

# Text Comprehension in Persons with Aphasia

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## Abstract:

Comprehension problems are common in persons with aphasia. A person with aphasia may experience pronounced problems at the acute phase following which recovery would take place. However, it is noticed that persons with aphasia may experience subtle deficits in text comprehension owing to the fact that the reading comprehension would require or impose additional load on the memory systems and meta cognitive systems. Inferencing abilities is also important for text comprehension. The present study was carried out with the aim of studying text comprehension in persons with aphasia. 7 participants with aphasia (3 Broca's, 2 anomic, 1 conduction and 1 Wernicke's aphasia) and 10 neuro typical participants were considered. Text comprehension was assessed through polar and multiple choice questions. The performance of the participants varied for polar and multiple choice questions. The performance was better for polar questions compared to multiple choice questions. Multiple choice questions led to more confusions especially in persons with anomic aphasia.

**Keywords:** inferencing; decoding; dissociation

## Introduction

“Aphasia is an impairment, due to acquired and recent damage of the central nervous system, of the ability to comprehend and formulate language. It is a multimodality disorder represented by a variety of impairments in auditory comprehension, reading, oral-expressive language, and writing. The disrupted language may be influenced by physiological inefficiency or impaired cognition, but it cannot be explained by dementia, sensory loss or motor dysfunction.” (Rosenbek, LaPointe & Wertz, 1989). The common classification of aphasia syndromes are based on the location of brain damage and the patterns of impaired language abilities, where the severity of impaired language abilities may vary with the location and extent of brain lesion. Individuals who had relatively normal language functions but have incurred auditory comprehension deficits may also exhibit deficits in reading comprehension. For example a person with lesion in the posterior part of the dominant hemisphere of the brain involving auditory association area has severe difficulty in comprehending spoken language, he exhibits difficulty in reading similar to his difficulty in auditory comprehension. Whereas person with anterior cerebral lesion has more difficulty with output modalities of speech and writing compared to comprehension aspects. However, they also exhibit some difficulty in the comprehension of speech as well as text.

Reading Comprehension Impairments is also known as Alexia. Common reading comprehension impairments include: difficulty in comprehending written material, difficulty in recognizing words by sight, difficulty reading non-content words, etc. Difficulties of reading and comprehending text are more frequent than difficulties of decoding single

words [1, 10] which can lead to work problems and social exclusion. Over years there was very less attention on reading skills of persons with aphasia than oral language functioning. There are very few studies in both reading comprehension of single words as well as comprehension of passages or paragraphs but the majority of research on adult acquired reading disorders focuses on assessment and rehabilitation at the single word level [5], which is less applicable and cannot be generalized to the text level difficulties [5]. There is an intense need for the research in text/paragraph/passage level reading difficulties.

According to Fiderer (2002), there are three different types of paragraphs and each type serves a specific purpose. Those are: (a) Narrative paragraph, it gives the details of an experience or an event in the order in which they happened, (b) Expository paragraph, it gives directions or uses facts and details to explain information, and (c) Descriptive paragraph, it gives a clear picture of a person, place, object, event, or idea. There are no such studies that have been conducted using all three different types paragraphs or passages. Few studies have been done in last three decades using narrative passages.

Germani and Pierce (1992) investigated the influence of linguistic context on the reading comprehension of people with aphasia. Participants silently read three types of narratives: (a) predictive narratives, (b) non-predictive narratives, and (c) predictive narratives without target sentences. After reading the narrative, the participants turned to the next page to find the related question. Participants pointed to the correct noun choice, from a field of two, without referring back to the narrative. Analyses of the data revealed that 75% of the participants benefited from

the predictive narratives and 83% of the participants benefited from the non-predictive narratives. These findings coincide with research relating to the positive impact of linguistic context on the auditory comprehension of people with aphasia (Germani & Pierce, 1992; Pierce & Beekman, 1985; Pierce, 1983; 1988; 1991; Stachowiak et al., 1977; Waller & Darley, 1978).

Dietz, Hux, McKelvey, Beukelman & Weissling (2009) evaluated the impact of three levels of visuographic context (a) photos of high-context scenes, (b) photos of low context scenes, and (c) no-context, on the reading comprehension of narrative text on persons with chronic aphasia where the participants have to read three different narrative texts, each presented with high, low, or no-context. The high context scenes includes photographs in which people interact with each other and natural environment with central action whereas low context scenes includes photographs with no central action and limited interaction between the people and the natural environment. Ten adults with chronic aphasia with concomitant reading comprehension deficits were included. Results revealed that narrative reading tasks were easier in the high- and low-context conditions than in the no-context condition for the persons with chronic aphasia. The author suggests that contextually rich visuographic information is supportive to individuals with chronic aphasia when they perform reading comprehension tasks.

Meteyarda, L. et,al (2015) had conducted the study to assess the component processes of text reading in a small group of individuals with aphasia who report difficulties in reading at the text level. The following four areas were assessed: reading speed, language skills (single word and sentence), inferencing, working memory and metacognitive skills (monitoring and strategy use) to provide a profile of their linguistic and cognitive skills, focusing on processes known to be important for text comprehension. The results of persons with aphasia were compared against age-matched control group. One participant presented with a trend for impaired abilities in Inferencing, with all other assessed skills being within normal limits. The other three had identified linguistic and working memory difficulties. They concluded that, assessment of verbal working memory and Inferencing appears to be critical for understanding text comprehension impairments in aphasia.

Need for the study: There are very few studies with respect to text/paragraphs/passages comprehension in persons with aphasia. So there is a crucial need for research in text/paragraph/passages comprehension. The present study checks the underlying strengths and deficits related to comprehension of written language that affect the communicative performance which helps us to know and work on the particular deficits of the individual and help him to actively participate in ideal settings, everyday contexts, and employment settings. When the reading deficits

in different types of passages has been found, the decisions about offering treatment can be made. The aim of the study was to investigate text comprehension in persons with aphasia

## Method

**Participants:** Ten Neurologically Healthy Individuals (NHI) were considered for the study where all the participants had Kannada as their first language. before the selection, Mini Mental Status Examination [4] was administered on those ten participants to rule out communicative, cognitive and sensory deficits. Seven persons with aphasia with at least (minimum) quantum of reading comprehension were considered for the study. The participants were diagnosed as having aphasia based on Western Aphasia Battery in Kannada [9]. All the participants had Kannada as their first language and their pre morbid proficiency in Kannada was native like.

**Materials:** Three 100 word Kannada passages were considered for the present study, where one passage from each type of paragraph (i.e. narrative, expository and descriptive) was taken. The narrative passage contained a simple short story, the expository passage contained the procedure to make coffee, and the descriptive passage contained the description of Tajmahal. Polar and multiple choice questions were prepared for all the three paragraphs.

**Procedure:** The ability of text comprehension in Kannada was tested in PWA (Persons with Aphasia) as well as the Neurologically Healthy Individuals (NHI). The passages and the questions were printed on a separate sheet of paper. It was made sure that the letters were clearly visible for the participants by using a proper font style and adequate font size for the letters. The participants were provided with the passages one at a time and the questions were provided soon after they finish each passage. There were no cues or pictures provided regarding the passage.

**Scoring:** In the polar questions, the participants need to tick true or false and in the multiple choice questions three options were given and the participants have to choose the correct answer. The detailed number of correct and incorrect responses of all the participants were calculated. The maximum score being 15.

## Results

The results are discussed in regard to the performance of individuals with a specific type of aphasia on the three types of paragraphs (i.e. narrative, expository and descriptive) for polar and multiple choice questions. The raw scores for polar questions is depicted in Table 1 and the raw scores for multiple choice questions is shown in table 2. The total for each of the aphasia variant is shown in Table 3.

Polar Questions					
PWA	Type of aphasia	Narrative	Expository	Descriptive	Total
1.	Broca	2	2	4	8
2.	Broca	4	4	5	13
3.	Broca	5	4	4	13
4.	Anomic	3	5	3	11
5.	Anomic	5	4	4	13
6.	Conduction	4	2	3	9
7.	Wernicke	0	4	1	5
8.	NHI	5	5	5	15

**Table 1:** Performance of participants for polar questions

Multiple Choice Questions					
PWA	Type of aphasia	Narrative	Expository	Descriptive	Total
1.	Broca	4	5	3	12
2.	Broca	3	4	5	12
3.	Broca	5	3	5	13
4.	Anomic	3	4	4	10

5.	Anomic	3	3	3	8
6.	Conduction	4	1	2	7
7.	Wernicke	0	3	2	5
8.	NHI	5	5	5	15

**Table 2:** Performance of participants for multiple choice questions

Total (Polar Questions and Multiple Choice Questions)					
PWA	Type of aphasia	Narrative	Expository	Descriptive	Total
1.	Broca	6	7	7	20
2.	Broca	7	8	10	25
3.	Broca	10	7	9	26
4.	Anomic	6	9	7	21
5.	Anomic	8	7	7	22
6.	Conduction	8	3	5	16
7.	Wernicke	0	7	3	10
8.	NHI	15	15	15	45

**Table 3:** Cumulative performance of participants on polar and multiple choice questions

## Discussion

Three persons with Broca's aphasia were considered for the study. As documented in literature, persons with Broca's aphasia are assumed to have fairly good comprehension. Out of three persons with Broca's aphasia, one participant found it difficult to answer the polar questions, the other two participants performed well. Out of three different types of paragraphs considered for testing reading comprehension, better score was obtained for descriptive followed by expository and narrative type of paragraphs. The three persons with Broca's aphasia performed well on multiple choice questions also. The performance was uniform across the three persons with Broca's aphasia. The performance on three different paragraphs however varied. Two persons with Broca's aphasia performed well on descriptive paragraphs while other person performed better on expository.

It is believed that the persons with Anomic aphasia encounter very mild deficits on comprehension. The comprehension scores are near normal. In the present study, two persons with anomic aphasia were considered. One person with anomic aphasia performed better on polar questions while the other person performed better on multiple choice questions. Thus the performance was not uniform. The scores (either individually or cumulative for two persons with anomic aphasia) was lesser compared to persons with Broca's aphasia. The scores were lesser for multiple choice questions when compared to polar questions as multiple choice questions would lead to more confusions compared to polar questions. As only two participants were considered, the results cannot be generalized however it was noticed that the text comprehension was not up to the mark in the participants considered.

The study also included one participant diagnosed with Wernicke's aphasia and one participant diagnosed with conduction aphasia. The person diagnosed with Wernicke's aphasia performed poorly compared to all the other participants. Persons with Wernicke's aphasia manifest comprehension problems. The comprehension problems would also extend to reading comprehension owing to which the participant would have performed poorly. Persons with conduction aphasia are assumed to show very mild or no comprehension deficits usually. The participant considered here in the present study performed fairly well but the performance was poorer when compared to persons with Broca's aphasia.

Neurologically healthy individuals on the other hand performed well on both multiple choice questions as well as polar questions on all three different types of paragraphs. The results were 100% it reached the ceiling effect as the stimulus constructed was simple and was designed mainly for persons with aphasia

## Conclusions

Performance on reading comprehension would require or impose additional load on the memory systems and meta cognitive systems. Inferencing abilities are assumed to play a role. Hence it should be considered for assessment. It is usually an ignored domain and the spoken word comprehension is considered in most of the assessment batteries. The present study was one such attempt to tap reading comprehension.

The performance of the participants varied for polar and multiple choice questions. The performance was better for polar questions compared to multiple choice questions. Multiple choice questions led to more confusions especially in persons with anomic aphasia. The performance varied across the three paragraphs and was not uniform. The study has to be carried out on a larger group of individuals to generalize the results better.

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