



CGSC 1001 - Quiz 1

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1. **Cognitive system:** Anything that takes input from the environment and creates an output to effect that environment
2. **Environment:** Effects the cognitive system through perception
3. **Perception:** The term for how a cognitive system gets it's input by transforming things from the environment to internal representations
4. **Action:** The term for the output that a cognitive system creates to effect the environment
5. **Distributed cognition:** Multiple cognitive systems can come together to form a group which completes a task
6. **Cognition:** The manipulation or storage of representations like making reminders or your name
7. **How representations are stored in memory in animals, software, and distributed systems?:** Animals = long-term or short-term and in the brain
Software = databases and symbols
Distributed system = paper, brain, disk, environment manipulation
8. **The different ways to describe memory:** Can be described as either biologically (location) or functionally (long-term vs. short-term)
9. **Sensory memory:** Type of memory where new perceptions re-write it every few seconds
10. **Short term memory:** Type of memory where it is stored for a temporary period of time before being forgotten or stored forever
11. **Long term memory:** Type of memory that is stored forever
12. **Workspace model:** Working memory is a buffer that shuffles memories pulling out certain memories when they are to be recalled, and it can hold about 4-5 memories at a time
13. **Declarative memory:** Facts, events that have happened to you, your name, student number, etc.
14. **Implicit memory:** Procedural memory like to tie a shoe, play a video game, any sort of physical task, etc.
15. **Implicit knowledge:** Stuff that's hard to express like meeting someone and getting a bad feeling from them or that they are familiar
16. **What parts of the brain is short term to long term memories associated with?:** The hippocampus
17. **What parts of the brain is procedural memory associated with?:** Cerebellum, basal ganglia, and the motor cortex
18. **Computer memory:** Stored as a disk or flash memory
19. **Software memory:** Stored as hash tables, schemata, frames, scripts, logical sentences, bitmaps, activation patterns, and weights in links



20. **What level of cognition are cognitive scientists most interested in?:** The information level
21. **Memory in distributed systems:** Books, brains, fingers, notes, arrows, signs, etc.
22. **What is learning?:** Changing memory with the purpose of preparing a system for better action in the future
23. **Habituation:** A style of learning where the diminution of a behavioural response is seen with repeated stimulation. Decreasing sensitivity to specific stimulation or in other words you stop noticing something.
24. **Sensitization:** A style of learning where a behavioural response is amplified by repeated exposure to a stimulus.
25. **Classical conditioning:** A type of learning where the subject learns to associate 2 previously unrelated stimuli with one another. Ex. Pavlov's dogs learning to salivate at the sound of a bell because they knew that meant food would follow.
26. **Testimonial learning:** A style of learning where factual information is gained through someone telling you it like in a textbook, prof, a friend, etc.
27. **Operant conditioning:** A style of learning where either a positive or a negative stimulus is either added or removed to elicit a desired behaviour that becomes learned
28. **What does reinforcement indicate in operant conditioning?:** Encouraging behaviour
29. **What does punishment indicate in operant conditioning?:** Discouraging a behaviour
30. **What does positive indicate in operant conditioning?:** To add something
31. **What does negative indicate in operant conditioning?:** To remove something
32. **Positive reinforcement:** The strongest style of operant conditioning where a behaviour is encouraged by adding a reward
33. **Negative reinforcement:** A style of operant conditioning where a behaviour is encouraged by removing a stimulus
34. **Positive punishment:** A style of operant conditioning where a behaviour is discouraged by adding a stimulus
35. **Negative punishment:** A style of operant conditioning where a behaviour is discouraged by removing a positive stimulus
36. **Practice:** The process of doing something over and over again to learn how to do it better. Play is theorized to be type of practice.
37. **Automatization:** When motor skills become instinct due to practice
38. **Imprinting:** A style of learning that is time-sensitive. This a rare kind of learning where a certain species will latch onto the first thing it sees



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39. **Observational learning:** A style of learning that happens by observing another individual so something. Much of enculturation is this style.
40. **Enculturation/imitation:** Cultural learning, when an environment changes quickly
41. **Reasoning or inference:** Getting facts by figuring them out, not a form of learning
42. **Genetic learning:** Evolves over time as environments change slowly
43. **Content bias:** Imitate the best idea
44. **Prestige bias:** Imitate the most successful
45. **Conformist bias:** Imitate the most common ways of doing things
46. **Baldwin effect:** Predisposed to easily learn to be afraid of things like snakes for example
47. **Substrate-neutral:** Means it happens to all kinds of things
48. **Learning at the sociological level:** Looking at the sociological implications of certain things to gain knowledge about cognition
49. **Learning at the psychological level:** A level of learning where behaviour and response is the focus
50. **Learning at the cognitive level:** The information level of the mind, theory of mind
51. **Theory of mind:** The things we do are represented in our heads as productions (an information entity that has prerequisites and actions to be done --> waiting for someone to ask your name and producing the response) all these productions are sitting waiting to act. Sets goals to do something, and the production will either get stronger or weaker based on the outcome
52. **Learning at the biological level:** Understanding what the brain is made of (neurons with dendrites and axons, etc.)
53. **Learning at the chemical level:** Not useful for figuring out the ways that the mind works, but helps to better understand the biological level ex. how synapses change
54. **Learning at the physical level:** Not a good description for learning. Not very applicable to cognition
55. **How do we know if a level is legitimate?:** If it can successfully make causal predictions using the ontology of that level
56. **Ontology:** A set of things said to exist
57. **How is reductivism seen in scholars?:** Certain scholars often believe that most of the levels higher than theirs can be deduced to lower levels (their own level)
58. **Why do we need the sociological level?:** To explain certain group behaviour phenomena like going on strike, because it's difficult to draw general conclusions based on an individual



59. **Why do we need the psychological level?:** Some behaviours aren't influenced by their social context so sociology won't do. We need it in addition to the cognitive level because we need a place for non-causal statistical models
60. **Why do we need the cognitive level?:** The explanation of certain behaviours without the language of information processing is too vague (how people do multiplication) which the psychological level can't explain and we need it because the biological level can't address mental states and processes because their defined functionally not anatomically
61. **Why do we need the biological level?:** In addition to the cognitive level because the biological structure sometimes influences the behaviour in ways information processing cannot explain (number/colour synesthesia). In addition to the chemical level because entire brain structures are used for particular things
62. **Synesthesia:** Mixing up information with other sensory information due to the way that sulci and gyri interact with each other
63. **Why do we need the chemical level?:** In addition to the biological level chemicals can affect behaviour (drug use) and in addition to the physical level, physics tells us nothing about behaviour
64. **Proximate explanation:** A closely related answer that makes general sense (We eat because it satisfies our hunger and food tastes good)
65. **Ultimate explanation:** The explanation from an evolutionary standpoint or a greater point of view overall (We eat because we need nutrition to stay alive)
66. **How does cognitive science prefer information?:** Described information and how it is represented for example theorizing that individual memories have "activation levels" that determine how easily they can be retrieved from memory. Being able to describe the workings of a mind at a level so detailed one could program a computer the same way.
67. **Activation levels:** As you're taking things in different parts of memory which will change in their individual activations (while camping we went to get some water at the bank --> more likely to take the meaning of the word that best fits the scenario due to the higher activation level)
68. **The metaphor for cognitive science is...:** The mind is a computer program, the mind is like software that runs on the hardware of the brain
69. **Programs:** Information processing instructions
70. **Functionalism:** Believes that mental states and processes are determined by their functional properties rather than their physical properties e.g. pain is a functional thing that manifests itself in different ways
71. **i.e.:** That is
72. **e.g.:** For example



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73. **Historical core fields of cognitive science:** Psychology, philosophy, computer science, and linguistics
74. **Contemporary core fields:** Neuroscience (cognitive neuroscience)
75. **Secondary fields:** Education and anthropology
76. **What professor Davis believes should be considered a sub-field:** Behavioural economics
77. **What is psychology characterized by?:** Subject matter: natural minds, mostly human. Broadly interested in cognitive functioning, even when it is erroneous
Methods: laboratory experimentation, statistical analysis, computer cognitive modeling
60% of papers are this
78. **Natural minds:** Minds that come about through evolution (humans)
79. **Psychology subfields:** Cognitive psychology, HCI, evolutionary psychology, psycholinguistics, and comparative psychology
80. **Cognitive psychology:** Broad field of basic research in human internal mental processes - limited to behavioural experiments
81. **Human factors/Human-Computer Interaction (HCI):** How people psychologically interact with artifacts (human-designed things), such as user interfaces
82. **Evolutionary psychology:** How our evolutionary history has made our minds what they are
83. **Psycholinguistics:** Studying language with experiments - have their own methodology and experiments
84. **Comparative psychology:** Animal cognition, sometimes comparing it to human
85. **Psychology critiques:** Not enough model building, dustbowl empiricism (not enough theory), methodologically limited, underestimate the complexity of language
86. **Dustbowl empiricism:** Being too focused on experimentation that there isn't enough focus on developing theories as to how the mind actually works
87. **A model:** A simplified representation that helps you to figure out how something works, but sometimes might not be detailed enough to make accurate predictions
88. **What is Philosophy characterized by?:** Subject Matter: usually big questions, what our concepts mean, otherwise quite broad
Methods: Thinking and writing.
Thought experiments
Conceptual analysis - trying to figure out the exact meaning of words we use
Argumentation - different from thought experiment without asking questions
Theorizing from evidence from other fields and common sense observations



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89. **Philosophy sub-fields:** Philosophy of mind, philosophy of science, philosophy of language
90. **Philosophy of mind:** Deals with qualia and comparing different philosophical view points
91. **Philosophy of science:** Analyzing how science should be practiced, philosophy of psychology, making theories, etc.
92. **Philosophy of language:** Figuring out how to connect words to create meaning and referring to something that doesn't exist
93. **Philosophy critiques:** Don't pay enough attention to empirical study, think the existence of a word implies the existence of its intended referent, too concerned with too many unimportant problems
94. **How is Computer science characterized?:** Subject Matter: How mental processes can work on machines, and how computers can effectively interact with humans
Methods: building and testing computer programs
95. **AI - artificial intelligence:** Trying make computers smart by however we can by building mental processes with computer programs to understand and create mental systems
96. **Computer science sub-fields:** Artificial intelligence and human-computer interaction
97. **Human-computer interaction:** To design computer interfaces that humans can effectively use
98. **Artificial intelligence critiques:** Insufficiently concerned with natural intelligence --> AI doesn't work the same way that people or animals do, too optimistic about the future of AI
99. **How is Linguistics characterized?:** Subject Matter: human spoken or signed natural language
NOT computer or animal languages
NOT (for the most part) written language
Methods: sound analysis, grammar creation, corpus analysis
100. **Linguistics sub-fields:** Phonology, morphology, syntax, semantics, and pragmatics
101. **Phonology:** How sounds are organized and used in language (how people pronounce things)
102. **Morphology:** How sound and meaning interact in words (verbal tenses) and how words change
103. **Syntax:** How sentences may be put together in language (making grammar rules)
104. **Semantics:** Meaning in language



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105. **Pragmatics:** How sentences interact with context (responding in ways that conveys further context)

106. **Linguistics critiques:** Build models of language and don't know what to do with them, not familiar with other findings about the mind, only concerned with themselves and their part in cognition

107. **Neuroscience - cognitive neuroscience:** Subject matter: how the brain processes information and creates cognitive processes. The biological functions of mental phenomena.

Methods: neuroimaging, single-cell recording, anatomical observation, computer modeling, pharmaceutical effects, genetic analysis, etc.

108. **Critiques of neuroscience:** Underestimate the complexity of language and thought process, unable to explain the processes we are interested in, dismissive towards other higher levels, biased towards nature in nature vs. nurture

109. **How is Education characterized?:** Subject matter: how people (usually children) learn, and how we can design education to help them effectively do it.

Methods: Naturalistic observation of case studies, empirical studies

110. **Critiques of education:** Case studies are worthless, too applied and not telling us enough about basic cognitive processes, controlled studies are poorly done and expensive and hard, only deal with one part of cognition (learning)

111. **How is Anthropology characterized?:** Subject matter: Social organization, human culture, enculturation, cultural change and transmission, shared knowledge, distributed cognition, situated cognition

Methods: Field work, ethnographic observation and interviewing. Emphasis on qualitative study

112. **Anthropology sub-fields:** Archeology and cultural anthropology

113. **Critiques of anthropology:** Biased towards nurture in nature vs. nurture, research is too qualitative and expensive, and it doesn't generalize enough to be useful, splitters rather than lumpers

114. **Cognitive science:** Subject matter: Study of minds and thinking, especially at the information processing level.

Methodological Definition: Applies methodologies from multiple disciplines to multiple problems from those disciplines

115. **What is a cognitive scientist?:** A scholarly practitioner that studies minds from one of the associated sub-fields

116. **How to improve learning in class:** Sit at the front and doodle

117. **How to take proper notes:** By hand shows that they remember more than on laptops because they're forced to process and summarize



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118. **Memorization:** Use flashcards to help test memory by guessing the answer before seeing the answer --> Anki

Study in more than one place, take a walk before, just before sleeping

119. **Forgetting curve:** Overtime as you're repeatedly exposed to a term the chances of forgetting it will diminish

120. **How much to study?:** 20 hours a week for 5 classes (reading, writing, drilling, discussing, etc.)

121. **Learning styles:** Theory is weak, there are good teachers and bad teachers, learning styles are dependent on the material not the student

122. **Multitasking:** People aren't good at it, watching videos or listening to lyrical music is not helpful

123. **Time management:** Structure your time for success. Make daily to-do lists and schedule in half-hour slots for tasks and what you have to do that day

124. **Why schedule time?:** Less stressful, less time wasted deciding what to do, no need to worry about all the other things to do because you have a set time to work on them as well

125. **Why half-hours are the best chunk of time:** Allows you to work on variety of things so you can incubate ideas, too much time leads to burn out, motivates you to really do work

126. **Where to study?:** Lots of different places to increase retention in multiple environments

127. **How important is sleep to studying?:** Sleep is required for encoding long-term memories so all-nighters are a waste of time because brain can't prune connections to make memory more efficient

128. **Psychoeducational assessment:** Completed by a clinical psychologist to assess cognitive and academic skills, should show a pattern of discrepancies where there are issues in cognition not academic skills

129. **Learning disability:** Causes unexpected academic underachievement due to an affected specific psychological process. Dysfunction of brain, since birth, not explained by anything else

130. **Learning disability prevalence:** General population = 2.5% 15+
PMC = 29% are learning disabilities

CU = 1.85% of population are registered with a learning disability

131. **Theory of learning disabilities:** Uses a triangle with top being the overall cognitive ability (IQ), then academic achievement (how you're doing in school) and specific cognitive weakness (that which causes the academic achievement results) on the same level.

132. **Academic achievement:** Reading:

Word recognition/phonology (dyslexia), fluency, comprehension



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Math:

Problem-solving, accuracy (computations), fluency

Written language:

Handwriting, spelling, fluency, written expression (i.e. organization/flow of ideas)

Oral language:

Expressive or receptive

133. Specific processing impairment: Specific Cognitive Weaknesses:

Visual Processing (spatial reasoning)

Generating, storing, or retrieving images

Auditory Processing

Processing sounds

Working Memory (not able to keep many things in your head at once)

Manipulating information

Processing speed (not as fast, need more time)

Performing simple tasks quickly

134. Pattern of strengths and weaknesses: -Average to above-average intelligence

-Specific academic weakness

-Specific cognitive processing weakness

-A meaningful relationship between the cognitive deficit and the academic deficit

135. Spoonerism: An auditory processing error where you have 2 words and you swap the beginning sounds of each word to make 2 new words (red pen to ped ren)

136. Learning strategies: Developing a strategy that makes learning more efficient like note taking, reading, time management, test taking, etc.

137. Metacognition: The ability to deliberately monitor and regulate ones knowledge, processes, and cognitive and affective states. Thinking about how you think.

138. Self-regulated learning: Planning, monitoring, testing, revising, and evaluating strategies

139. Affective states: Managing emotions

140. Cognitive states: Managing internal and external distractions

141. Steps of analogy: Retrieval, mapping, transfer/adaptation, evaluation, and storage

142. Retrieval: Finding something good in memory to make an analogy with

143. Mapping: Finding correspondences between elements of the two analogues

144. Transfer/adaptation: Using (and changing) knowledge of one analogue to learn or invent something about the other (the inferences that we make based off of the analogy)

145. Evaluation: Determining if the transfer did what you wanted it to do

146. Storage: Indexing the memory so that it can be used successfully in the future



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147. **Exemplar-based reasoning:** Reasoning based on particular examples rather than on prototypes or rules
148. **Memory-based reasoning:** Reasoning from memories as opposed to using more abstract reasoning rules
149. **Instance-based reasoning:** Same as exemplar
150. **Case-based reasoning:** An AI field that reasons from "cases" in memory
151. **Primary scene metaphor:** Cognitive representation of experiences everyone has, like swallowing
152. **Correlation-based metaphor:** Base metaphor is sensory, target is abstract, as in "prices have fallen sharply"
153. **Structural language:** A set of symbols that can be arranged in certain ways
154. **Functional language:** A complex code by which agents can communicate information
155. **Natural language:** Created by cultures of humans that evolved over time and can be very ambiguous
156. **Artificial language:** Created by individuals or smaller groups, so computer codes for example
157. **Computer language:** Artificial language for communication with computers
158. **Zoosemiotics:** Animal communication
159. **How animal communication is studied:** Through expression, gaze following, vocalization, olfactory communication, and electric colouration
160. **Why do animals communicate?:** For dominance, courtship, ownership, food alert, alarm, or metacommunication
161. **Vervet monkey communication:** Vervet monkeys give different alarm calls for different predators eliciting specific and similar response (call for leopard vs. eagle vs. python all sound different and all monkeys respond in same way to specific sounds) just by playing specific alarm calls without an actual predator in the environment to elicit the same response
- Also did an experiment to see if they knew who was talking, recorded specific monkey and played his voice when no one was around, and eventually everyone stopped listening to that specific monkey meaning that they are able to assign credibility to specific monkeys and can recognize voices
162. **Honeybee communication:** Dances to inform where new food is located so they're just dancing to illustrate a map, bees can't see where or what the bee is doing so they get its information from touch
- Stopped a bee from returning to the hive so they can't track the sun light and location, however the bee was still able to adjust for the time that had passed according to where the sun was located



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163. **Human language:** Has a structure which is implicit. We all know how to do it but we generally don't know how we even do it.

164. **Parsing:** Breaking down a sentence into its nouns, verbs, adverbs, adjectives, etc.

165. **Logic:** A formal, normative system of reasoning. Symbolic logic specifies ways that sentences can be represented unambiguously. Typically it is limited in its semantics. Ex. saying that there are exactly 74 lawyers working at this specific firm, it would take a lot of work

166. **Minds are mentalese:** A language of thought. When we have trouble expressing what you want to say it supports this view.

167. **Sensory modalities:** Physical signal - perceptual modality

Light - vision

Air vibrations (sound) - audition

Physical pressure - touch (haptics)

Chemicals - taste and olfaction

Body position - kinesthetics/proprioception

168. **Atypical modalities:** Senses in the bowel, stomach, pain receptors, heat receptors, etc.

169. **Extramission theory:** Rays of light emanating from the eye in combination with light in the world allow us to see

170. **Intromission theory:** Visual perception is accomplished by rays of light reflected from objects into the eyes

171. **How light is processed in the eye:** -Light is reflected into the eye and focused on the retina

-Light stimulates the rods and cones

-Transduction of light into electricity

172. **Rods in the retina:** Most light sensitive, information is received by a convergence of many rods causing a loss of visual acuity, makes peripheral vision sensitive to movement

173. **Cones in the retina:** 3 types; correspond to short, medium, and long wavelengths

174. **Depth perception:** Provides us with the ability to understand the size of things, their perspective; things are smaller on the fovea as they get farther, occlusion; when one thing is in front of another, texture and shading, saturation; closer things are more saturated and same for texture, focus, multiple images

175. **Dorsal stream:** The "where" pathway; motion, representation of object location, control of eyes and arms, spatial awareness

176. **Ventral stream:** The "what" pathway; form of recognition and object representation and is associated with storage of long term memory



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177. **How audition works:** Sound waves (acoustical energy) vibrate the eardrum and ossicles, localization is done by examining the differences between the sounds in the 2 ears, like depth perception
178. **Biosonar:** To send out sound to determine the spatial information from it's echo, used by bats, toothed whales, dolphins, and 2 kinds of birds
179. **Haptics (touch):** Important for manipulation of objects, especially when in combination with proprioception
180. **Active perception:** Haptics and vision
181. **Olfaction:** Detects chemicals, influences taste greatly
182. **Why animals use smell:** To mark territory, to detect fertility, and to track pheromone traces
183. **Gustation:** Chemical receptors in tastebuds last for about a week or 2 then wear out. Involves feel, temperature, taste, smell, and pain.
184. **Kinesthesia, Proprioception, and the Vestibular system:** Kinesthesia and Proprioception are how you know where your body parts are and how they are moving.
185. **How Kinesthesia, Proprioception, and the Vestibular system works:** Uses sensors in the inner ear and in muscles
186. **Interoception:** Perception of hunger, need for digestive elimination, heart rate, need to sneeze, cough, etc.