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Özgün araştırma

Akıcı ve Akıcı Olmayan Afazisi Olan Türk Bireylerin Resim Adlandırma Özellikleri

Aydan Dumbak[1], Güzide Atalık[2], Önal İncebay[3], Ayşen Köse[4], Maviş Emel Kulak Kayıkcı[5]

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Öz

Amaç: Afazisi olan bireylerde adlandırma problemi mevcuttur. Adlandırma sırasında parafaziler görülür ancak parafaziler ile afazi türleri arasında anlamlı bir ilişki yoktur. Bu çalışma, parafazi ile afazi türü arasındaki ilişkinin yanı sıra, ipucu vermenin adlandırma performansı üzerindeki etkisini belirlemeyi amaçlamıştır.
Gereç ve Yöntem: Çalışmaya akıcı ve akıcı olmayan afazi olarak iki gruba ayrılan afazisi olan 37 Türk birey katılmıştır. Katılımcılara 40 adet resim sunulmuş ve adlandırmaları istenmiştir. Doğru yanıt vermemeleri durumunda ipuçları verilmiştir. Katılımcıların cevapları, parafazi türleri ve ipuçlarına nasıl tepki verdikleri kaydedilmiştir.
Bulgular: Her iki gruptaki katılımcıların tüm kelimeleri adlandırma performansları, ipuçları verildiğinde önemli ölçüde artmıştır. Akıcı afazi grubunda toplam 181 parafazi gözlenmiştir: Fonemik parafaziler en sık (%41,4) görülürken, onu %32,1 ile semantik parafaziler takip etmiştir. Akıcı olmayan afazi grubunda ise 270 parafazi gözlenmiştir ve fonemik parafaziler en sık (%60,7) gözlenen parafazi çeşidi olmuştur.
Sonuç: Akıcı olmayan grupta fonemik ve neolojik parafaziler akıcı afazi grubuna kıyasla anlamlı derecede yüksek olarak gözlenmiştir. Akıcı olmayan afazisi olan bireylerde fonemik ve neolojik parafazi daha sık görülmüştür. Bu çalışma, ipucu yönteminin afazisi olan bireylerin adlandırma performansı üzerinde olumlu bir etkiye sahip olduğunu ortaya koymuştur ve bu sonuç önceki araştırmalarla tutarlıdır.

Anahtar Kelimeler: *Afazi, adlandırma, resim adlandırma, parafazi, ipucu verme*

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Original Research

Picture Naming Properties of Turkish People with Fluent and Non-Fluent Aphasia

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Abstract

Objectives: People with aphasia (PWA) have naming problems. During naming activities, they produce paraphasias. However, there is no significant association between paraphasia and aphasia types. This study aimed to identify the relationship between paraphasia and aphasia type, as well as the effect of cueing on naming performance.
Materials and Methods: The study comprised 37 Turkish PWA who were divided into two groups: fluent and non-fluent aphasia. Participants were presented with 40 pictures and asked to name them. Cues were given in case they did not answer correctly. The participants' answers, the types of paraphasias, and how they responded to the cues were all recorded.
Results: Participants in both groups significantly increased their naming performance for all words when cues were given. A total of 181 paraphasias were observed in the fluent aphasia group: Phonemic paraphasias were the most common (41.4%), followed by semantic paraphasias with 32.1%. There were 270 paraphasias in the non-fluent aphasia group, with phonemic paraphasia being the most common (60.7%).
Conclusion: Phonemic and neologistic paraphasias were significantly higher in the non-fluent group. Phonemic and neologistic paraphasia is more common in those with non-fluent aphasia. This study found that the cueing method had a favourable influence on PWAs' naming performance, which is consistent with prior research.

Keywords: Aphasia, naming, picture naming, paraphasia, cueing

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Introduction

Aphasia is an acquired language disorder that causes a dysfunction of language abilities and is usually caused by injury to the left hemisphere of the brain (Helm-Estabrooks et al., 2014). Aphasias are classified as fluent or non-fluent depending on the severity of the impacted speech fluency. For both fluent and non-fluent aphasia, word retrieval deficit (anomia) is the core symptom, and it is the most common indication of word production problems. Therefore, naming and word production activities are usually the most essential parts of aphasia speech and language therapies (Conroy et al., 2009).

During picture naming activities, people with aphasia (PWA) frequently produce speech production errors known as paraphasia, which means producing unintended utterances during naming. The term "paraphasia" describes incorrect productions in which the error is at the phoneme or word level, and the production is related or unrelated to the target word (Goodglass & Wingfield, 1997). According to studies analysing the findings of paraphasia in aphasia types, some forms of paraphasia are frequently detected in some types of aphasia. However, there was no statistically significant association between the paraphasia and aphasia types reported (Kohn & Goodglass, 1985; Le Dorze & Nespoulous, 1989). Determining the manifestation of anomia, detailing paraphasias, and deciding on the approach not only contributes to the correct naming but also to personalising the therapy (Bandur & Shewan, 2001) and shaping the expectations (Kohn & Goodglass, 1985). There are different types of paraphasias. When there is a deterioration at the semantic level, the production of a different word, which is semantically related to the target word but not correct, during the recall of a word is called semantic paraphasia (Maher & Raymer, 2004). Semantic errors might include using the target word's category rather than its name (e.g., animal for a horse), using another word from the same semantic category (e.g., donkey for a horse), or using a word with similar properties to the target word (e.g., cup for a coffee) (Maher & Raymer, 2004; Martin, 2013; Patterson & Chapey, 2008).

Failure to recover the correct phonological representation at the phonological level results in a production where part of the target word is produced, but some of the sounds are incorrect. The error in this production is called phonemic paraphasia (e.g., crowd for cloud). Phonologically similar to the target word but also real words, this is referred to as phonosemantic paraphasia (Maher & Raymer, 2004). Inaccurate productions that are not actual words and that have little or no resemblance to the target word are called neologisms (e.g., podar for blanket).

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The frequency of use of the word is also substantially correlated. By their very nature, words with a high frequency tend to be learned earlier than words with a low frequency since a word that is used more frequently in the individual's environment will be learned at an earlier age (Morrison et al., 1997). It has been stated in many studies that words with a high frequency are more easily recalled than words with a low frequency because their lexical representations are stronger (Jescheniak & Levelt, 1994; Martin, 2013).

In all of the therapeutic approaches used to develop naming skills, semantic and/or phonological features that express different processes in word production are used. The definition of semantic features, understanding semantic features, and sentence completion are examples of semantic features; phonological features, on the other hand, include the first-last sound of the word, the first syllable of the word, the number of syllables in the word, the word(s) that rhyme with the word, and the repetition of the entire word (Conroy et al., 2009; Patterson & Chapey, 2008; Wambaugh et al., 2001).

In treatment, the cueing hierarchy approach is commonly used. When a person has difficulty naming an image, a speech and language therapist will give them a series of phonemic and/or semantic cues that will help them recall the term (Chapey, 2020). Although the effect of applying the cueing hierarchy approach on improvement and generalisation varies, research in the literature shows that it improves word recall skills and helps people give cues on their own (Hillis, 1989; Thompson et al., 2006). There are controversial ideas in the literature about which type of cue is more successful in helping name. The first views claim that semantic cues are more beneficial. Another viewpoint claims that phonemic tasks are an effective rehabilitation strategy for people who have trouble recalling the phonological form (Miceli et al., 1996; Nettleton & Lesser, 1991).

Although there are studies on naming and cueing hierarchy in aphasia, there is no consensus on these issues. The first aim of this study is to identify the paraphasia errors that occur during picture naming in individuals with fluent and nonfluent aphasia. The second aim is to evaluate the relationship between paraphasia errors and the type of aphasia and to investigate the change in naming performance according to the type of cue given.

Materials and Methods

The study was approved by the Hacettepe University Clinical Research Ethics Committee (Ethics Committee Decision No: 2019 / 23-19), and the consent of all individuals and their caregivers participating in the study was obtained.

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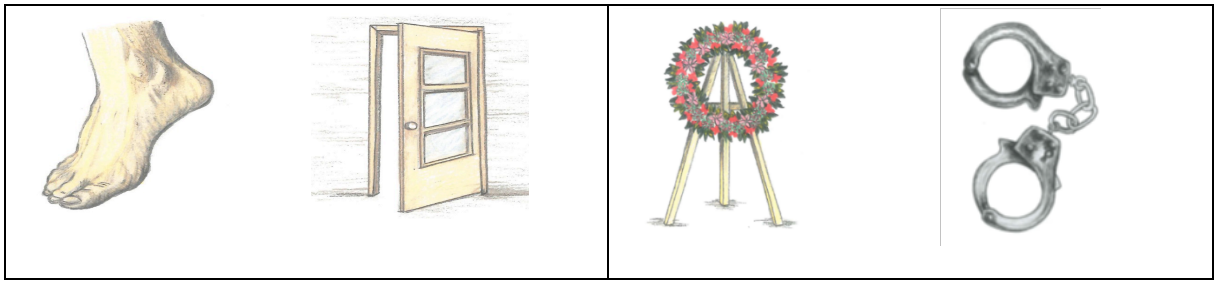
Participants

Thirty-seven PWA (26 male, 11 female) who applied to the Speech and Language Therapy Department of Hacettepe University were included in this study. The inclusion criteria were determined as having a history of left hemisphere stroke, at least six months having passed since the stroke, and being ready to complete the evaluations. All individuals with aphasia who applied throughout the study and met the inclusion criteria were included in the study.

Evaluations

The Language Assesment Test for Aphasia (ALA, Togram & Mavis,2009) was administered to all patients in order to determine the type of aphasia. The language modalities assessed in the test include spontaneous speech and language, auditory comprehension, repetition, naming, reading, grammar, speech act and writing. Participants were grouped as fluent and non-fluent aphasia according to the ALA test results.

For the investigation of confrontation naming, 20 frequently used object words and 20 non-frequently used object words were selected as stimuli from different categories to obtain samples for the investigation. The frequency of occurrence of words was determined according to The Word Frequency Dictionary of Written Turkish (Tekcan et al., 2002). Figure 1 demonstrates examples of the drawings of frequently used and non-frequently used objects. After the coloured drawings of the determined objects were prepared, the name agreement and image agreement of these drawings were evaluated. The degree to which the mental image produced by an object's name corresponds to the presented object is called "image agreement," and the degree to which speakers agree on the name of an object is called "name agreement" (Shao & Stiegert, 2016).



(A) (B)

Figure 1: Examples of the drawings of frequently used (A) and non-frequently used (B) objects. Figure A: colourful hand drawings of a foot and a door; Figure B: colourful hand drawings of wrath and a handcuff

The drawings of objects were shown to the patients, and they received 1 point for each correct response without any cue. In the event that they do not respond, three types of cues were

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presented depending on their responses. The cues were semantic, phonemic, and repetition cues. Patients' responses were recorded, as well as production errors, paraphasia occurrences, and paraphasia types. These recordings were listened to by two expert speech and language therapists who have more than five years of experience in the field, and the types of paraphasia were determined and noted.

Statistical analysis

The IBM SPSS Statistics 23 program was used for the statistical analysis of this study. Descriptive statistics of age, etiology, ALA test scores, and confrontation naming scores of the cases were performed. The Mann-Whitney U test was used to analyse the number of paraphasic errors made in both groups, the types of paraphasic errors made, and the change in performance when a cue is given.

Results

The mean age of the patients was 56.08 (SD: 9.895 27-82 range), 58.04 for the fluent group, and 56.71 for the non-fluent group. Etiologies were 83.8% ischemic cerebrovascular stroke and 16.2% other (Table 1).

Table 1. Etiologies and Types of Aphasias

	Frequency	**Percent (%)**
Etiology		
Ischemic stroke	28	75.7
Hemorrhagic stroke	3	8.1
Traumatic brain injury	1	2.7
Tumor	2	5.4
Primary progressive aphasia	3	8.1
Total	37	100.0
Fluency		
Fluent	20	54.1
Non-fluent	17	45.9
Total	37	100.0
Aphasia type		
TCM	5	13.5
BROCA	9	24.3
GLOBAL	3	8.1
ANOMIC	14	37.8
WERNICKE	4	10.8
TCS	2	5.4
Total	37	100.0
Time post-onset aphasia (months)	Mean	Min-Max
Fluent	14.1	1-60
Non-fluent	16.78	1-60

TCM: Transcortical Motor Aphasia, TCS: Transcortical Sensory Aphasia

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While 62.2% of the participants had fluent aphasia, 37.8% of them had non-fluent aphasia. Table 1 shows the etiology of the cases, the forms of aphasia, and the time since the onset of aphasia. There was no statistically significant difference between the fluent and nonfluent aphasia groups in terms of time since the onset of aphasia and age. ($p>0.05$).

For the total score of 44, the mean ALA naming subtest score was 33.78 (SD: 1.923) for the fluent aphasia group and 24.21 (SD: 3.746) for the non-fluent aphasia group. In confrontation naming, over the total score of 40, the mean score was 28.09 (SD: 1.793) for the fluent group and 20.29 (SD: 2.479) for the non-fluent group (Table 2). A statistically significant difference was noted between the naming performance of frequently used words and non-frequently used words. Patients' scores were higher for frequently used words ($p<0.001$) than for non-frequently used words. When a cue was given, naming performance significantly increased for all words. ($p<0.001$). On 40 different pictures, fluent aphasia group participants made a total of 181 paraphasias, and the distributions of those paraphasias were 41.4% phonemic, 32.1% semantic, 18.2% phonosemantic, and 8.3% neologistic.

Table 2. ALA scores and confrontation naming scores of the cases

	Mean		**Min-Max**		**SD**		**p**
	Fluent	**Non-fluent**	**Fluent**	**Non-fluent**	**Fluent**	**Non-fluent**	**MWU**
ALA total score	218.57	176.5	55-288	65-251	61.75	67.73	0.05*
ALA naming score	33.78	24.21	7-44	0-43	9.22	14.01	0.02*
Confrontation naming							
Frequently used	16.87	13.36	2-20	4-20	4.07	5.35	0.024*
Non-frequently used	11.87	6.93	0-19	0-13	5.19	4.44	0.016*

*$p<0.05$, SD: Standart deviation, ALA: Aphasia Language Assessment, MWU: Mann-Whitney U

The total number of paraphasias that non-fluent patients made was 270; 60.7% of these paraphasias were phonemic, 10.4% of them were semantic, 26.7% were phonosemantic, and 2.2% of the paraphasias were neologistic (Figure 2). In the graph, in the fluent aphasia group, 41.4% phonemic, 32.1% semantic, 18.2% phonosemantic, and 8.3% neologistic paraphasia are shown. In the non-fluent aphasia group, 60.7% phonemic, 10.4% semantic, 26.7 phonosemantic, and 2.2% neologistic paraphasia are shown.

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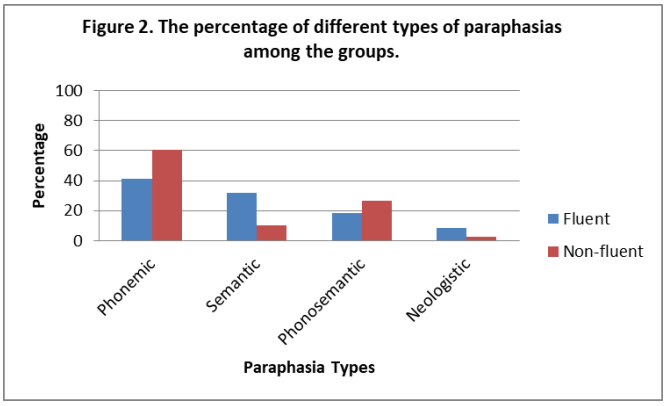

Figure 2. The percentage of different types of paraphasias among the groups. A colourful graph showing the percentages of the distribution of paraphasic errors in fluent and non-fluent aphasia groups.

When compared with the fluent group, non-fluent aphasia group participants made more paraphasias while naming. The types of paraphasias that were significantly higher than the fluent group were phonemic and neologistic paraphasias ($p<0.001$). In terms of semantic and phonosemantic paraphasias, there was no significant difference between the two groups (Table 3).

Table 3. Comparison of the number of paraphasia types between the groups

Mean values of paraphasia types	Fluent (n=23)	Non-fluent (n=14)	MWU P values
Phonemic	3.57±1.07	11.71±1.97	0.000*
Semantic	2.76±0.62	2±0.57	0.433
Phonosemantic	0.71±0.22	0.43±0.29	0.202
Neologistic	1.57±0.69	5.14±1.65	0.009*

*p<0.05; MWU: Mann-Whitney U

Discussion

The main purpose of this study is to assess the relationship between paraphasias and aphasia types after determining the paraphasias that occur during picture naming in people with fluent and nonfluent aphasia. Another aim is to see if there is a difference in naming performance depending on the type of cues.

The stronger a word's presence in the lexicon, the more common it is in a person's particular vocabulary. This suggests that high-frequency words are easier to find and retrieve than low-frequency words (Jescheniak & Levelt, 1994; Martin, 2013). Consistent with the

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literature, this research found that participants performed better when naming frequently used words than when naming less frequently used words.

Presenting a cue is a very common strategy to enhance patients' ability to name the objects. In the present study, giving cues led to significantly increased word production for PWA during the naming task ($p<0,001$). In accordance with the present results, previous studies have demonstrated that cueing strategy has a positive effect on the naming performance of PWAs (Conroy et al., 2009; Nickels, 2002).

In the present study, it is noted that patients with non-fluent aphasia exhibit more phonemic paraphasias than patients with fluent aphasia. This outcome is contrary to that of Berg (2006), who claims that different types of PWAs' processing issues appear to converge on the phonological level and that phonological paraphasias are poor discriminators across aphasic types (Berg, 2006).

Stark et al. (2019) discovered that neological errors were associated with frontoparietal cortex lesions in the left hemisphere (Stark et al., 2019). In the present study, the fluent aphasia group exhibited significantly more neologistic errors than the non-fluent aphasia group. Considering that fluent aphasias are mostly caused by temporal lobe lesions (Papathanasiou & Coppens, 2013), this finding is understandable. However, since the lesion location information for the cases in this study could not be obtained, it would not be correct to make a complete interpretation. The frequencies of paraphasia related to the lesion site may be the subject of future studies.

The findings of this study back up previous research on naming performance in people with aphasia. Knowing the types of paraphasic errors seen in people with aphasia can help with determining the kind of aphasia and tailoring therapy approaches for these people. The participants in this study were 37 people with aphasia, and they were divided into two groups: fluent and nonfluent aphasics. These two groups were compared on age and aphasia onset variables, and no significant differences were detected ($p<0.005$). These two characteristics are among the factors that influence PWAs' performance and prognosis. Furthermore, poor prognosis is linked to advanced age, higher initial severity, cerebrovascular origin, and the presence of a broad region of involvement (Maas et al., 2012; Reineck et al., 2005). No remarks were provided about these factors because there was no information about each individual's lesion location or linguistic history.

Turkish is an agglutinating inflectional language. The sound properties of Turkish are different than those of other languages, like Anglo-Saxon and Latin languages. With this study,

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it is seen that the differences in the linguistic structure of the Turkish language have no effect on the characteristics of the naming errors. However, the sample size of the study is small, so it would be better to conduct similar studies with more participants in order to achieve more valid and reliable evidence about the distribution of paraphasias specific to different aphasia types.

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Declaration of Interest

There is no conflict of interest between any institution, organization or researchers within the scope of the study.

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