

Psychology 3450 – Human Cognition

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How to Study

- Psychology is about experiments & what & how we learn from them
 - Important to understand logic behind hypothesis
→ method → results → conclusion
- Not just what we know, but how we know it.

How to Study - 2

- Exams will include multiple-choice and essay questions
- MC questions focus on important details
- Essay questions test
 - your ability to describe important experiments and explain the underlying logic,
 - and your ability to relate ideas to one another.

How to Study - 3

- Describe experiments as follows:
 - Purpose of the experiment:
 - What hypothesis is being tested, or what question is being asked?
 - Method
 - Participants – age, sex, how obtained, clinical sample, socioeconomic status, race & ethnic background
 - General task
 - Experimental design and procedure
 - Procedure – described chronologically
 - Design – overview of structure of experiment

How to Study - 4

- Describing an Experiment, cont' d
 - Results:
 - In which conditions was performance best or worst?
 - Were different dependent variables affected differently by the experimental conditions?
 - Speed vs accuracy, types of errors made
 - Conclusions
 - What conclusions are drawn from the findings?
 - Important to make the logic clear
 - How do conclusions relate to original hypotheses

Chapter 1: Overview

- Scope of cognitive psychology
 - To understand human behaviour, we need to understand how humans learn & remember, why they forget, how they perceive & understand their world, how they organize their knowledge, how they use knowledge to make decisions and solve problems, how people reason and make judgements
- A brief history
- An example of research in cognition

A Brief History

1. Introspection

- Wilhelm Wundt & his students (Germany) & Edward Bradford Titchener (USA)
 - *Introspection*: look inward to study & report one's thoughts
- some thoughts not conscious
 - objectivity versus subjectivity
 - findings must be replicable
- scientific hypotheses must be testable
 - Possibility that hypothesis can be proven wrong

A Brief History - 2

2. Behaviourism: First half of 20th Century

- stimuli & behaviour measurable – objective
- organism's learning history can be recorded
- avoid mentalism – mention of goals, plans, beliefs, expectations, mental images, etc.
- explanatory concepts
 - stimulus - response associations, reinforcement

A Brief History

3. Behaviourism: Problems

- Physical similarity of stimuli not as important as interpretation (meaning) of stimuli.
- e.g. Select odd item:
 - Lupin, Iris, Rose, Pearl
 - blue, black, blond, red
- Physical similarity of responses not as important as what the response accomplished (goal); e.g. press on lever, close the door
- To explain behaviour, must refer to perception, interpretation, & understanding of stimuli; expectations & beliefs, goals & plans

A Brief History

4. Cognitive Revolution

- Kantian or *transcendental method* – begin with the facts & then reconstruct processes that lead to observations
- invention of computers in 1950s → new metaphor for the mind
- hypothesize series of information-processing operations that resulted in observed behaviour
- make predictions – test hypotheses

How Cognitive Research Works – Working Memory

Model of short-term (working) memory (Baddeley & Hitch)

Three parts: (1) Central executive, (2) Phonological buffer, (3) Visuospatial sketch pad

- (2) and (3) are temporary storage systems, one for phonological information (speech) and one for visuo-spatial information.
- central executive does thinking, problem solving & decision making; co-ordinates use of buffers.

Articulatory Rehearsal & Phonological Buffer

Articulatory rehearsal (Inner voice) - silent pronunciation or subvocalization.

Retrieve phonological representation from LTM & store in phonological buffer, or phonological store, or phonological loop.

Phonological representation (Inner Ear)
- combination of auditory and articulatory information.

Phonological loop is passive storage device.
Information in phonological buffer decays.

Evidence for Baddeley-Hitch Model of STM

Prediction: Concurrent articulation prevents subvocalization and use of phonological buffer.

1. Concurrent articulation reduces memory span because phonological buffer not available.
2. Concurrent articulation eliminates “sound-alike” errors (called acoustic confusions) with visually presented letters.

Evidence for Baddeley-Hitch Model of STM - 2

4. Concurrent articulation does not interfere with the visuo-spatial sketch pad.

No effect of concurrent articulation on memory for unnamable visual stimuli (Hebrew or Arabic letters, nonsense shapes). Phonological buffer not used.

5. Concurrent articulation does not interfere with the central executive.

Concurrent articulation or small memory load does not interfere with “thinking”, e.g. solving logic problems. Memory items are stored in phonological loop.

Nature of Evidence for STM Model

We hypothesize abstract entities and processes (central executive, subvocalization) to explain behaviour.

Experimental tests – manipulate variables & determine their effect

- participants’ activities: concurrent articulation
- nature of stimuli: rhyming vs nonrhyming words, namable vs non-namable stimuli
- measure different aspects of behaviour (response time, number of errors, proportion of different types of errors)

Nature of Evidence for STM Model - 2

Neuropsychological evidence from people with damage to specific brain areas or to specific functions (e.g. speech production).

- ***anarthria*** – inability to speak due to brain damage

Cognitive neuroscience - brain imaging technology indicates which areas of brain are active.

- same areas active in speech & subvocal rehearsal

Nature of Evidence for STM Model - 3

• Different Populations

– Deaf vs. hearing people

- Deaf people rehearse using covert sign language rather than covert verbal rehearsal

• Importance of multiple lines of evidence
