KING'S College LONDON

INSTITUTE OF PSYCHIATRY,
PSYCHOLOGY & NEUROSCIENCE

Module:
Psychological Foundations of Mental Health

Week 1:
Introduction to Cognitive Psychology

Professor Richard Brown

Topic 3:
The cognitive (r)evolution
Part 2 of 3

1

Building blocks of cognitive psychology

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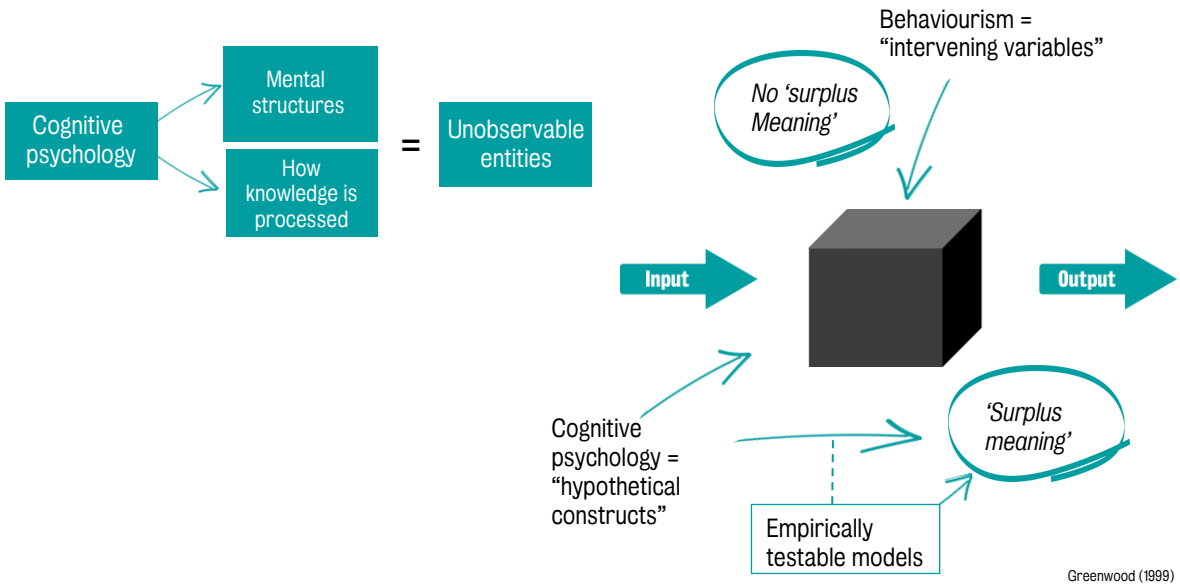
Cognitive psychology: From intervening variables to hypothetical constructs



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Hypothetical constructs: Cognitive building blocks

What are the cognitive building blocks on which cognitive psychology models are based?

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What about the brain?

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Some illustrative examples of cognitive psychological research

Rest of topic:

Examples of how cognitive psychology investigated

Structures & processes of the mind

Empirical methods

Hypothetical constructs

What to look out for:

How cognitive methods & theories:

- go beyond early cognitivism
- overcome behaviourist objections

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Example 1: Sternberg 'memory scanning'

Sternberg, S. (1966). High-speed scanning in human memory. *Science*, 153: 652-654.

How is symbolic information retrieved from memory?

Short-term memory

Seconds rather than minutes or hours

Symbolic information = numbers

Sternberg (1966)

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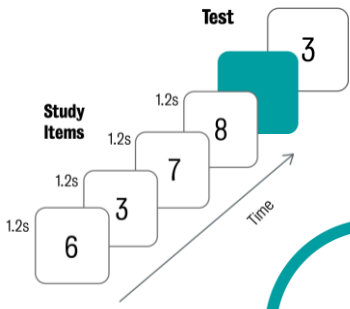
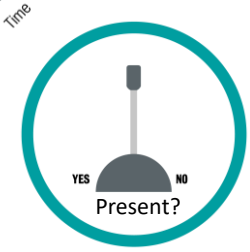
'Memory scanning' paradigm



Limit of accurate recall = immediate memory span



Measure reaction-time

Empirical question: What is the effect of the length of the list on time to decide?

Results: Longer list = longer reaction time

Sternberg (1966)

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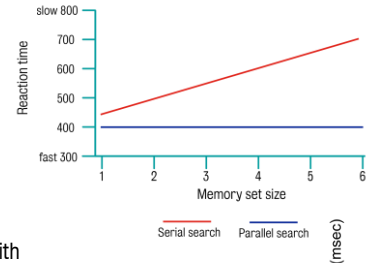
Question 1: Serial or parallel search?

What happens in cognitive terms during this test?

Item-by-item: Serial search → **Prediction:** Reaction time increases with number of items in list

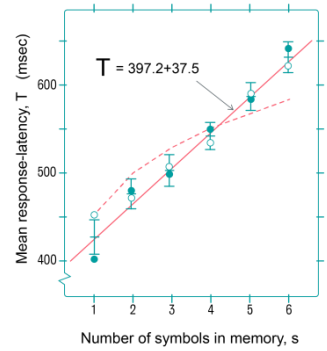
Or

Whole set: Parallel search → **Prediction:** Reaction time the same regardless of list length



Predicted

Actual



Sternberg (1966)

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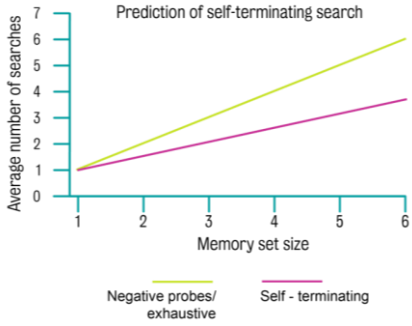
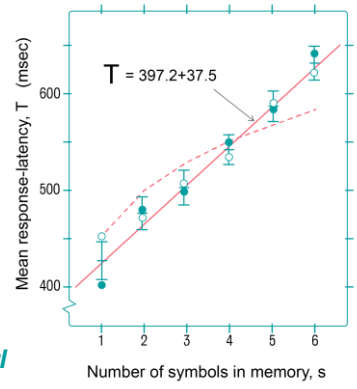
Question 2: Self-terminating or exhaustive search



Predicted



Actual

Question: what is the effect of the position of the item in the list?

Does the search stop as soon as the item is detected?

Self-terminating search	Exhaustive search	Search is exhaustive	In some conditions we use serial, exhaustive processes	We can study internal processes empirically

Sternberg (1966)

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Example 2: 'Mental rotation'

Shepard, R and Metzler, J (1971). Mental rotation of three-dimensional objects. *Science* 171 : 701- 703.

Processing of internal representation

Internal representation = mental image

Shepard & Metzler (1971)

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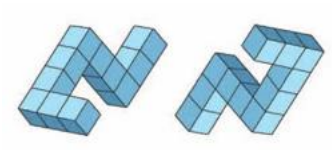
'Mental rotation' of 3-D objects



Task: Decide whether two objects are the same

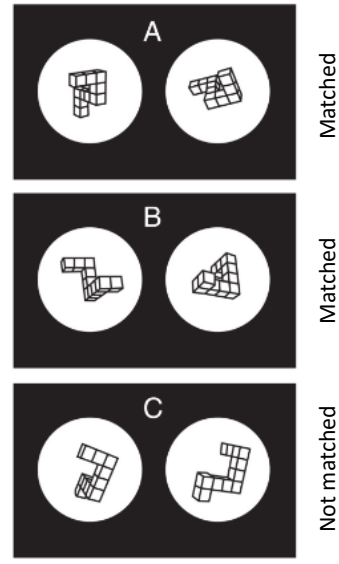
Rotation on physical plane

Matching based on *internal process*

Mental rotation

Question:

Relationship between time to make positive match and angle of rotation?



Shepard & Metzler (1971)

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Matching rotated 3-D objects

Processes

Construct mental representation of two objects

Compare and decide

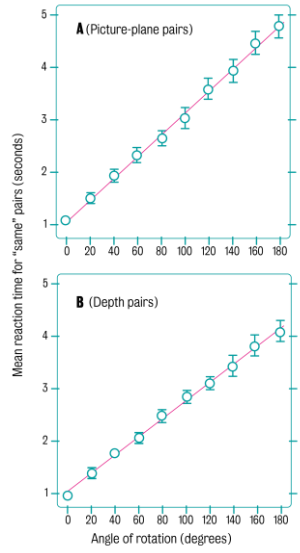
Time to decide is:
A: independent of the angle (parallel process)
B: systematically related to angle (serial process)

Findings support serial process

Access & transform internal representation to allow judgement

Mental manipulation speed "mimics" real 3D manipulation speed

Mental image follow principles similar to that in the real world



Shepard & Metzler (1971)

Example 3 – 'Depth of processing' in memory (1)

Does the depth of processing of verbal information effect the ability to subsequently recall that information?

Click **Next** to continue

Craig, F.I.M & Tulving (1975)

Example 3 – 'Depth of processing' in memory (2)

Learning and remember minutes to hours later

Meaningful information

Long term memory

Does how we learn affect how much we remember later?

Craig, F.I.M & Tulving (1975)

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Example 3 – 'Depth of processing' in memory (3)

Information can be represented in different ways

Different levels of representation

Word

Its physical form

or

its meaning

What is the effect of the depth of initial processing on subsequent recall?

Craig, F.I.M & Tulving (1975)

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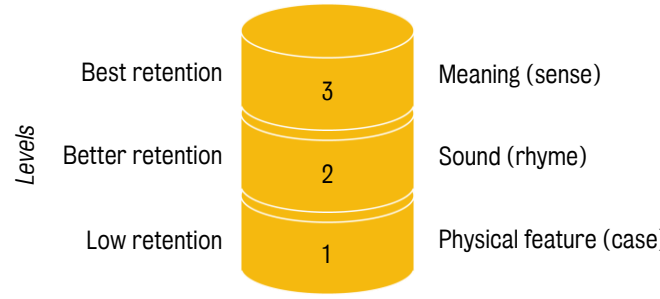
‘Depth of processing’ and verbal memory recall (1)

Present List → **Memorise** → **Recall**

Level of recall reflects efficiency of learning

Hypothesis
The deeper the processing, the better the retrieval.

‘No instruction to remember’
‘Presented with 60 words’
‘Three types of question’



Shown 120 words – 60 old, 60 new

Which did they recognize?

Craig, F.I.M & Tulving (1975)

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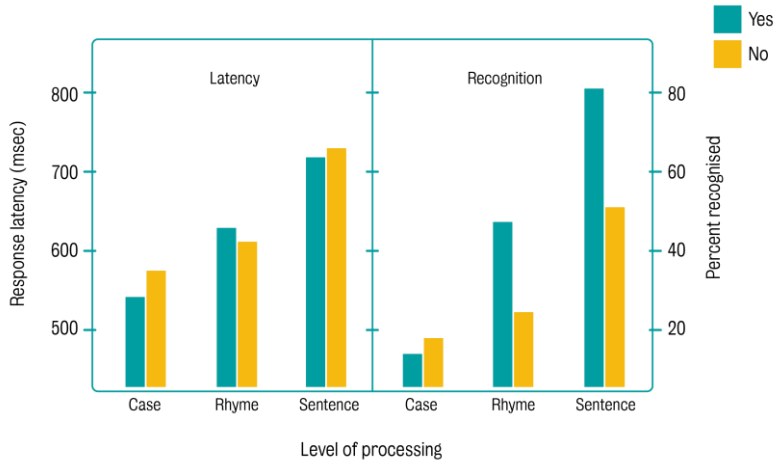
‘Depth of processing’ and verbal memory recall (2)



The more we elaborate information the better it is recalled

Negative memories repeatedly processed may become clearer and stronger

Dwelling and rumination

Memory of negative events in depression

‘Memory bias’

Craik, F.I.M & Tulving (1975)

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