UNIT : 3 NEUROLINGUISTICS & PSYCHOLINGUISTICS

:: STRUCTURE ::

3.0 OBJECTIVES

- To make students familiar with the terms of Neurolinguistics and Psycholinguistics
- To help students understand the historical perspectives of Neurolinguistics and Psycholinguistics
- To create the understanding among the leaners about the interdisciplinary approach of Neurolinguistics and Psycholinguistics
- To introduce the students with the important areas of Neurolinguistics and Psycholinguistics

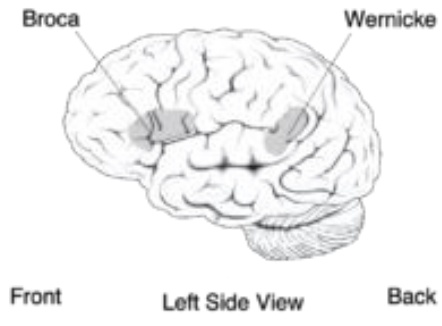
3.1 INTRODUCTION

Neurolinguistics is the study of neural mechanisms in the human brain that controls the comprehension, production, and acquisition of language. It is an interdisciplinary field. Neurolinguistics draws methods and theories from fields such as neuroscience, linguistics, cognitive science, communication disorders and neuropsychology.

Neurolinguists study the physiological mechanisms by which the brain processes information related to language, and evaluate linguistic and psycholinguistic theories, using aphasiology, brain imaging, electrophysiology, and computer modeling.

3.2 HISTORICAL PERSPECTIVE OF NEUROLINGUISTICS

Neurolinguistics has its roots in the 19th century where study of aphasiology was carried out. Aphasiology is the study of linguistic deficits (aphasias) occurring due to damage in brain. Aphasiology correlates the impact of brain injuries on language processing. Paul Broca drew a connection between a particular brain area and language processing. He was a French surgeon who conducted autopsies on numerous individuals who had speaking deficiencies, and found that most of them had brain damage (or lesions) on the left frontal lobe, in an area now known as Broca's area.

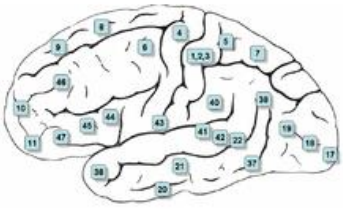


Phrenologists had made the claim in the early 19th century that different brain regions carried out different functions and that language was mostly controlled by the frontal regions of the brain. While Broca's research was possibly the first to offer empirical evidence for such a relationship. Broca’s research has been

described as "epoch-making" and "pivotal"to the fields of neurolinguistics and cognitive science.

(Image – 1 – Broca& Wernicke's Area)

Later, Carl Wernicke, after whom Wernicke's area is named, proposed that different areas of the brain were specialized for different linguistic tasks. Broca's area handles the motor production of speech, and Wernicke's area handles auditory speech comprehension.The work of Broca and Wernicke established the field of aphasiology and the idea that language can be studied through examining physical characteristics of the brain.



In early 20th century, Korbinian Brodmann, "mapped" the surface of the brain and divided the brain into numbered areas based on each area's cytoarchitecture (cell structure) and function. These areas are known as Brodmann areas today and are widely used in neuroscience.

(Image – 2 - Surface of the human brain, with Brodmann areas numbered)

Edith Crowell Trager, Henri Hecaen and Alexandr Luria were the ones to coined the term "Neurolinguistics" around 1940s and 1950s. Luria's book "Problems in Neurolinguistics" is likely the first book with "neurolinguistics" in the title. Harry Whitaker popularized neurolinguistics in the United States in the 1970s and founded the journal titled "Brain and Language" in 1974.

Aphasiology is the historical core of neurolinguistics. In the recent years the field has broadened considerably because of the emergence of new brain imaging technologies (such as PET and fMRI) and time-sensitive electrophysiological techniques (EEG and MEG), which can highlight patterns of brain activation as people engage in various language tasks. Electrophysiological techniques, in particular, emerged as a viable method for the study of language in 1980.

- **Check Your Progress – I**

1 What is Neurolinguistics?

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2 Describe the chronological development of Neurolinguistics.

3 What is Aphasia?

4 What is Broca's area?

5 Which is the control point of language in brain?

6 Briefly state Korbinian Brodmann work.

7 Who coined the term Neurolinguistics? (VSAQ)

8 Name the founder of the journal "Brain and Language".(VSAQ)

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9 Briefly state the various techniques of mapping of the brain patterns (SAQ)

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3.3 NEUROLINGUISTICS – AN INTERDISCIPLINARY FIELD

Neurolinguistics is closely related to the field of psycholinguistics. It explains the cognitivemechanisms of language by employing the traditional techniques of experimental psychology. Today, psycholinguistic and neurolinguistic theories often collaborate with one another.

Much work in neurolinguistics involves testing and evaluating theories put forth by psycholinguists and theoretical linguists.Theoretical linguists propose models to explain the structure of language and how language information is organized. Psycholinguists propose models and algorithms to explain how language information is processed in the mind. Neurolinguists analyze brain activity to infer how biological structures (populations and networks of neurons) carry out those psycholinguistic processing algorithms.For example, experiments in sentence processes used ELAN, N400, and P600 brain responses to examine how physiological brain responses reflect the different predictions of sentence processing models put forth by psycholinguists, such as Janet Fodor and Lyn Frazier's "serial" model, and Theo Vosse and Gerard Kempen's "unification model".

Neurolinguists can also make new predictions about the structure and organization of language based on insights about the physiology of the brain, by "generalizing from the knowledge of neurological structures to language structure."

Neurolinguistics research is carried out in all the major areas of linguistics. They are given in the table below.

Subfield	Description	Research Questions in Neurolinguistics
Phonetics	the study of speech sounds	how the brain extracts speech sounds from an acoustic signal & how the brain separates speech sounds from background noise
Phonology	the study of how sounds are organized in a language	how the phonological system of a particular language is represented in the brain
Morphology and Lexicology	the study of how words are structured and stored in the mental lexicon	how the brain stores and accesses words that a person knows
Syntax	the study of how multiple-word utterances are constructed	how the brain combines words into constituents and sentences; how structural and semantic information is used in understanding sentences
Semantics	the study of how meaning is encoded in language	

- **Check Your Progress – II**

Explain Neurolinguistics as an interdisciplinary field and also tabulate subfields with required explanation.

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3.4 A FEW SIGNIFICANT AREAS OF NEUROLINGUISTICS

Neurolinguistics research investigates several topics, including where language information is processed, how language processing unfolds over time, how brain structures are related to language acquisition and

learning, and how neurophysiology can contribute to speech and language pathology.

I) Localizations of language processes

Much work in neurolinguistics (like Broca's and Wernicke's) investigated the locations of specific language "modules" within the brain. Research questions include (1) what course language information follows through the brain as it is processed, (2) whether or not particular areas specialize in processing particular sorts of information, (3) how different brain regions interact with one another in language processing,and (4) how the locations of brain activation differ when a subject is producing or perceiving a language other than his or her first language.

II) Time Course of Language Processes

Neurolinguistics also involves the use of electrophysiological techniques to analyze the rapid processing of language in time. The temporal ordering of specific patterns of brain activity may reflect discrete computational processes that the brain undergoes during language processing; for example, one neurolinguistic theory of sentence analyzing proposes that three brain responses (the ELAN, N400, and P600) are products of three different steps in syntactic and semantic processing.

III) Language Acquisition

Another area of research is the relationship between brain structures and language acquisition. Research in first language acquisition has already established that infants from all linguistic environments go through similar and predictable stages (such as babbling), and some neurolinguistics research attempts to find correlations between stages of language development and stages of brain development, while other research investigates the physical changes (known as neuroplasticity) that the brain undergoes during second language acquisition, when adults learn a new language. Neuroplasticity is observed when both Second Language acquisition and Language Learning experience are encouraged, the result of this language exposure concludes that an increase of gray and white matter could be found in children, young adults and the elderly.

IV) Language Pathology

Neurolinguistic techniques under Language Pathology are also used to study disorders and breakdowns in language, such as aphasia and dyslexia, and how they relate to physical characteristics of the brain.

Check Your Progress – III

Explain in detail a few significant areas of Neurolinguistics.

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3.5 CONCLUDING REMARKS (NEUROLINGUISTICS)

Neurolinguistics is the study of how language is represented in the brain: that is, how and where our brains store our knowledge of the language (or languages) that we speak, understand, read, and write, what happens in our brains as we acquire that knowledge, and what happens as we use it in our everyday lives.

Neurolinguistics is deeply entwined with psycholinguistics, which is the study of the language processing steps that are required for speaking and understanding words and sentences, learning first and later languages, and also of language processing in disorders of speech, language, and reading.

3.6 KEY WORDS

Neurolinguistics	the study of neural mechanisms
Cognitive Science	the interdisciplinary study of mind and intelligence
Physiological Mechanisms	Mechanisms, by which organ systems of the body function
Aphasiology	study of language impairment usually resulting from brain damage
Aphasias	disorder that affects how you communicate
Lesions	A lesion is any damage or abnormal change in the tissue of an organism, usually caused by disease or trauma
Phrenology	the study of the conformation of the skull as indicative of mental faculties and traits of character

Empirical Evidence	is information that researchers generate to help uncover answers to questions that can have significant implications for our society.
Auditory	relating to the sense of hearing
Cytoarchitecture	is the study of the cellular composition of the central nervous system's tissues under the microscope
Algorithm	a process or set of rules to be followed in calculations
Language Acquisition	is the process by which humans acquire the capacity to perceive and comprehend language as well as to produce and use words and sentences to communicate.
Language Pathology	is a field of expertise practiced by a clinician known as a speech–language pathologist or a speech and language therapist,
Babbling	producing meaningless speech sounds
Dyslexia	a learning disorder that involves difficulty reading due to problems identifying speech sounds and learning how they relate to letters and words

3.7 BOOKS SUGGESTED

- Neurolinguistics: An Introduction to Spoken Language Processing and Its Disorders(Cambridge Textbooks in Linguistics) by John C.L. Ingram
- The Symbolic Species: The Co-evolution of Language and the Brain by Terrence W. Deacon
- Introduction to Neurolinguistics by Elisabeth Ahlsen, John Benjamins Publishing Company
- Studies in Neurolinguisticsby Haiganoosh Whitaker (Editor), Harry Whitaker (Editor) by Academic Press

ANSWERS

Check Your Progress – I

Answer : 1

Neurolinguistics is the study of neural mechanisms in the human brain that controls the comprehension, production, and acquisition of language. It is an interdisciplinary field.

Answer : 2

Neurolinguistics has its roots in the 19th century where study of aphasiology was carried out. Paul Broca drew a connection between a particular brain area and language processing. Phrenologists had made the claim in the early 19th century that different brain regions carried out different functions and that language was mostly controlled by the frontal regions of the brainLater, Carl Wernicke, after whom Wernicke's area is named, proposed that different areas of the brain were specialized for different linguistic tasks In early 20th century, Korbinian Brodmann, "mapped" the surface of the brain and divided the brain into numbered areas based on each area's cytoarchitecture (cell structure) and function.

Answer : 3

Aphasiology is the study of linguistic deficits (aphasias) occurring due to damage in brain. Aphasiology correlates the impact of brain injuries on language processing.

Answer : 4

Paul Broca drew a connection between a particular brain area and language processing. He was French surgeon who conducted autopsies on numerous individuals who had speaking deficiencies, and found that most of them had brain damage (or lesions) on the left frontal lobe, in an area now known as Broca's area.

Answer : 5

Language was mostly controlled by the frontal regions of the brain.

Answer : 6

In early 20th century, Korbinian Brodmann, "mapped" the surface of the brain and divided the brain into numbered areas based on each area's cytoarchitecture (cell structure) and function. These areas are known as Brodmann areas today and are widely used in neuroscience

Answer : 7

Edith Crowell Trager, Henri Hecaen and Alexandr Luria were the ones to coined the term “Neurolinguistics” around 1940s and 1950s

Answer : 8

Harry Whitaker popularized neurolinguistics in the United States in the 1970s and founded the journal titled "Brain and Language" in 1974.

Answer : 9

New brain imaging technologies (such as PET and fMRI) and time-sensitive electrophysiological techniques (EEG and MEG), which can highlight patterns of brain activation as people engage in various language tasks.

Check Your Progress – II

Answer:

Neurolinguistics is closely related to the field of psycholinguistics. It explains the cognitive mechanisms of language by employing the traditional techniques of experimental psychology. Today, psycholinguistic and neurolinguistic theories often collaborate with one another.

Much work in neurolinguistics involves testing and evaluating theories put forth by psycholinguists and theoretical linguists.

Check Your Progress – III

Neurolinguistics research investigates several topics, including where language information is processed, how language processing unfolds over time, how brain structures are related to language acquisition and learning, and how neurophysiology can contribute to speech and language pathology. Following are the areas of Neurolinguistics:

I) Localizations of language processes
II) Time Course of Language Processes
III) Language Acquisition
IV) Language Pathology

3.8 PSYCHOLINGUISTICS

3.8.0 INTRODUCTION

Psycholinguistics or psychology of language is the study of the interrelation between linguistic factors and psychological aspects. It is mainly concerned with the mechanisms by which language is processed and represented in the mind and brain; that is, the psychological and neurobiological factors that enable humans to acquire, use, comprehend, and produce language.

Psycholinguistics is concerned with the cognitive faculties and processes that are necessary to produce the grammatical constructions of language. Modern research makes use of biology, neuroscience, cognitive science, linguistics, and information science to study how the mind (brain) processes language, social sciences, human development, communication theories, infant development and so on.

3.8.1 Areas Of Study Of Psycholinguistics

Psycholinguistics is an interdisciplinary field that consists of researchers from a variety of different backgrounds, including psychology, cognitive science, linguistics, speech and language pathology, and discourse analysis. Psycholinguists study how people acquire and use language, according to the following main areas:

- **language acquisition**: how do children acquire language?
- **language comprehension**: how do people comprehend language?
- **language production**: how do people produce language?
- **second language acquisition**: how do people who already know one language acquire another one?

- **Check Your Progress – IV**

1 What is Psycholinguistics?

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2 Enlist the Areas of Psycholinguistics.

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A researcher interested in language comprehension may study word recognition during reading, to examine the processes involved in the extraction of orthographic, morphological, phonological, and semantic information from patterns in printed text.

A researcher interested in language production might study how words are prepared to be spoken starting from the conceptual or semantic level. Developmental psycholinguists study infants' and children's ability to learn and process language.
Psycholinguistics further divide their studies according to the different components that make up human language.

Linguistics-related areas include:

- **Phonetics and phonology** are the study of speech sounds. Within psycholinguistics, research focuses on how the brain processes and understands these sounds.

- **Morphology** is the study of word structures, especially between related words (such as dog and dogs) and the formation of words based on rules (such as plural formation).
- **Syntax** is the study of how words are combined to form sentences.
- **Semantics** deals with the meaning of words and sentences. Where syntax is concerned with the formal structure of sentences, semantics deals with the actual meaning of sentences.
- **Pragmatics** is concerned with the role of context in the interpretation of meaning.

3.8.2 History & Origin Of Psycholinguistics

In seeking to understand the properties of language acquisition, psycholinguistics has its roots in debates regarding innate versus acquired behaviors (both in biology and psychology). Behaviors are considered innate and can be analyzed in line with psychological aspect of an individual.

The theoretical framework for psycholinguistics began to be developed before the end of the 19th century as the "Psychology of Language". The work of Edward Thorndike and Frederic Bartlett laid the foundations of "Science of Psycholinguistics". In 1936 Jacob Kantor, a prominent psychologist used the term "psycholinguistic" as a description within his book "An Objective Psychology of Grammar".

However, the term "psycholinguistics" only came into widespread usage in 1946 when Kantor's student Nicholas Pronko published an article entitled "Psycholinguistics: A Review". Pronko's desire was to unify innumerable theoretical approaches under a single name.

- **Check Your Progress – V**

Briefly state the history and origin of Psycholinguistics?

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3.8.3 THEORIES OF PSYCHOLINGUISTICS

1 Language acquisition

Though there is still much debate, there are two primary theories on childhood language acquisition:

- **the behaviorist perspective**, whereby all language must be learned by the child; and

- **the innatist perspective**, which believes that the abstract system of language cannot be learned, but that humans possess an innate language faculty or access to what has been called "universal grammar".

The innatist perspective began in 1959 with Noam Chomsky's highly critical review of B.F. Skinner's Verbal Behavior (1957). Chomsky suggested that humans possess a special, innate ability for language, and that complex syntactic features, such as recursion, are "hard-wired" in the brain. When Chomsky asserted that children acquiring a language have a vast search space to explore among all possible human grammars, there was no evidence that children received sufficient input to learn all the rules of their language. Hence, there must be some other innate mechanism that endows humans with the ability to learn language. According to the "innateness hypothesis", such a language faculty is what defines human language and makes that faculty different from even the most sophisticated forms of animal communication.

2 Language Acquisition Device (LAD)

Language Acquisition Device (LAD) is a claim from language acquisition research proposed by Noam Chomsky in 1960s. LAD concept is an unsupported natural mental capacity which enables an infant to acquire and produce language. It is a component of the nativist theory of language. This theory asserts that humans are born with the instinct or "innate facility" for acquiring language.

A summary explaining LAD by Chomsky states that languages are endless relating to the sequence of word forms (strings) and grammar. These word forms organize grammatically correct sequences of words that can be pooled over a limited lexicon of each independent language. So, LAD is tasked to select from an infinite number of grammars the one which is correct for the language that is presented to an individual, for example, a child.

3 Language Comprehension

The structures and uses of language are related to the formation of ontological insights. Some see this system as "structured cooperation between language-users" who use conceptual and semantic deference in order to exchange meaning and knowledge, as well as give meaning to language, thereby examining and describing "semantic processes".

The theory of the "semantic differential" supposes universal distinctions, such as:

- Typicality: that included scales such as "regular–rare", "typical–exclusive";
- Reality: "imaginary–real", "evident–fantastic", "abstract–concrete";

- Complexity: "complex–simple", "unlimited–limited", "mysterious–usual";
- Improvement or Organization: "regular–spasmodic", "constant–changeable", "organized–disorganized", "precise–indefinite";
- Stimulation: "interesting–boring", "trivial–new".

4 Reading

One question in the realm of language comprehension is how people understand sentences as they read (i.e., sentence processing). Experimental research has spawned several theories about the architecture and mechanisms of sentence comprehension. These theories are typically concerned with the types of information, contained in the sentence, that the reader can use to build meaning, and at what point in reading does that information becomes available to the reader. Issues such as "modular" versus "interactive" processing have been theoretical divides in the field.

A modular view of sentence processing assumes that the stages involved in reading a sentence function independently as separate modules. These modules have limited interaction with one another. For example, one influential theory of sentence processing, the "garden-path theory", states that syntactic analysis takes place first. Under this theory, as the reader is reading a sentence, he or she creates the simplest structure possible, to minimize effort and cognitive load. This is done without any input from semantic analysis or context-dependent information. Hence, in the sentence "The evidence examined by the lawyer turned out to be unreliable", by the time the reader gets to the word "examined" he or she has committed to a reading of the sentence in which the evidence is examining something because it is the simplest parsing. This commitment is made even though it results in an implausible situation: evidence cannot examine something. Under this "syntax first" theory, semantic information is processed at a later stage. It is only later that the reader will recognize that he or she needs to revise the initial parsing into one in which "the evidence" is being examined. In this example, readers typically recognize their mistake by the time they reach "by the lawyer" and must go back and reevaluate the sentence. This reanalysis is costly and contributes to slower reading times.

In contrast to the modular view, **an interactive theory of sentence processing**, such as a constraint-based lexical approach assumes that all available information contained within a sentence can be processed at any time. Under an interactive view, the semantics of a sentence can come into play early on to help determine the structure of a sentence. Hence, in the sentence above, the reader would be able to make use of plausibility information in order to assume that "the evidence" is being examined instead of doing the examining.

When reading, saccades can cause the mind to skip over words because it does not see them as important to the sentence, and the mind completely omits it from the sentence or supplies the wrong word in its stead. This can be seen in "Paris in the the Spring". This is a common psychological test, where the mind will often skip the second "the", especially when there is a line break in between the two.

5 Language Production

Language production refers to how people produce language, either in written or spoken form, in a way that conveys meanings understandable to others. One of the most effective ways to explain the way people represent meanings using rule-governed languages is by observing and analyzing instances of speech errors, which include speech disfluencies like false starts, repetition, reformulation and constant pauses in between words or sentences, as well as slips of the tongue, like-blendings, substitutions, exchanges (e.g. Spoonerism), and various pronunciation errors.

These speech errors have significant implications for understanding how language is produced, in that they reflect that:

1 **Speech is planned in advance**: speech errors such as substitution and exchanges show that one does not plan their entire sentence before they speak. Rather, their language faculty is constantly tapped during the speech production process. This is accounted for by the limitation of working memory. In particular, errors involving exchanges imply that one plans one's sentence ahead but only with regard to its significant ideas (e.g. the words that constitute the core meaning) and only to a certain extent.
2 **Lexicon is organized semantically and phonologically**: substitution and pronunciation errors show that lexicon is organized not only by its meaning, but also its form.
3 **Morphologically complex words are assembled**: errors involving blending within a word reflect that there seems to be a rule governing the construction of words in production. In other words, speakers generate the morphologically complex words by merging morphemes.

It is useful to differentiate between three separate phases of language production:

1 **conceptualization:** "determining what to say";
2 **formulation:** "translating the intention to say something into linguistic form";
3 **execution:** "the detailed articulatory planning and articulation itself".

Psycholinguistic research has largely concerned itself with the study of formulation because the conceptualization phase remains largely elusive and mysterious.

6 Transformational Grammar (TG) or Transformational-Generative Grammar (TGG)

In linguistics, transformational grammar (TG) or transformational-generative grammar (TGG) is part of the theory of generative grammar, especially of natural languages. It considers grammar to be a system of rules that generate exactly those combinations of words that form grammatical sentences in a given language and involves the use of defined operations (called transformations) to produce new sentences from existing ones. The method is commonly associated with American linguist Noam Chomsky.

Generative algebra was first introduced to general linguistics by the structural linguist Louis Hjelmslev although the method was described before him by Albert Sechehaye in 1908. Chomsky adopted the concept of transformations from his teacher Zellig Harris, who followed the American descriptivist separation of semantics from syntax. Hjelmslev's structuralist conception including semantics and pragmatics is incorporated into functional grammar.

- **Check Your Progress – VI**

Explain in detail the theories of Psycholinguistics

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3.8.4 Concluding Remarks (Psycholinguistics)

Psycholinguistics combines methods and theories from psychology and linguistics. It attempts to evaluate the psychological reality and underpinnings of linguistic rules and processes. It also seeks to link word and sentence processing to the deeper expressive processes of message construction and interpretation. Psycholinguistic experiments typically use reaction-time methodology to examine language comprehension and production as online processes. It shows that words and sentences are constructed in an overlapping, incremental fashion. This incrementalism allows us to begin producing words. In order to construct formal models of this incremental processing, psycholinguists have used both modular accounts and neural network accounts. These models are then further elaborated to account for the process of language acquisition, as well as variations in language processing that arise between different languages. Modular theories typically propose a fixed core of processing strategies

that apply across languages and are available even to young children. Interactive theories tend to emphasize the extent to which the structures of particular language emerge during the process of learning, as a response to specific structural cues provided by the native language.

3.9 KEY WORDS (PSYCHOLINGUISTICS)

Psychology	the scientific study of mind and behavior.
Neurobiology	a scientific field in which researchers study the nervous system and brain function
Discourse	is spoken or written communication between people, especially serious discussion of a particular subject
Orthography	the art of writing words with the proper letters according to standard usage
Phonological	the system of contrastive relationships among the speech sounds that constitute the fundamental components of a language.
Semantic	relating to meaning in language or logic.
Hypothesis	a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.
Ontological	showing the relations between the concepts and categories in a subject area or domain.
Semantic Differential	a measurement scale designed to measure a person's subjective perception of, and affective reactions to, the properties of concepts, objects, and events by making use of a set of bipolar scales.
Stimulation	encouragement of something to make it develop or become more active.
Garden-path Theory	The garden-path sentence effect occurs when the sentence has a phrase or word with an ambiguous meaning that the reader interprets in a certain way and, when they read the whole sentence, there is a difference in what has been read and what was expected.
Syntactic Analysis	an analysis that focuses on understanding the logical meaning of sentences or of parts of sentences.
Speech Disfluencies	any disruption in the flow of spoken language that is caused by the speaker
Lexicon	the complete set of meaningful units in a language
Morpheme	a short segment of language that meets three basic criteria
Articulatory	relating to the formation of speech sounds.

3.10 BOOKS SUGGESTED

- **Psycholinguistics, (Oxford Introductions to Language Study) by Thomas Scovel, H.G. Widdowson (Series Editor)**
- Psychology and Language: An Introduction to Psycholinguistics by Herbert H. Clark, Eve V. Clark, by Houghton Mifflin Harcourt P
- An Introduction to Psycholinguistics by Danny D. Steinberg by Addison Wesley Publishing Company
- Psycholinguistics: Language, Mind and World by Danny D. Steinberg, Hiroshi Nagata, David P. Aline by Routledge
- Language in Mind: An Introduction to Psycholinguisticsby Julie Sedivy by Oxford University Press

ANSWERS

- **Check Your Progress – IV**

Answer : 1

Psycholinguistics is an interdisciplinary field that consists of researchers from a variety of different backgrounds, including psychology, cognitive science, linguistics, speech and language pathology, and discourse analysis.

Answer : 2

Psycholinguists study how people acquire and use language, according to the following main areas:

- language acquisition: how do children acquire language?
- language comprehension: how do people comprehend language?
- language production: how do people produce language?
- second language acquisition: how do people who already know one language acquire another one?

- **Check Your Progress – V**

Answer

Psycholinguistics has its roots in debates regarding innate versus acquired behaviors. The theoretical framework for psycholinguistics began to be developed before the end of the 19th century as the "Psychology of Language". The work of Edward Thorndike and Frederic Bartlett laid the foundations of “Science of Psycholinguistics”. In 1936 Jacob Kantor, a prominent psychologist used the term "psycholinguistic" as a description within his book “An Objective Psychology of Grammar”.
However, the term "psycholinguistics" only came into widespread usage in 1946 when Kantor's student Nicholas Pronko published an article

entitled "Psycholinguistics: A Review". Pronko's desire was to unify innumerable theoretical approaches under a single name.

- **Check Your Progress – VI**

Answer

Theories of Psycholinguistics are

1 Language acquisition
Though there is still much debate, there are two primary theories on childhood language acquisition:

- the behaviorist perspective, whereby all language must be learned by the child; and
- the innatist perspective, which believes that the abstract system of language cannot be learned, but that humans possess an innate language faculty or access to what has been called "universal grammar".

2 Language Comprehension
The structures and uses of language are related to the formation of ontological insights.

3 Reading
One question in the realm of language comprehension is how people understand sentences as they read.

4 Language Production
Language production refers to how people produce language, either in written or spoken form, in a way that conveys meanings understandable to others