Neurolinguistics, as the term suggests, is a branch of linguistics that concerns the research area which is the outcome of the interaction between two important branches of human science – neurology and linguistics. The present work is an attempt at the linguistic interpretation of a neurological deficit called “aphasia”. We are concerned with the question how this neurological damage can affect the working of language in human beings. The very fact that the damage to the CNS [Central Nervous System], particularly brain, affects language acts as evidence for the contention that language is a biological phenomenon.

1.1 Aphasia: An Introduction

The use of speech to communicate is unique to humans. When speech is impaired or absent, the impact on the person and his family is profound. One of the most heartbreaking and devastating disabilities is aphasia. Most people have not heard about aphasia, nor do they know the term until someone in their family or a friend suffers from aphasia. Aphasia is an impairment of language, affecting the production or comprehension of speech and the ability to read or write. Aphasia is always due to injury to the brain, most commonly from a stroke, particularly in older individuals. But brain injuries resulting in aphasia may also arise from head trauma, brain tumors, or infections.

Aphasia can be severe enough to make communication with the patient almost impossible. However it can be very mild. It may affect mainly a single aspect of language use, such as the ability to retrieve the names of objects, or the ability to put words together into sentences, or the ability to read. More commonly, however, multiple aspects of communication are impaired, while some channels remain accessible for a limited exchange of information. It is the job of a professional to determine the amount of
function available in each of the channels for the comprehension of language, and to
assess the possibility that treatment might enhance the use of the channels that are
available. Transient aphasia refers to a communication problem that lasts only a few
hours or days. More than half of those who initially show symptoms of aphasia recover
completely within the first few days.

No medicine or drugs have been known to cure aphasia, as yet. Surgery is successful in
those occasions where pressure from a brain tumor or a hematoma, i.e. a swelling filled
with blood, impacts a critical speech center. Surgery is not useful in cases of aphasia
following stroke, which represent the vast majority of instances. Speech therapy is often
provided to persons with aphasia, but does not guarantee a "cure". The purpose of speech
therapy is to help the patient fully utilize remaining skills and to learn compensatory
means of communication. Who are these speech therapists or if the question is reframed,
it would be, "who should be worthy of being a speech therapist for these aphasics"? The
answer is – none other than linguists with clinical experiences as only a linguist can
understand the specific area of deficit in a language as no two patients with aphasia are
affected in the same manner.

1.1.1 Concepts & Definitions: An overview

Paul Broca (1861) defined “aphemia”, i.e. aphasia, as a loss of speech consequent to
lesion of the frontal lobe of the brain, the lesion usually localized in third frontal
convolution and sometimes in the first convolution. Broca used the term speech rather
than language which shows his preference for “articulated oral language” over oral
comprehension of language. Broca (1865) noted that in all his cases, the damage is
localized in the left hemisphere. Generalizing these findings, he said, “We speak with the
left hemisphere”. Carl Wernicke (1874)¹ demonstrated that damage to an area in the back
of sylvian fissure had caused linguistic deficits Unlike Broca’s patient, the patients he
described had impaired comprehension and they frequently used elaborate descriptions in

¹ As quoted in Obler and Gjerlow (1999)
response to a single word, i.e. "circumlocution". The patients also made phonemic substitutions. The collection of these symptoms described by Wernicke is known as Wernicke's aphasia. J. Hughlings Jackson (1879) defined aphasia as impairment in linguistic formulation and expression. He was among the pioneers to highlight the need to understand the patients' "premorbid personality" in order to appreciate the modifications that occur as 'sequel of brain damage and overall aphasic involvements'. According to him, an aphasic person becomes "lame in thinking".

Influenced by both Darwinian evolutionary theory and Hughlings Jackson's writings on aphasia, S. Freud (1891) identified a "continuous cortical region ... between the terminations of optic and acoustic nerves and the areas of the cranial and certain peripheral motor nerves in the left hemisphere" as the central apparatus for speech. All the convolutions of sylvian fissure contribute in speech functions. Freud viewed aphasic disturbances as evolutionary retrogressions. Anyway, Freud was a little influence on his contemporaries and the reason was the unavailability of the translation of his manuscript on aphasia. In his "Project" he tried to break the myth of mind. Pierre Marie (1906) identified aphasia as a deficit of intellect related to the impairment in the language use. For Marie, Broca's definition of aphasia is actually that of dysarthria. The intellectual deficit, described here, may be same as the impairment of language comprehension. Henry Head (1926) thought aphasia to be the disturbances of symbolic formulation and expressions. His concept of aphasia implies that all functioning in which some symbolization is involved is impaired in aphasic persons. He had some reservations against Jackson's use of proposition and its implications although the cognitive school in the field of aphasiology was founded by Hughlings Jackson through his emphasis on the intellectual modifications of the aphasics. Wisenberg & McBride (1935) were one of the precursors to note the significance of handling the aphasic impairments individually, i.e. single case approach, and they advocated the need to consider the patient's premorbid

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2 Which was a draft until it was translated and published in 1895 by Basic Books under the title of "Project for a Scientific Psychology" but better known as "Project" after the publication.
3 As quoted in Lesser (1978)
4 As quoted in Eisenson (1984)
6 As quoted in Eisenson (1984)
intellectual state while analyzing them. Kurt Goldstein (1948) further emphasizes the need to take the aphasics individually by considering their thought and behavior, post-onset. He also belonged to the cognitive school of aphasiology. He considered the significance of the impairment of abstract thinking and reasoning as the underlying substrate for verbal and non-verbal behavior of the aphasics. Weigl & Bierwisch (1973) presented the basis of neuropsychological research for the investigation of aphasics’ state and stressed on the need to consider the system of linguistic competence, which underlies the complex system of performance strategies, and performance – as the ‘aphasia must be considered ... as interference of those components...’ while the underlying competence remains intact. So these hypotheses are based on the claims that competence and performance are two psychologically distinct processes and in aphasia the performance is disturbed. Damasio (1981) views aphasia as disturbances in comprehension and verbal encodings resulting from brain damage.

The derangement of language must result from the pathology of the brain. The disorders of the language abilities resulting from functional disorders or psychiatric disorders are excluded. By a consensus aphasia could be defined as the impairment of linguistic competence or performance as a result of acquired (localized) brain damage.

1.2 Assessment of Morphological Impairments

There has been a debate regarding single case vs. group-studies over the past two decades. There are strong claims for single case method that single case-studies are justifiable and are the only source of valid inferences about the structure of the normal cognitive system. Neither anatomical impairments nor cognitive-linguistic impairments are same for two patients; hence no group study is justified in such cases. The variables

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7 In 1981 their paper ‘Neuropsychology and Linguistics; Topics of Common Research’ was published in a collected volume [Weigl et al, ‘Neuropsychology and Neurolinguistics: Selected Papers’, Mouton].
8 In Weigl & Bierwisch (1973), the viewpoint is that aphasia is the deficit to the access to the knowledge of the language, i.e. linguistic competence, which is intact.
observed in the group of patients are too great in number to justify the groupings and the extensive variability reflecting meaningful and very specific patterns of dissociations, displayed by the patients would be lost in case they are grouped together in the name of agrammatism [Miceli et al (1989)]. Averaging over the findings in a group of the patients increases the probability of chance and therefore the preferred methodology should be *multiple* single-case studies rather than group studies. The present study also comprises of multiple single-case studies.

1.2.1 Morphological Representation

There are two main existing hypotheses regarding the morphological representation in the mental lexicon – *full word listing* hypothesis [Butterworth (1983)] and *autonomous morpheme representation* hypothesis [Taft & Forster (1975)]. In addition, there are other variant hypotheses, e.g. *dualistic representations* [Patterson (1982)] according to which along with the morphemes some words are also represented in the mental lexicon.

1.3 The area of Investigation in the present work

To understand the nature of the pathology and to learn the normal cognitive linguistic processes, it is essential to study the impaired language, e.g. the aphasic’s language. Although the concerns for these two needs and their perspectives will be overlapping but it is necessary to understand the difference of their need.

The area of investigation is morphology, inflectional morphology in particular, so the errors are to be checked against their morphological status. Although it has been considered that a study of inflectional morphology necessarily entails a study of syntactic aspects [Marantz (1997)] as inflections are syntactic features too [Luzzatti & Blesser (1996), Freidmann & Grodzinsky (1997)], the present work is limited in its scope to the mental representation of inflectional morphology at lexical level and the syntactic
interpretation of the data at the post-lexical level has been intentionally avoided. Since inflectional morphology is taken into consideration, units number, gender, person, tense and aspect inflections are the points of focus – how these are accessed and represented in the mental lexicon? It is followed by the existing hypotheses regarding the mode of representations in the mental lexicon. An attempt is made to investigate if the representation in the mental lexicon is of morphemes, of whole words, or that of both morphemes and whole words?

To the best of our knowledge, Hindi language data of aphasics have never been put to analysis especially with regard to inflectional morphological representations. The absence of such work is one of the reasons why this topic has been taken up for the purpose of research. It is always interesting to see the results and then apply it to other areas of research. For instance, language teaching will be more methodical in terms of the gradation and structure of the teaching materials if the representation of language is known to us. As the topic of the thesis itself delimits the area of investigation, the work is limited to only ‘representation’ of inflectional morphology. Hindi is a richly inflected language. A couple of examples will clarify this.

e.g. 1. mə-ne ɾoṭi kʰa-y-i

I-ERG bread-SG eat-PER-PAST-FSG

Gloss: ‘I ate a chapatti’.

2. sita skul ja ɾəh-i tʰ-i

sita school go PROG-FEM-SG AUX-PAST-FSG-∅

Gloss: ‘Sita was going to school’.

In the above example 1, the verb-root /kʰa-/ i.e. ‘eat’, is accompanied by a morpheme /-i/ which stands for past tense, the perfective aspect. feminine gender and /-ə/ at the end
stands for singular number, whereas /-y-/ is an epenthetic semi-vowel. In the example 2, immediately after the verb-root we have the aspect marker, i.e. /-rəh/, with feminine gender information, i.e. /-i/, and singular number information, i.e. /-ə/. Similarly the Aux in past, i.e. /kə/, with feminine gender information, i.e. /-i/, and singular number information, i.e. /-ə/. One can observe the complexity of Hindi morphology that a verbal complex carries information like tense, aspect, gender and number. Such morphemes are called portmanteau, i.e. where a single morpheme is multi-functional, i.e. serving several concurrent grammatical functions. This very characteristic of Hindi makes the study interesting to note the inflectional changes and impairments while analyzing the Hindi language of an aphasic. This is a single case based study (refer 3.1) and the justification for such study has been provided in the section 2.3. This section also deals with the criteria of the case selection and the points of attention and care to be noted while dealing with aphasics.

1.4 Organization of the chapters

After the introduction, there is chapter 2 which deals with the review of the relevant existing literature in both neurolinguistic and linguistics. A review of existing morphological models in both theoretical linguistic and neurolinguistic literature is given. It is followed by a review of morphological deficits in terms with special mentions of agrammatism/paragrammatism and syntax/morphology. In addition, it also carries the review of arguments supporting the relevance of dissociation and double dissociation and of single case studies, and arguments for the irrelevant aphasia batteries in a research like the present one. Chapter 3 deals with the methodology adopted in this thesis. In this chapter the type of case study, place of study, criteria of selection of cases, aims and objectives have been discussed. Points considered during the data elicitation have also been given. Analyzing procedures and the nature of questionnaire have also been discussed here. Chapter 4 deals with a brief description of the cases under consideration in the present study. The analysis of their data has also been presented in this chapter.
The chapter 5 deals with the discussion on the data analysis of the cases under consideration and the final chapter 6 presents summary and conclusion. In the appendix, the sample\(^\text{10}\) of the questionnaire has been given.

\(^{10}\) The nature of the questionnaire changed from patient to patient in the present study as discussed in the methodology, i.e. chapter 3, section 3.8. However a sample is given for reference in the appendix.