HUL381/ELL457: Assignment 1

Indicative Solutions

1.

Dichotic listening is an experimental technique that uses auditory signals to observe the behavior of the individual hemispheres of the human brain. Subjects hear two different sound signals simultaneously through earphones. (0.5 marks)

When asked to state what they heard in each ear, subjects are more frequently correct in reporting linguistic stimuli (words, nonsense syllables, and so on) delivered directly to the right ear, but are more frequently correct in reporting nonverbal stimuli (musical chords, environmental sounds, and so on) delivered to the left ear. Such experiments provide strong evidence of lateralization, and that language is localized in the left hemisphere. (0.5 marks)

2.

The critical-age hypothesis assumes that language is biologically based and that the ability to learn a native language develops within a fixed period, from birth to middle childhood. During this critical period, language acquisition proceeds easily, swiftly, and without external intervention. After this period, the acquisition of grammar is difficult and, for most individuals, never fully achieved. Children deprived of language during this critical period show atypical patterns of brain lateralization. (1 mark)

3.

Corpus Callosum is a network of nerve fibres that connects the cerebral hemispheres and allows them to communicate. (0.25 marks)

The term used for patients with removed/damaged corpus callosum is **split-brains**. (0.25 marks)

Such a patient, when holding a pencil in its left hand will be able to identify it, but not name it, since language is lateralized in the left hemisphere and the signals from left hand go immediately to the right hemisphere, and can't reach the left due to the damaged/removed corpus callosum. (0.5 marks)

4.

Declarative: Associating physical concepts to content and function words, retrieval of those words while trying to talk about those entities or concepts.
Procedural: Knowledge of rules of grammar, composing sentences and constructing discourse structure over multiple sentences.
Example:
In a hurry to reach the classroom, Sahil dropped his ice-cream while running.
In the above sentence, words like "hurry", "reach", "classroom", "Sahil", "dropped", "ice-cream" and "running" refer to either physical entities or concepts. Naming them requires "look-up" or declarative knowledge. On the other hand, composing them in a grammatical structure using function words like "in", "to", "while" etc. requires procedural knowledge.

5.

Broca's aphasia and Wernicke's aphasia result from damage in different parts of the brain. Both result in different linguistic abnormalities. In Broca's aphasia, or agrammatic aphasia the patient is not able to form grammatical sentences. They utter content words, but cannot use function words properly.
On the other hand, Wernicke's aphasia patients form grammatical but meaningless sentences; non-sense sentences.

	Broca's Aphasia	*Wernicke's Aphasia*
	Damage in Broca's area that is located in the frontal lobe of the left hemisphere	Damage to Wernicke's area of the brain located in the temporal lobe of the left hemisphere
	Affects motor speech area (movement)	Affects sensory speech area (understanding)
	It is expressive aphasia (non-fluent aphasia)	It is receptive aphasia (fluent aphasia)
	Loss of the ability to produce language (spoken or written)	Inablity to understand language (written or spoken form)
	Patients have insight into their problem and are frustrated	Patient is unaware of his problem
	Characterized by agrammatism, effortful speech and language including important content words	Characterized by neologisms and word salads and meaningless sentences