



# Inter-Relationship between Conceptual Ambiguity and Naming Performance in Persons with Aphasia

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### Research Article

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## Abstract

Aphasia is an acquired language disorder with a wide variety of symptoms. Anomia or word finding difficulty is a common symptom of aphasia regardless of the type of Aphasia. Conventionally a wide variety of confrontation naming tests are used to assess the naming domain in Aphasia. However the confrontation naming test is deemed to be simple limiting its utility. The current study uses fusion pictures which are conceptually loaded. The developed test was administered on 8 persons with aphasia and 0 neuro-typical adults. Both between and within group analysis revealed a significant difference. Persons with aphasia exhibited more difficulty on fusion compared to non-fusion pictures unveiling the role of conceptual ambiguity in naming.

**Keywords:** Conceptual Ambiguity, Naming, Anomia, Embedding

## Introduction

Aphasia is an “acquired communication disorder caused by the brain damage, characterized by an impairment of language modalities: speaking, listening, reading, and writing”. Naming difficulty is seen across all the aphasia types and is considered as a classical sign in aphasia regardless of the type of Aphasia. Anomic aphasia is variant of aphasia with pronounced naming difficulty [1]. Failure in naming a picture per se can be attributed to lexical semantic breakdown. Lexical semantic breakdown is a consequence of a storage deficit or access deficit; failure in naming can be attributed to the difficulty in retrieving the right word from the lexicon in persons with anomic aphasia [2].

Confrontation tests or picture naming tests is found to be a reliable measure clinically and is often extended for

research also. These cluster of tests can be administered using a uniform protocol and scoring systems. Picture-naming is the most common means of assessing the integrity of lexical access [3]. The picture naming task involves three overlapping stages, the first stage is visual recognition, second stage is lexical semantic stage (meaning is linked to the percept) and final stage is the retrieval of phonological output [4]. Many researchers have used the confrontation naming task to examine the lexical semantic deficits in individuals with aphasia as this task is found to be effective in teasing the lexical semantic breakdown [5,6]. Though the tests of confrontation naming test has numerous advantages like superior reliability and validity, the basic limitation of the confrontation naming is that it undermines the stages of lexical access and is deemed simple [7]. As an alternate, fusion stimulus was developed and used in the current study. The fusion was developed by superimposing one picture

over the other, this makes the study exploratory as there are no studies in literature using fusion stimuli to the best of our knowledge.

### Need of the Study

The fusion stimulus was formed by superimposing two colour pictures, this type of stimulus imposes significant conceptual load. It further increases the task complexity involving naming in persons with aphasia.

### Aim of the Study

The current study was designed to explore the naming abilities in milder variants of aphasia through fusion stimuli and thereby to increase the conceptual ambiguity of lexical access.

### Objectives

- To measure the content validity for newly developed fusion stimulus
- To determine scores of naming tasks between fusion and non-fusion stimuli in persons with aphasia and neuro-typical adults.

### Methods

**Validity check:** The fusion stimulus was developed by superimposing one lexical with another. Content validity of the stimuli were done by four speech language pathologists. Each of them rated the 35 stimuli from 1-4. 1 being poor and 4 for excellent. Experts rated the stimuli on four parameters-image ability, image realism and clarity on merger process and identification of lexical categories. The content validity index was determined on the participants and top 31 stimulus with content validity index scores of greater than 0.90 on all the aforementioned categories was used in the primary study.

**Participants:** 8 participants in the age group of 25-55 years with an average post stroke of 18 months were recruited for the study. As per the findings of WAB-K 5 individuals had anomic aphasia and 3 participants had Broca's aphasia. In addition to this 10 neuro typical participants in the same age range were recruited, Fusion Naming task was administered on all the participants with a total of 18 non-fusion stimuli and 31 fusion stimuli (shortlisted after conducting the content validity).

### Procedure and Stimuli

Each correct response was given a score of 2, partially correct response and responses elicited with cues were

given score of 1 and incorrect response was given of 0. The maximum scores for non-fusion stimulus were 18 for non-fusion stimulus and 62 for fusion stimulus. The test was conducted in two rounds. There were no cues given in round 1. Cues given were phonemic in nature. For all the stimuli marked as zero and one in the first round were again shown in round 2 and responses were elicited through phonemic cues. The scores elicited on phonemic cues were rated separately to determine the efficacy of cues.

### Results & Discussion

The content validity index was determined as mentioned in the method. As seen in Table 1, individuals with aphasia secured a score of 12 for the non-fusion stimulus and secured score of 14 for fusion cues (without cues) and 30 for the same stimulus (with cues). While, the neuro-typical adults secured a score of 18 and 58 for the fusion and non-fusion stimulus. As the data did not abide by the properties of normal distribution, Mann-Whitney U test was carried out. The statistics to verify if there was any significant difference for fusion and non-fusion stimulus. Z score obtained was 2.33 ( $p < 0.05$ ) for non-fusion stimulus and 2.98 and 3.38 ( $p < 0.01$ ) for fusion stimulus (with and without cues).

	Persons with Aphasia	Neuro-typical adults
Fusion stimulus	12	18
Non-Fusion stimulus	14	58

**Table 1:** Median Scores for fusion and non-fusion stimulus.

Wilcoxon's signed rank test was used to compare the scores on fusion stimulus with and without cues and Z score of 2.04 was obtained, and the corresponding p value showed significant difference for the scores elicited with and without cues. It was observed that persons with aphasia exhibited more difficulty in naming the fusion stimulus and required a cue while responding. Thus, the fusion stimulus imposed more challenges to the participants. The fusion stimulus imposed the conceptual load leading to ambiguity, participants with aphasia could name one of the lexical item, thus leading to incomplete responses. The trend of response did not abide by a particular trend. Some of the participants were naming the major lexical item effectively while few others were naming the minor lexical item in a correct manner. The other significant finding was that the individuals with aphasia followed a trend of naming the pictures from head to tail while mixed trend was observed in the neuro typical adults. The direction of naming again varied from caudal to rostral and visa-versa. Thus, there was disparity making it difficult to deduce trend.

The other observation was that the participants with aphasia as evident on Wilcoxon's signed rank test was that the participants with aphasia benefited with phonemic cues. In other words, the phonemic cues enabled the participants to overcome the lexical semantic breakdown and name the target pictures effectively.

The current study used fusion stimulus making the study exploratory. The stimulus was subjected to an expert opinion and the content validity index was derived. However, the findings can be deemed as preliminary and the psychometric properties of the test items should be determined to develop the stimulus as a standard material and will be considered in future. The study can also be extended by considering a greater number of persons with aphasia.

### Conclusion

The current study used fusion stimulus and stimulus imposed more constraint on naming especially in persons with aphasia. The fusion stimulus is expected to enhance the task complexity especially in persons with aphasia. The current study compared the performance of persons with aphasia and neuro-typical on fusion and non-fusion stimulus. It was observed that the difference was very prominent for fusion stimulus. In other words, the fusion stimulus imposed a greater constraint on naming in persons with aphasia. Persons with aphasia, despite the severity levels exhibited difficulties for the fusion stimulus.

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