

EXP3604C Exam 1 Notes

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Cognition involves perception, attention, memory, imagery

Also problem-solving, categorization, judgment and language skills

The human mind has been studied in many ways

Physiology- used techniques such as the fMRI, PET scan, ERP

BOLD response- fMRI measures blood flow to different areas of the brain during a mental task

Lateral occipital brain area deals with objects

Fusiform face area deals with face recognition

Most complex tasks use many different brain areas

The level of analysis required to look at everything involved in them is huge...10 bil brain cells!

Cognitive psychologists take the cognitive approach

What's happening in what?

What has to happen to get things done?

Figuring out processes and steps involved in mental tasks

Making models of how tasks are accomplished

Example: looking at how people respond to simple questions

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Object recognition is one of the brain's most complex tasks

Occipital lobe deals with visual features, lines/curves and is in the back of the brain

Temporal lobe deals with recognizing and telling different objects apart

Hubel + Wiesel experimented on a cat and discovered that individual neurons respond to specific things

Some respond to only straight lines that are in a certain place in field of vision

Allows recognition of lines and angles

Feature analysis model- features are recognized and then represented, step by step

Pandemonium model- features are recognized all at once in many areas of brain, then decide what it is

Top-down processing- have assumptions/expectations that guide perception of an object

Bottom-up processing- examine with no assumptions, then recognize features and decide what it is

Connectionist model- recognize words, letters and lines/curves/features all at once

Word superiority effect- can recognize individual letters better when placed in a recognizable word

Some stroke victims can recognize object but can't locate it or pick it up

Others can locate object but can't recognize it

The circle size illusion shows that object recognition and object location are processed differently

People were confused about visual size but could reach for and pick up the circle correctly

Conscious recognition- identifying objects

Unconscious recognition- locating objects

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Mental attention is limited, like a spotlight or fuel source

Attention improves target detection

Posner's spatial cueing task- told to look in direction of arrow for target to pop up

Involved valid (arrow correct), invalid (arrow incorrect), and neutral (two arrows) trials

Visual search task- have to pick out object based on certain characteristics

Easy if it has an addition that the rest of the objects don't

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Hard if it is missing something that all of the other objects have

Distractor- visual task object that meets some search qualifications but not all

Feature integration theory- people use feature maps (keywords) when looking for objects

Example: color/shape/size

Loaded without attention

Disjunctive search- have to find object with only 1 difference, involves using feature map

Conjunctive search- have to find object with 2 differences

Binding- object has 2 differences, the features are combined into one object

Finding an object with binding requires more attention, effort and time

Posner and Boies 1967 Secondary RT test

Tell subject to do a main task: match capital letters with lowercase letters

See if they can detect a tone while they are busy

Gave a warning tone before each sequence of letters began

If there was a warning, subject could match letters much faster

They completed the task right after the tone fast, then the next one after much slower

Conclusion: attention capacity was in short supply after the first task

Change blindness- not noticing a change

Example: the gorilla experiment

Only happens if the change isn't too obvious, is subtle enough

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Becoming more skilled at a task -> can do task automatically

Also allows someone use attention or planning better, or add more complexity

Automatic- uses no attention, unconscious, continues by itself after first starting

Formed through practice and repetition of the same thing over and over

Consistency breeds automacy

Consistent- uses parallel processing, not attention demanding, "out of control"/goes on by itself

Parallel processing- can process many tasks at once because one of them is on auto pilot

Inconsistent- uses serial processing, attention demanding

Serial processing- must process tasks individually, can only focus on one task at a time

Instance theory of automaticity

Consistent mapping is required, which may show the importance of memory

Automaticity retrieves old info rather than working it out from scratch, uses memory shortcut

Theory says that once memory has enough instances of a task, it becomes automatic

Skilled performance- performing 2 tasks at once, multitasking

Selective attention- choosing to pay attention to some things and ignore others

Ignored material is not remembered even after multiple repetitions

In audio experiments, changes in language or playing tape backwards weren't noticed

Changes in tone, pitch, and gender of speaker were noticed

Broadbent theory- attention filtering happens at the physical level, physical (f) -> meaning -> awareness

Mind analyzes sounds first, then decides to accept/ignore them

If distinct enough, sounds may be noticed anyway

Example: hearing your name

However, people were filtering sounds out based on meaning

Put one audio in one ear and another in the other then swap -> follow one message

Attenuation theory- filter is at meaning, physical -> meaning (f) -> awareness

Moveable theory- filter doesn't stay in one place, physical (f) -> meaning (f) -> awareness

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Stroop test- ink color and color name mixed up, told to name one or the other

- Measures controlled and automatic processes

- Word reading is automatic, fast and involuntary

- Color naming is slower and requires attention

Clinical attention problems are found with depression, ADHD, older people

- Anxiety makes people pay more attention

- OCD makes people pay very specific attention, too focused to ignore things

- Schizophrenics are easily distracted and lose focus

Alertness- being ready or prepared, tied to right frontal + parietal lobes

Orientation- locating objects in space, tied to parietal lobe + frontal eye fields

Executive control- conscious effort/choice/conflict resolution, tied to frontal lobe + anterior cingulate

- Requires dopamine

Template matching theory- compare perceived object with a model in memory -> recognize object

Feature analysis theory- break down perceived features into parts -> recognize object

Recognition by components- perceive location of "geon" shapes -> recognize object

Sensation- seeing/feeling/etc

Perception- consciously noticing and determining what a stimulus is

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Long-term memory- stored memories, not currently remembered

Short-term memory- consciousness, where things are remembered

Hippocampus- deals with memory encoding + formation

Amnesia and brain injuries can be caused by herpes encephalitis, lack of oxygen, physical trauma

There may not be 2 types of memory but just 2 different difficulty levels, but this is debatable

H.M. had parts of brain removed for seizure treatment, caused him to have poor long-term memory

K.F. had poor short-term memory

Brown-Peterson memory task- hear group of 3 letters and repeat them while counting back by 3

- Tests short-term memory by making subject too busy to encode info into long-term memory

- Subject ended up forgetting letters after only 18 seconds

There are different reasons for forgetting

- Decay- losing memory over time

- Interference- other info got in the way

- Proactive interference- many similar earlier events make it harder to remember new event

 - Example: learning lots of new names

Information in short-term memory (STM) can be lost in 3-36 seconds with no interference

Acoustic similarity- words sound similar, have 10% recall rate

Meaning similarity- words mean similar things, 71% recall rate

Dissimilar words- words that sound dif and mean dif things, 82% recall rate

- Conclusion: people mostly use acoustic encoding

Can also use visual/spatial encoding- location and #D objects

Or semantic/meaning encoding- types of objects

STM capacity- about 7 different things or groups

- Chunking- grouping things up to make them easier to remember

Word length effect- longer words are harder to remember

Acoustic short-term memory can hold about 1.5 seconds of auditory info

Semantic short-term memory can hold 7 short words, 6 long words, 4 short phrases or 3 long phrases

Visual short-term memory can hold 6 locations