Methods for studying communication phenomena
Problems of Interpretation

Human Communication 1

Lecture 13

Wason's 4-card problem (the 'selection' task)

We will conduct an 'experiment' in relation to a specific phenomenon:

- you will see four cards - pretend they are real cards and you could turn them over
- each card has a number on one side and a letter on the other

Your task is to decide whether the following is true of the cards you are shown

- *If there is a vowel on one side, there is an even number on the other*

- Only turn the ones you *must* turn over to be sure

The Experiment

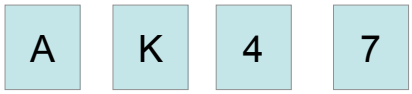
The rule you are to check:

- If there is a vowel on one side, there is an even number on the other

Which card/cards do you turn over to check the rule?

- write down your choice of cards

While you are fresh from making the choices, examine the reasons a little. Consider why you did or did not turn a card?



Consider why you did or didn't turn a card?

Most responses run a little like this:

- I turned the A because if it has, say, a 4 on the back, then the rule is true of this card.
- I didn't turn the K because the rule isn't about consonants.
- I turned the 4 to see if there was an A, because that would support the rule.
- I didn't turn the 7, because the rule isn't about odd numbers.

What is the norm (most frequent choices)?

- Most people select the A
- A few select the K
- A few select the 4
- Few people select the 7

Wason says the 'correct answer' is:

- Select A (which nearly everyone does)
- Select 7 (which almost nobody does)
- Leave K and 4 (which most people do)

We will consider the nature of explanations of most people's failure to select 7 ….

Explanations

There are distinct *kinds* of explanations in terms of peoples':

- Understanding of the sentence - *logical or interpretational*
- Strategies for evidence seeking - *evidential*
- Perspective on the information - *perspectival*

A simple logical (interpretational) explanation

The people who turn 4 do it because they interpret *if…, then…* to mean *if, and only if…, then*

- this explanation proposes a different logic for the words

Does this explanation work?

What should subjects do if the rule was:

if and only if there is a vowel on one side then there is an even number on the other?

- they should turn all four cards.

In fact very few subjects turn all four cards.

Verifying and Falsifying

The dominant psychological explanation of 4-card behaviour has been in terms of evidential strategies:

- Popper, philosopher of science - cannot verify theories, only successively falsify and improve
- Seeking examples that fit does not help - only seeking examples that falsify, and *failing to find them* can help
- One counter example falsifies a theory

This is how scientists work ….

Everyday people tend to merely look for examples which fit

They fail to notice that ***anything*** could fit their unscientific theories

Will this wash?

Is science like Popper says?

Is the everyday reasoning like Popper says?

Is falsification a good strategy?

A terminological problem:

- verify = establish truth of rule
- or, verify = seek examples 'matching' rule

If Popper is right, the only way to verify (in first sense) is to seek to falsify

Psychologists generally mean the second interpretation of 'verify'

Kuhn, *paradigms* and planets

Kuhn was a sociologist of science. *The Structure of Scientific Revolutions* examines the history of science for examples of how scientists actually responded to evidence

- *Normal* science vs scientific *revolution*

Normal science - Ptolemy and 'spherical motion' round earth

- if the data does not fit, add an epicycle
- but given enough epicycles, absolutely anything will fit

Kuhn, *paradigms* and planets

Eventually Copernicus' *heliocentric* theory and Kepler's elliptical orbits'revolution

The *paradigm* is a model and its *idealisations*

Before searching for falsifying instances can be of help, scientists need a *paradigm = set of theoretical beliefs and evidential methods that give coherent account of range of phenomena*

- the paradigm is extremely resistant to falsifying instances
- seeking to explain counterexamples rather than ignoring them

e.g Newton versus Einstein

The light switch

If the switch is down, then the light is on - switch goes down - no light comes on: what now?

- check the bulb
- check for a power cut
- check the fuse
- . . .

We have a 'theory' of electrics, and (quite rightly) do not easily give it up

Rules and regularities have *boundary conditions*

- 'If the switch is down *and nothing is abnormal* then the light is on'

The light switch

But everyday reasoning not the same as scientific reasoning - e.g. naïve physics - dropping objects of different masses….

Popper overstressed falsification at expense of description, exploration and discovery

Do people actually falsify in the 4-card task?

What was your justification for turning the A?

What was your justification for turning/not turning the 4?

- people do try to falsify *at least sometimes*

Do you agree with Wason that the choice of A and 7 is correct?

- and anything else is wrong?

Evidence seeking - The Raven's Paradox

if it's a raven, then it's black

Logically equivalent to:

if its non-black, then its a non-raven

1. look for non-black things, check that they are non-ravens
2. each white thing that turns out to be a tennis shoe supports the law

Do we need to check every white thing? Every black thing?

How do we escape this paradox?

Through the numbers - the size of the different sets <non-black things> and <non-ravens>

are hopelessly large sets

Our concepts are chosen to focus attention - negatively defined sets are usually hopelessly large

So are we right in the 4-card problem?

Wason's observations about when we actually use negatives - *the contexts of plausible denial*

Should we entertain the idea that subjects may be correct in not choosing the 7?

Maybe turning 7 is like looking for white things and seeing if they are ravens?

Perhaps subjects' evidential habits just persist from this strategy which is correct in the real-world?

Points raised in this example…

Importance of understanding one area in depth then generalising

Raises questions of competing descriptions and explanations

Good e.g. of how scientific explanation works and how different disciplines relate

No right answers - have to collect evidence, weigh it for/against positions, from different perspectives

How do we know what is correct?

Wason employs *classical logic* as a *normative competence theory* - this is only one of a number of possible logics

- discrepancy here between behaviour and competence model
- reports as indirect evidence - can be useful but not always reliable

Tensions between normative and descriptive stances: psychology as description, but look for generalisations and develop normative models

Normative and Descriptive Stances

Normative: how something should behave

- How we ought (ideally) to communicate
- What rules give 'correct' analysis
- How 'should' we reason - what logics should describe this

Descriptive: how do things actually behave

- How do we communicate?
- How do we reason?

Leeves and Harris (2000)

4 year olds told:

"All cats bark, Fido is a cat. Does Fido bark?"

Knowledge that cats do not bark clashes with problem context - effectively reject the premises…

But if given clues about world defined by such premises: "on this strange planet.." then likely to conclude that fido barks

In general, should we be following the interpretation, as a game, or do we bring in real world context?

Science as Idealization

Science focusses on some phenomena and systematically ignores others

e.g. Galileo ignored friction for general theories of motion

Do the same in Linguistics and Psychology

- do not include all variables
- exclude some data

e.g. rules of grammar do not cover all cases and ignore errors (unless this is the focus)

Methods: Analysis and synthesis

To understand X:

Analytical approach:

- Observe X in context
- Take X to pieces and see how it works - (Psychology, Linguistics)

Synthetic approach:

- Build one and see how it behaves (AI, Computational Linguistics)

  May be 'black box': deduce the properties any X must have (Cog Psych)

e.g. joke generation and article tutor use both