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The effectiveness of phonemic and semantic cues on confrontation naming in individuals with aphasia

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Abstract

Introduction: Cueing is a universal technique which is used for evaluation and therapy to improve naming deficits. The necessity of phonemic cues denotes lexical access difficulties. The need for semantic cues is found in visual deficit or inability to recognise the object or picture. This study compare the effectiveness of phonemic and semantic cues on confrontation naming in individuals with aphasia and also investigate the effect of phonemic and semantic cues on confrontation naming among the aphasic subgroups (Non-fluent and Fluent aphasic).

Method: In this study, 15 individuals with aphasia were included. The individuals with aphasia were sub-grouped into Fluent and non-fluent aphasic Sub-group. Confrontation naming task was administered. For confrontation naming task, pictures from Boston Naming Test were taken. Among those pictures, 30 pictures were paired with phonemic cue and other 30 pictures were paired with semantic cue. The examiner presented the picture and asked them to name it. If the participants failed to name it within 20 seconds, then the assigned phonemic or semantic cue for that picture was presented. Then the number of correct responses with phonemic cue and semantic cue were calculated.

Results: There was a significant difference in the responsiveness between phonemic cue and semantic cue. In both the aphasic groups number of correct responses with phonemic cue was higher than the number of correct responses with semantic cue.

Conclusion: The present study highlights that in individuals with aphasia phonemic cues are more effective when compared to semantic cues on confrontation naming.

Keywords: Aphasia, word finding, semantic cue, phonologic cue

Introduction

Naming difficulties are frequently observed in many individuals with aphasia irrespective of the aphasia types. Aphasia is the frequently occurring neurogenic language disorder. Aphasia is an “acquired communication disorder caused by the brain damage, characterized by an impairment of language modalities: speaking, listening, reading, and writing. It is not the result of sensory, motor or any general intellectual deficits, confusions or any psychiatric disorder”^[1]. The aphasic syndrome can be broadly categorised into fluent aphasias and non-fluent aphasias. Fluent aphasias consists of Wernicke’s, Anomic, Transcortical Sensory and Conduction aphasia. Non-fluent aphasias consists of Broca’s, Transcortical Motor and Mixed Transcortical aphasia^[2]. In individuals with aphasia, naming disturbances can occur either from incomplete/incorrect activation of phonologic or semantic information^[3, 4, 5, 6].

In aphasia, one of the frequently occurring features is word-finding difficulty^[7]. To assess the word finding difficulty, the most commonly used naming tasks are confrontation naming and verbal fluency. Jaya, Rani, and Monish (2020)^[8] mentioned that, between the confrontation naming and verbal fluency task there was a statistically significant difference in the performance of individuals with aphasia. In their study, it was also highlighted that, on both the confrontation naming and verbal fluency task, Fluent aphasic group performed better when compared to the Non-Fluent aphasic group.

Word-finding difficulty has been broadly studied using confrontation naming task. This is because of the fact that when a picture is presented to the patient, without any ambiguity, the examiner knows the target word which the patient is searching. But, this is not the case, when examining the word-finding difficulties using spontaneous speech of aphasic individual^[7]. Many researchers used Confrontation naming task to examine the lexical-semantic deficits in individuals with aphasia. According to cognitive science, three stages which are involved in the process of confrontation naming: first stage is visual recognition of

object, second stage is lexical semantic stage (meaning is linked to the percept) and final stage is phonological output (phonological forms are linked to the lexical labels before the readiness of articulatory system for production of speech) [9]. The Boston naming test [10] is a frequently used test to assess the confrontation naming skill where the person is asked to name the presented picture of the object. Cueing is a universal technique which is used for evaluation and therapy to improve naming deficits [11]. A cue is a bit of linguistic information which is related to the target word and it is presented once, prior to the attempt of the individual or following a failed attempt. Commonly used cues are Phonological (providing the initial sound of the target word) or semantic (providing a associated word of the target word) [12, 13, 14]. The necessity for cues in naming task can be controlled and shows specific deficits according to their nature. The necessity of phonemic cues denotes lexical access difficulties. The need for semantic cues is found in visual deficit or inability to recognise the object or picture [15]. If an efficient cue is given, it will enhance the word production and leads to more appropriate naming [16]. Li and Williams (1989) [17] studied the efficacy of phonemic and semantic cues in persons with aphasia who had naming difficulties. They reported that when there was a failure in response to confrontation naming, phonemic cueing was effective over the semantic cueing. In their study, aphasic individuals performed better on phonemic cues compared to semantic cues. Few early evidences stated that phonological cues assist by specifying a semantic target for the picture, which consequently helps the selection of a specific phonological forms [13, 18]. There are few studies in which the comparison between the phonological and semantic cues were done and they come forth with some common pattern. Even though both phonologic and semantic cues can be efficient (occasionally equivalent across a group) [18], Phonological cues found to be efficient for many individuals [13, 19]. Meteyard and Bose (2018) [20] did a study to compare the efficacy of phonological cue and semantic cue in picture naming for a group of persons with aphasia and found that phonological cues were more efficient when compared to semantic cues, in upgrading the accuracy of naming among the individuals.

Need for the study

There are few studies done in Tamil speaking individual with aphasia, so the current study was undertaken to determine the effectiveness of phonemic and semantic cue on confrontation naming in individuals with aphasia. There is a necessity for further investigation of cueing responsiveness (phonemic and semantic cues) in individuals with aphasia for efficient rehabilitation planning.

Aim

- To compare the effectiveness of phonemic and semantic cues on confrontation naming in individuals with aphasia
- To investigate the effect of phonemic and semantic cues on confrontation naming among the aphasic subgroups (Non-fluent and Fluent aphasic)

Material and Method

In this study, 15 individuals with aphasia who ranged in age from 30 to 60 years were included. For all the individuals, the etiology of the aphasia was left hemisphere

cerebrovascular accident. All the individuals were right handed native speakers of Tamil. Western Aphasia Battery [21] was used to determine the type of Aphasia. There were 5 Broca's, 4 Wernicke's, 3 Anomic, 2 Conduction and 1 Transcortical motor Aphasic individuals. These individual were sub-grouped into Fluent aphasic and Non-Fluent aphasic. There were 9 individuals in Fluent aphasic Sub-group (4 Wernicke's, 3 Anomic, 2 Conduction aphasia) and 6 individuals in non-fluent aphasic Sub-group (5 Broca's and 1 Transcortical Motor aphasia). Ethical clearance was obtained from the ethics committee at the institute prior to start the investigation.

For confrontation naming task, pictures from Boston Naming Test [10] were taken. There were 60 pictures. Among those pictures, 30 pictures were paired with phonemic cue (example, for the target word "pencil", examiner said, the word starts with [p]) and other 30 pictures were paired with semantic cue (The semantic cues for each of the 30 picture from the Boston Naming Test were utilized). Confrontation naming task was administered to all individuals with aphasia. The presentation order of the stimulus picture was randomized. The examiner presented the picture and asked them to name it. The participants were given a time of 20 seconds to name the picture. If the participants failed to name it within 20 seconds, then the assigned phonemic or semantic cue for that picture was presented. Then scoring was done by calculating the number of correct responses with phonemic cue and number of correct responses with semantic cue. This study followed a randomized controlled design. Descriptive statistics (mean and standard deviation) was used to analyze the obtained data.

Results

Comparison between phonemic and semantic cue on confrontation naming in a group of individuals with aphasia

Table 1: represents the overall mean score and standard deviation for number of correct responses with phonemic and semantic cue

	Correct responses with phonemic cue	Correct responses with semantic cue
Overall Mean Score	8.06	3.6
Standard deviation	6.06	3.45

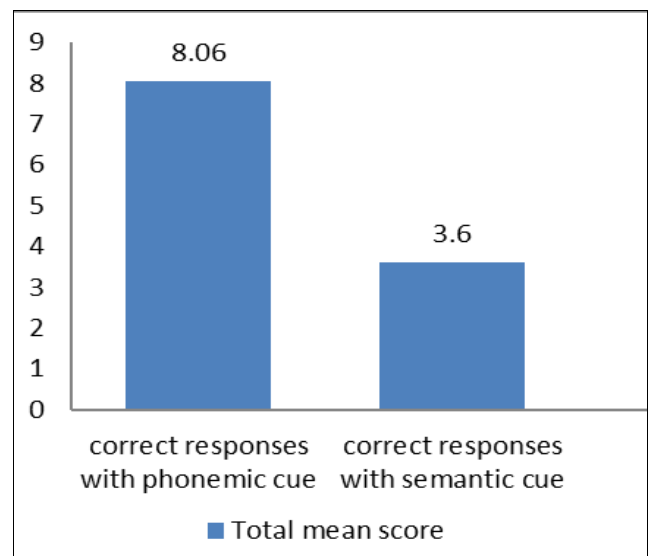


Fig 1: Represent the total mean score for number of correct responses with phonemic and semantic cue

As from table I and figure 1, correct responses with phonemic cue (8.06) has highest total mean score than that of correct responses with semantic cue (3.6). Thus, there was a significant difference in the responsiveness between phonemic cue and semantic cue. Comparison between phonemic and semantic cue on confrontation naming within aphasic subgroup of fluent and non-fluent aphasic individuals

Table 2: represent the overall mean values of Fluent and Non-Fluent aphasic group on their responsiveness to phonemic and semantic cueing

	Fluent Aphasic group	Non-Fluent Aphasic group
Correct responses with phonemic cue	9.88	5.33
Correct responses with semantic cue	3.44	3.83

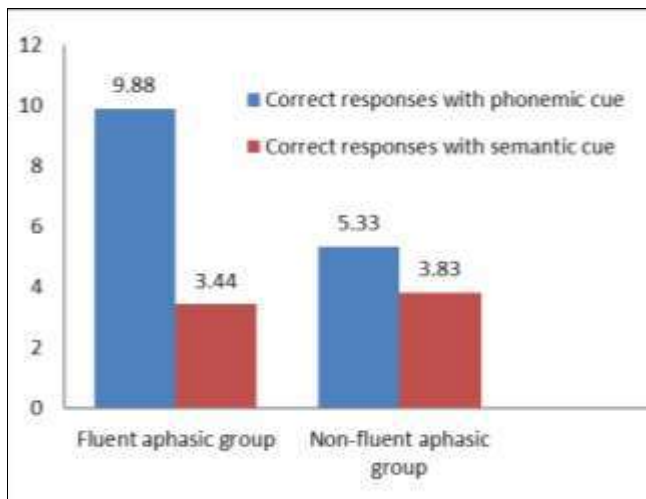


Fig 2: Represent the overall mean values of Fluent and Non-Fluent aphasic group on their responsiveness to phonemic and semantic cueing

As from the table II and figure 2, overall mean scores of fluent aphasic and non-fluent aphasic group for correct response to each type of cues indicated that in both the groups number of correct responses with phonemic cue was higher than the number of correct responses with semantic cue.

Discussion

The overall findings from present study indicated that in individuals with aphasia, the responsiveness to phonemic cue is more effective when compared to the semantic cue on confrontation naming. This results receives support from the studies done by Li and Williams (1989) [17]; Meteyard and Bose (2018) [20]. It was reported that phonological cues influence recognition of object in the short term and enhance the link from semantics to phonology [22]. During picture naming, the participants were asked to recognize a picture and retrieve a relevant name for it. If the participants were unable to retrieve a name, providing a phonological cues aids to constrain the “search space” that the participants were using when they see at the picture [22]. By this way, the phonological information of the target word was fed back to the initial stages of the picture recognition, promoting word retrieval by enhancing the specificity of conceptual information that was retrieved. This then feed

forwarded to lexical as well as word form retrieval and this increase the chance of naming correctly [20]. The facilitating effect produced by the phonological cueing was thought to occur because of the time reduction required for phonological encoding of the target word by pre-activation of the segments that was shared with the target word, therefore reducing the latency of naming [23, 24, 25]. This hypothesis was adopted in aphasic individuals by Howard and Orchard-Lisle (1984) [26], who reported that phonemic cues may function at the level of phonological encoding, since at this level the phonologically coded information seems to be available. They mentioned that phonemic cues were capable of increasing the accuracy of naming whether naming difficulties occur because of breakdown in initiating verbal responses, increased threshold in the output lexicon, or deficits in the verbal semantic system. Pellet Cheneval, Glize, and Laganaro (2018) [27] mentioned that in individuals with aphasia, phonological cueing facilitates lexical selection locus. They provided direct evidence supporting the effectiveness of phonological cueing at the lexical level of word encoding (lexical hypothesis). Meteyard and Bose (2018) [20] concluded that in aphasic individuals, the effectiveness of phonological cues were more when compared to the semantic cues in improving the accuracy of naming. They also suggested that phonological cues could be broadly useful because phonological cues could support the conceptual as well as the semantic information that was retrieved during the recognition of picture.

Conclusion

The present study highlights that in individuals with aphasia phonemic cues are more effective when compared to semantic cues on confrontation naming. During picture naming, phonological cues was helpful by feeding back to the earliest levels of picture recognition process. Thereby, supporting the initial categorization of a target (Meteyard, & Bose, 2018) [20]. Therefore, in individuals with aphasia phonemic cues can be used to improve the accuracy of confrontation naming.

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