**10 Thinking and language**

Thinking and cognition

* The computational theory of mind holds that the mind functions in a manner loosely analogous to a computer.
* Cognitive scientists study mental activities involved in collecting, processing, storing, retrieving, and manipulating information.
* Thought is the active process of mentally manipulating or processing information to solve problems, make decisions, increase knowledge, or fantasize.
* Thinking involves two components: mental images and concepts.

Kahneman’s two-system theory of thinking

* Kahneman distinguishes between two thinking systems, one being intuitive and effortless, the other being conscious and effortful.

Problem-solving

* Problems are obstacles that stand in the way of achieving a goal, and we use thought to solve them. Four strategies for problem solving are: trial and error, algorithms, heuristics, and insight.
* Trial and error works well if the options for possible solutions of a problem are relatively few.
* Algorithms are step-by-step ‘recipes’ that can solve any problem of a specific type.
* Heuristics, including the availability heuristic and the representativeness heuristic, are mental shortcuts that are used automatically under conditions of uncertainty. The representativeness heuristic is misleading if base rates are not taken into consideration. A base rate is a percentage probability figure indicating the prevalence of something, or how frequently it occurs.
* Insight occurs when a person has reached an impasse in attempts to solve a problem and then suddenly and effortlessly arrives at a solution. Creativity is a complex set of behaviours generally involving originality, flexibility, and utility; it includes finding problems as well as solving them.

Decision-making

* Cognitive biases are systematic distortions in thinking, memory, and perception.
* The confirmation bias is often considered the most prevalent and destructive of all problems with human reasoning. The confirmation bias is primarily seen in the tendency to pay more attention to evidence that confirms what we already believe.
* Belief persistence, a related bias, allows a person to resist changing a belief by discounting disconfirming evidence. The gambler’s fallacy is a misperception of randomness.

Language

* At least three principles characterize human language: generativity, recursion, and displacement.
* Languages may influence the way we think, but they do not determine the way we think.
* Many researchers believe that the capacity for language is a special internal faculty comprising innate, specialized neural and cognitive structures and ‘wiring’.
* From this view, all languages possess a ‘universal grammar’.
* The internal language faculty allows children to learn language effortlessly, even though they are exposed to only a few of the words and constructions possible in the language.

Language and thinking

Do non-human animals have language?

* Animals communicate, but they do not have language. Unlike human language, animal communication systems are closed-ended rather than open-ended.
* Extensive efforts to teach language to chimpanzees have resulted only in the teaching of limited vocabularies and virtually no grammatical structures.

Research among primates suggests that language may have evolved from gestures rather than vocal utterances.