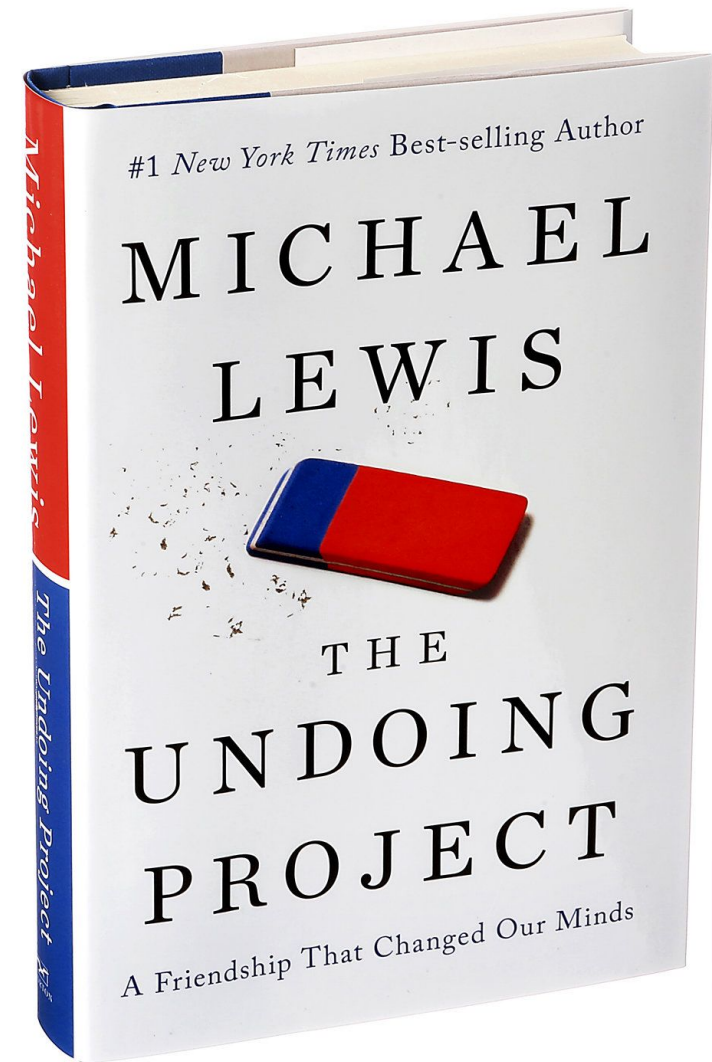
The human brain makes judgments based on the availability of information.  
This is called the '*availability heuristic*'.



# Heuristics in the brain

There are *many* more of these heuristics which can give you a much more complete view of how and why people make judgments that aren't always correct.

These are explored in this excellent book about the work of Kahneman and Tversky.



# Heuristic (noun)

## Definition

A process or shortcut for solving a problem

## Examples:

- Robert challenged his first thought because he wanted to avoid the availability heuristic.
- Mr Sheehan taught his class to use the PEACE heuristic to improve their writing.
- Fiona tried to always leave things on a high due to her knowledge of the peak-end rule heuristic.
- Humans naturally approach problems heuristically, whereas computers approach problems algorithmically.
- Artificial intelligence seeks to get computers to solve problems heuristically instead of algorithmically.
- David used the heuristic Mr Wilkinson had taught him to help him solve the calculation.

