B.A. 1

COGNITIVE PROCESSES

THINKING

- **Thinking**: Thinking can be defined as *"a mental activity that goes on in the brain when a person processing information – organizing it, understand it and communicating it to others".* Thinking is the base of all cognitive activities and is unique to human beings. It involves manipulation and analysis of information received from the environment. When people think, they are not only aware of the information in the brain but also are making decisions about it, comparing it to other information, and using it to solve problems.

- **Basic Elements of Thinking:**

  - **Concepts:** concepts can be defined as "*Mental categories for objects or events that are similar to one another in one or more respect*". They are ideas that represent a class or category of objects, events, or activities. Concepts not only contain the important features of the objects or events people want to think about, but also they allow the identification of new objects and events that may fit the concept. For example, dogs come in all shapes, sizes, colours, and lengths of fur. Yet most people have no trouble recognizing dogs as dogs, even though they may never before have seen that particular breed of dog. Concepts play a central role in our task of understanding the world around us and representing it mentally. Concepts are of various types:

    - **Basic Level Concept:** the type of concept around which other similar concepts are organised. For example: Apple.

    - **Subordinate Concept:** the most specific form of concepts. For example: Granny Smith Apple, Himachal Apple.

    - **Superordinate Concept:** the most general form of concept. For example: Fruit.

    - **Formal/Artificial Concept:** they are defined by a specific set of rules or features. For example: a square is a shape that has four equal sides.

    - **Natural Concept:** concepts formed by people as a result of experience in the real world

People organize concepts into category *hierarchies* to use them efficiently. For example, Cabdrivers organize their cities into geographical sectors, which subdivide into neighbourhoods and again into blocks. We form some concepts by *definition.* We are told that a triangle has three sides and we classify all three - sided geometric forms as triangles. Most often, we develop concepts based on ***prototypes**—a mental image or best example that incorporates all the features we associate with a category* (Rosch, 1978).The more attributes new items share with an existing prototype, the more likely they are to be included within the concept. For example, consider the following natural concepts: *clothing, art.* For clothing, most people think of items like shirts, pants, or shoes. For art, most people think of paintings, drawings, and sculptures.

Concepts allow you to group things into categories and thus better organize and store information in memory. For example, instead of having to store hundreds of mental images of many different kinds of dogs, you can store a single prototype of the average dog.

By having concepts that can be used to classify and categorize things, you can easily classify new things without having to relearn what each thing is. For example, once you have a concept for a dog, rabbit, cat, or cookie, you do not have to relearn what that thing is on each new encounter.

- **Images:** *An image is a mental representation of a sensory experience.* It can be used to think about things, places, and events. Some research findings suggest that once we form a mental image, we think about it by scanning it visually Justas we would if it actually existed. Other findings, however, indicate that our use of visual images in thinking are embedded in our knowledge about the world, and are interpreted in light of such knowledge rather than simply scanned. Mental images serve important purposes in the thinking process. People report using images for understanding verbal instructions, by converting the words into mental pictures of actions; for increasing motivation, by imagining successful performance; and for enhancing their own moods, by visualizing positive events or scenes

- **Proposition:** Thinking involves active manipulation what we see and how we represent it (concepts). Often, thinking involves relating one concept to another, or one feature of a concept to the entire concept. This is known as **propositions**—*sentences that relate one concept to another and can stand as separate assertions.* For example, Carla (concept) likes to buy flowers (concept). Dogs (concept) bark (property of the concept).

- **Language:** *A language consists of symbols that convey meaning, plus rules for combining those symbols, that can be used to generate an infinite variety of messages.* Human languages have a hierarchical structure. Basic sounds are combined into units with meaning, which are combined into words. Words are combined into phrases, which are combined into sentences. Language uses symbols for communicating information. For a set of symbols to be viewed as a language, several criteria must be met. First: The words and sentences must carry *meaning.* Second, although the number of separate sounds or words in a language may be limited, it must be possible to combine these elements into an essentially infinite number of sentences. Finally, the meanings of these combinations must be independent of the settings in which they are used. In other words, sentences must be able to convey information about other places and other times. Only if all three of these criteria are met can the term *language* be applied to a system of communication.

- **Phonemes:** At the base of the language hierarchy are ***phonemes,*** *the smallest speech units in a language that can be distinguished perceptually.* They are the basic sounds of consonants and vowels. English has forty-six separate phonemes: vowels, *a, e, i, o,* and *u;* consonants, such as *p, m, k,* and *d;* and blends of the two.

- **Morphemes and Semantics: Morphemes** *are the smallest units of meaning in a language***.** They can include root words as well as prefixes and suffixes. For example, words like *fire, guard,* and

friend, consist of a single morpheme. Many others represent combinations of morphemes. For example, the word *unfriendly* consists of three morphemes: the root word *friend,* the prefix - *un,* and the suffix *-ly.* Each of the morphemes contributes to the meaning of the entire word. **Semantics is** *the area of language concerned with understanding the meaning of words and word combinations*.

- **Syntax:** Syntax *is a set of rules that specify how words can be arranged into meaningful phrases and sentences*. A simple rule of syntax is that a sentence must have both a *noun phrase* and a *verb phrase.*

- **Milestones of Language Development:**

(Taken from Weiten – Psychology: Themes and Variations)

Months

1–5 *Reflexive communication:* Vocalizes randomly, coos, laughs, cries, engages in vocal play, discriminates language from non-language sounds

6–18 *Babbling:* Verbalizes in response to speech of others; responses increasingly approximate human speech patterns

10–13 *First words:* Uses words; typically to refer to objects

12–18 *One-word sentence stage:* Vocabulary grows slowly; uses nouns primarily; over extensions begin

18–24 *Vocabulary spurt:* Fast-mapping facilitates rapid acquisition of new words

Years

2 -*Two-word sentence stage:* Uses telegraphic speech; uses more pronouns and verbs

2.5 -*Three-word sentence stage:* Modifies speech to take listener into account; over regularizations begin

3 - Uses complete simple active sentence structure; uses sentences to tell stories that are understood by others; uses plurals

3.5 -*Expanded grammatical forms:* Expresses concepts with words; uses four-word sentences

4 - Uses private speech; uses five-word sentences

5 - *Well-developed and complex syntax:* Uses more complex syntax; uses more complex forms to tell stories

6 - Displays meta linguistic awareness

<div align="center">**OR**</div>

(Taken from Baron)

12 weeks: Smiles when talked to; makes cooing sounds

16 weeks: Turns head in response to human voice

20 weeks: Makes vowel and consonant sounds while cooing

Average Age Language Behaviour Demonstrated by Child

6 months: Progresses from cooing to babbling that contains all sounds of human speech

8 months: Repeats certain syllables (e.g., "ma-ma")

12 months: Understands some words: may say a few

18 months: Can produce up to fifty words

24 months: Has vocabulary of more than fifty words; uses some two-word phrases

30 months: Has vocabulary of several hundred words; uses phrases of three to five words

36 months: Has vocabulary of about a thousand words

48 months: Has mastered most basic elements of language

REASONING

- **Reasoning:** drawing conclusions from available information. More formally, in reasoning we make *cognitive transformations of appropriate information in order to reach specific conclusions (Galotti, 1989).* It of two types:

- **Deductive reasoning**
    - In this form of reasoning, a person starts with a general belief, and from there determines what conclusion can be reached. Essentially, deduction starts with a hypothesis and examines the possibilities within that hypothesis to reach a conclusion. Deductive reasoning has the advantage that, if your original premises are true in all situations and your reasoning is correct, your conclusion is guaranteed to be true.
    - However, deductive reasoning has limited applicability in the real world because there are very few premises which are guaranteed to be true all of the time.
    - **Syllogistic reasoning (a form of deductive reasoning)** — *reasoning in which conclusions are based on two propositions called premises.* (Two statements reach a logical conclusion). For example, consider the following syllogism:
    - *Premise:* All humans are mortal.
    - *Premise:* All am a human.
    - *Conclusion:* Therefore, I am mortal
    - "All dogs are mammals; Kirra is a dog; therefore, Kirra is a mammal."

- **Inductive Reasoning:**
    - In this form of reasoning, a person starts with a theory and then moves on to a general belief.
    - It is based on our ability to recognize meaningful patterns and connections. By taking into account both examples and our understanding of how the world works, induction allows you to conclude that something is likely to be true. By using induction, you move from specific data to a generalization that tries to capture what the data "mean." For example, after eating strawberries once, your lips swelled up soon. A few weeks later you ate strawberries again and soon your lips again became swollen. You eat strawberries again, your lips get swollen the third time. You become aware that swollen lips can be a sign of an allergy to strawberries. Using induction, you conclude that you are allergic to strawberries.

- **Formal reasoning:** In formal reasoning, all the required information is supplied, the problem to be solved is straightforward, there is typically only one correct answer, and the reasoning we apply follows a specific method.

- **Everyday reasoning:** *everyday reasoning* involves the kind of thinking we do in our daily lives: planning, making commitments, etc. The problems involved often have several possible answers, which may vary in effectiveness; and the problems themselves are not self-contained—they relate to other issues and questions of daily life (Hilton, 1995).

- **Barriers to reasoning:**
  o **Mood States:** the way we feel—our current moods or emotions—can reduce our ability to reason effectively.
  o **Beliefs:** Reasoning is often influenced by our beliefs. For example, a person with deeply held convictions against the death penalty listens to a speech favouring capital punishment contains arguments that point to the conclusion that death penalty is justified for preventing social evils. Yet the listener totally rejects this conclusion because of his or her beliefs against death penalty.
  o **Confirmation bias**: our strong tendency to test conclusions or hypotheses by examining only, or primarily, evidence that confirms our initial views.
  o **Hindsight effect:** the tendency to judge events as more predictable after their occurrence than in foresight

DECISION MAKING

- **Decision making:** *The process of choosing among various courses of action or alternatives.* It involves evaluating alternative sand making choices among them. Most people try to be systematic and rational in their decision making. Simon's *Theory of Bounded Rationality* asserts that people tend to use simple strategies in decision making that focus on only a few facets of available options and this often result in decisions that may be irrational and not the best. Many decisions involve choices which can be made from a number of options. Barry Schwartz (2004) has argued that people in modern societies are overwhelmed by an overabundance of choices (choice overload). Schwartz (2004) argues that while the abundance of choices seem good, it has unexpected costs. People often make errors even when choosing among a handful of alternatives and that errors become much more likely when decisions become more complex. Having more alternatives increases the potential for post-decision regret which undermines individuals' happiness and contributes to depression. *Additive strategy* involves the listing of attributes and rating them on their desirability and importance that influence decisions of individuals.

- **Strategies for decision making:**
  o People make choices by gradually eliminating less attractive alternatives using a method called **elimination by aspects** (Slovic, 1990; Tversky, 1972). Alternatives are eliminated by evaluating

them on each attribute or aspect. Whenever any alternative fails to satisfy some minimum criterion for an attribute, it's eliminated from further consideration.

- o **Heuristics**: *Mental rules of thumb that permit us to make decisions and judgments in a rapid and efficient manner*. While heuristics reduces the work, it may not always enhance the quality of the decisions made.
  - **Availability heuristic**: *the tendency to make judgments about the frequency or likelihood of events in terms of how readily examples of them can be brought to mind*. This shortcut tends to work fairly well, because the more readily we can bring events to mind, the more frequent they generally are; but it can lead us into error as well. The availability heuristic also influences many people to overestimate their chances of being a victim of violent crime, being involved in an airplane crash, or winning the lottery. People can readily bring vivid examples of them to mind and they conclude that such events are much more frequent than they really are.
  - **Representativeness heuristic**: People make decision based on similarity (prototypes): The more closely an item— or event, object, or person—resembles the most typical examples of some concept or category, the more likely it is to belong to that concept or category.
  - **Anchoring-and-Adjustment Heuristic**: *A cognitive rule of thumb for decision making in which existing information is accepted as a reference point but then adjusted in light of various factors*.

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- Psychology in Modules. 9th ed. David Myers
- Psychology. 3rd ed. Saundra K. Ciccarelli.
- What is Cognition? Lumen Learning. https://courses.lumenlearning.com/wmopen-psychology/chapter/what-is-cognition/
- Inductive and Deductive Reasoning. https://courses.lumenlearning.com/engcomp1-wmopen/chapter/text-inductive-reasoning/

NOTE: Please do refer to other books/materials to add on to the notes above while studying/preparing for your exams.