TURKISH JOURNAL OF CEREBROVASCULAR DISEASES

REVIEW

Turkish Journal of Cerebrovascular Diseases 2025;31(3):128-134
doi: 10.5505/tjcvd.2025.85866

The Impairment-Based Therapy Approaches in Aphasia: A Review Study

Afazide Bozukluk Temelli Terapi Yaklaşımları: Bir Derleme Çalışması

Semra Selvi Balo,[1] Emine Güler Coşkun[2]

[1]Department of Speech and Language Therapy, Faculty of Health Sciences, Anadolu University, Eskişehir, Türkiye
[2]Department of Speech and Language Therapy, Graduate School, Anadolu University, Eskişehir, Türkiye

ABSTRACT

There are various approaches applied in the therapies of aphasia, an acquired language disorder that develops due to a stroke or cerebrovascular accident (CVA). Within the framework of The International Classification of Functioning, Disability and Health (ICF), these approaches are classified as 'impairment-based' and 'activity/participation-based' approaches. The primary aim of this study, designed with a descriptive research model, is to provide a resource for speech and language pathologists working with individuals with aphasia by presenting research findings on the effectiveness of impairment-based approaches applied in aphasia therapies at national and international levels. In this regard, studies of impairment-based approaches to aphasia therapy conducted in the literature were included. The results of the studies were summarised and information was provided on the therapies' duration, frequency, and intensity, the type of aphasia for which they are suitable, the effectiveness of the therapies, and the gains achieved. The findings of the studies revealed that the impairment-based approaches discussed in this study were effective on individuals with both fluent and nonfluent aphasia with different severity levels. Each approach was found to produce gains in different language skills, such as increasing verbal output, naming, auditory comprehension, repetition, reading, and writing, depending on the area of focus.

Keywords: Aphasia, aphasia therapy, impairment-based approaches.

ÖZ

İnme veya serebrovasküler olaya (SVO) bağlı olarak gelişen bir edinilmiş dil bozukluğu olan afazinin terapilerinde uygulanan farklı yaklaşımlar bulunmaktadır. İşlevsellik, Yeti Yitimi ve Sağlığın Uluslararası Sınıflandırması (The International Classification of Functioning, Disabilty and Health; ICF) çerçevesinde bu yaklaşımlar "bozukluk temelli" ve "aktivite/katılım temelli" yaklaşımlar olmak üzere sınıflandırılmaktadır. Temel amacı afazili bireylerle çalışan dil ve konuşma terapistleri için klinikte başvurabilecekleri kaynak niteliğinde bir araştırma ortaya koymak olan ve betimsel araştırma modeli ile desenlenen bu çalışma kapsamında afazi terapilerinde ulusal ve uluslararası boyutta uygulanan bozukluk temelli yaklaşımların etkililiğine ilişkin araştırma bulgularının derlenmesi amaçlanmıştır. Bu doğrultuda, alanyazında bozukluk temelli afazi terapi yaklaşımlarını konu edinen araştırmalar mevcut derleme çalışmasına dahil edilmiştir. Araştırmalardan elde edilen bulgular derlenerek terapilerin ne kadar sürede, sıklıkta ve yoğunlukta uygulandıkları; hangi afazi tipi için uygun oldukları; terapilerin etkililikleri ve elde edilen kazanımlar gibi konularda bilgi verilmiştir. Sonuç olarak, bu çalışma kapsamında ele alınan bozukluk temelli yaklaşımların farklı şiddet düzeylerindeki gerek tutuk gerekse akıcı afazili bireyler üzerinde etkili olduğu ortaya konmuştur. Her bir yaklaşımın odaklandığı alana göre sözel çıktıyı artırma, adlandırma, işitsel anlama, tekrarlama, okuma, yazma gibi farklı dil becerilerinde kazanım sağladığı görülmüştür.

Anahtar Kelimeler: Afazi, afazi terapisi, bozukluk temelli yaklaşımlar.

Cite this article as: Selvi Balo, S. and Güler Coşkun, E. The impairment-based therapy approaches in aphasia: a review study. *Turk J Cerebrovasc Dis.* 2025;31(3):128-134.

Corresponding Author: Semra Selvi Balo, semraselvi@anadolu.edu.tr

Received: November 1, 2024 **Accepted:** January 5, 2025 **Publishing Date:** December 25, 2025

INTRODUCTION

Aphasia due to stroke or cerebrovascular accident (CVA) is defined as the loss or impairment of speech production and/or comprehension abilities, based on the area affected by the damage.[1] In aphasia, impairment in language comprehension and expression may occur in the dominant hemisphere of the brain (usually the left hemisphere) as a result of brain damage.[2] Therefore, aphasia is a disorder that has a significant impact on an individual's communication and quality of life.

Impairments in different language skills are observed depending on the area of the brain affected in aphasia. The Boston classification system was developed by Norman Geschwind, Frank Benson, Harold Goodglass, and Edith Kaplan in the 1960s. This classification provides eight subtypes/syndromes of aphasia, updating the classic definitions of aphasia subtypes: 1) Broca, 2) Transcortical Motor, 3) Global, 4) Mixed Transcortical, 5) Wernicke, 6) Transcortical Sensory, 7) Conduction, and 8) Anomic aphasia (Figure 1). Each of these syndromes is characterized by a specific symptom profile that includes the fluency of verbal expression (fluent or non-fluent speech), comprehension, and repetition skills. The majority of individuals with aphasia experience varying degrees of impairment in auditory comprehension, spontaneous speech, reading, and writing. Non-fluent (agrammatic) aphasias include Broca's Aphasia, Transcortical Motor Aphasia, Global Aphasia, and Mixed Transcortical Aphasia. Fluent aphasias include Wernicke's aphasia, transcortical sensory aphasia, conduction aphasia, and anomic aphasia.[3]

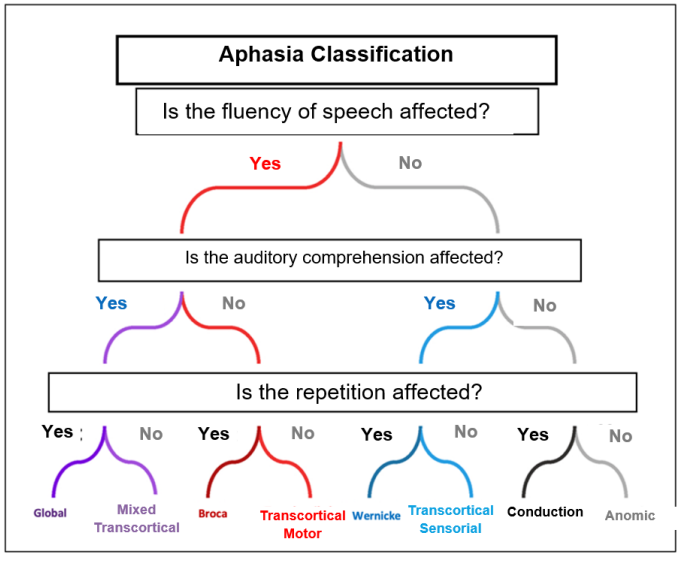

Figure 1. Classification of aphasia.

MAIN POINTS

- This study serves as a guide for speech and language therapists in aphasia therapy.
- Impairment-based approaches can be preferred in the treatment of both fluent and non-fluent aphasias.
- Impairment-based approaches may focus on auditory comprehension, spontaneous speech, and/or naming.

Speech-language therapists (SLTs) are responsible for assessing and treating aphasia.[4] Following a comprehensive language assessment, SLTs select appropriate intervention strategies based on the individual's needs, as outlined in the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF), and carry out the process. According to the ICF, aphasia therapy approaches are classified into two main types: impairment-based approaches and activity-participation-based approaches. While impairment-based approaches focus on body functions/structures, activity participation-based approaches focus on activities/participation. İmpairment-based approaches aim to develop skills in impaired language areas. Approaches based on activity and participation aim to reduce restrictions on language and communication that limit the participation of people with aphasia in daily life, strengthen their communication skills, and educate their relatives so they can be involved in the process.[5]

The ICF model has three domains: "body functions and structures," "activities," and "participation" (Figure 2). The area of "body functions and structure" classifies health status based on impairment. The impaired body structure in aphasia refers to the damaged brain region, while the impaired body functions result from impairments in language comprehension and speech caused that damage. Language impairments include grammar, word finding, and comprehension.[6,7] The "activity" area focuses on an individual's participation in daily activities and how their health affects these activities (e.g., talking on the phone, giving directions, and telling stories). Aphasia therapy approaches that focus on this area consider the context and environment where communication takes place.[8] The "participation" area focuses on the individual's role in society and the effects of aphasia on social activities and daily life (e.g., dining out with friends, engaging in social events). The participation approach to aphasia therapy, which focuses on this area, considers the speech partner to be a crucial component of aphasia treatment.[9,10]

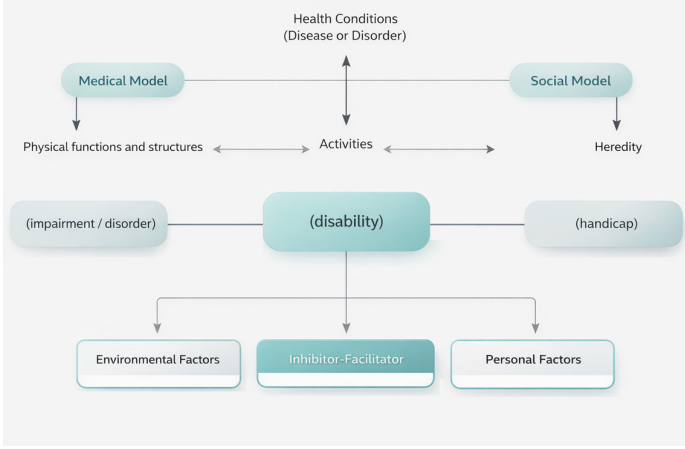

Figure 2. World Health Organization's International Classification of Functioning, Disability and Health

Impairment-Based Approachesin Aphasia

İmpairment-based approaches are based on the view that speech is not lost, only processing areas are damaged. The focus of these approaches is on the damaged area of speech.[11]

The ICF model includes the following impairment-based approaches aimed at developing skills in impaired areas of speech (spontaneous speech, comprehension, reading, writing) related to body functions and structure: Melodic Intonation Therapy (MIT),[12] Constraint Induced Language Therapy (CILT),[13] Verb Network Strengthening Treatment (VNeST),[14] Semantic Features Analysis (SFA),[15] Phonological Components Analysis (PCA),[16] Response Elaboration Training (RET),[17] Schuell's Stimulation Approach,[18] The Helm Elicited Language Program for Syntax Stimulation (HELPSS),[19] Treatment of Underlying Forms (TUF),[7] Oral Reading for Language in Aphasia (ORLA),[20] Multiple Oral Reading (MOR),[21] Copy and Recall Therapy (CART).[22]

The following section provides a brief description of the most commonly used therapy approaches mentioned above by speech-language therapists.

Melodic Intonation Therapy

The Melodic Intonation Therapy (MIT) program is based on the principles of intonation and rhythm[12]. It is believed that synchronizing body movements with rhythm will facilitate learning of articulation and prosody.[23] One of the preferred therapy methods for severe, non-fluent aphasia, MIT aims to improve expressive speech by utilizing the musical elements of speech (e.g., melody, rhythm) and leveraging preserved functions (such as singing) to engage areas of the undamaged right hemisphere that retain speech abilities.[24] This approach is thought to have been inspired by the observation that many people with non-fluent aphasia can sing the words to familiar songs, yet struggle to sing exact words in different contexts.

MIT combines melodic intonation with left-hand rhythm to enhance the production of increasingly functional target sentences of varying lengths and complexities, thereby eliciting expressive speech in individuals with severe aphasia.[25] The therapy program consists of three levels (beginner, intermediate, and advanced) with increasing degrees of difficulty and is designed to help individuals with non-fluent aphasia progress from intoning simple, 2-3 syllable expressions (singing) to producing expressions with five or more syllables. Each level consists of 20 words (eg. "water") or social phrases (eg. "I love you"), featuring an increased level of complexity and decreased frequency presented through visual cues. Expressions are toned in only two pitches, the natural prosody of the expressions determines melodies, and the patient's left hand is tapped once per syllable.[24]
The eligibility criteria for MIT are as follows:

- Left hemisphere stroke etiology,
- An undamaged right cerebral hemisphere,
- A diagnosis of severe non-fluent aphasia characterized by weak speech production,
- Ability to sing at least some of the words to familiar songs,
- Impaired repetition,
- Relatively intact auditory comprehension.[26]

A literature review of the therapeutic approach referred to revealed a limited number of studies.[25,27-29] Participants in MIT-related research are individuals with non-fluent aphasia (particularly Broca's and global aphasia). Therapies utilizing the MIT approach typically lasted between 6 to 8 weeks, with sessions lasting from 30 to 60 minutes each. The number of weekly sessions varies based on the program's intensity and therefore cannot be generalized. The MIT approach has been particularly effective in increasing verbal output.[25,27-29]

Constraint-Induced Language Therapy

Constraint-Induced Language Therapy (CILT) is a behavioral approach based on current neuroscientific knowledge, which includes neurological rehabilitation, experience-induced brain plasticity, and learned non-use theory.[30,31] This has recently been referred to as Intensive Language Action Therapy (ILAT).[32] The CILT therapy method derives from constraint-induced movement therapy developed by Taub and colleagues.[31,33] As a result, a significant portion of the theoretical background of CILT relies on research derived from physical therapy in stroke rehabilitation. The use of strong limbs is limited in physical therapy for individuals with post-stroke plegia or paresis who are unable to use their impaired limbs. This encourages the use of the weaker parts of the body. Thus, progress is observed on the limb where the individual experiences weakness. Researchers adopted this principle and implemented it in speech therapy for individuals with chronic aphasia.[13]

CILT is essentially based on the idea that if an individual cannot naturally use a disabled body part, restricting the use of the healthy part may encourage the use of the disabled body part. Additionally, it is suggested that the intervention caused by this restriction, along with intensive mass training, can trigger use-dependent restructuring in the brain.[33] The three basic principles of CILT therefore provide: 1) intensive therapy over a relatively short time (e.g., 30 hours over two weeks), 2) restriction of all modes of communication other than speech, and 3) enforcement of the use of spoken language in relevant communication exchanges.[34]

The participants in the studies reviewed about CILT comprise individuals with both non-fluent and fluent aphasia of various types. The sessions were administered over 2 weeks; however, for one of the two groups in the study, this period was extended to 10 weeks. Although the gains from the CILT approach are low in some studies, improvements have been observed in various language functions overall.[32,35-37]

Verb Network Strengthening Therapy

Verb Network Strengthening Therapy (VNeST), based on a previous study,[14] is a semantic intervention program designed to improve vocabulary. VNeST aims to enhance lexical access to studied concepts; in other words, it seeks to improve the ability to recall words. This approach aims to systematically increase the salience of words and their thematic roles, promoting the generalization of lexical access across a hierarchy of contexts (single words, sentences, discourse).[38]

VNeST's hypothesis is the systematic facilitation of semantically related subjects and objects with target actions. Thus, neural activation increases, leading to the recall of actions not explicitly studied in semantically related therapy, along with the subjects and objects necessary for these actions. VNeST improves word output in individuals with aphasia who have limited verbal abilities and enhances semantic content in those with fluent aphasia. This approach increases the number of sentences produced by individuals with aphasia, enabling them to communicate through discourse and making their expressions more understandable.[38]

The participants involved in studies on VNeST include individuals with both non-fluent and fluent aphasia. The duration of VNeST therapy varies, typically spanning 2 to 3 sessions per week for a period of 8 to 10 weeks. The therapies have yielded varying levels of improvement in different speech skills. In addition to language skills, improvements were observed in the cognitive skills of the clients.[38-41]

Semantic Feature Analysis

Semantic Feature Analysis (SFA) was developed to provide an organized method for activating semantic networks.[15] This method is based on lexical retrieval models that consider the semantic system as a network of concepts. Thus, a construct is an organized structure of semantic features that give meaning to a concept.[42] The theory underlying the method is that activating the semantic network surrounding the target also activates the target itself, thereby facilitating the recall of the word.[43]

SFA is thought to boost word recall by activating semantic networks, aiding in the enhancement of naming and word-finding skills. In the SFA therapy program, individuals with aphasia are encouraged to produce words that are semantically related to the target.[43] If the individual with aphasia cannot produce the target word, they are asked to answer questions such as what the word is used for, what it looks like, and where it is located.[44]

Since all individuals with aphasia have difficulty naming, SFA can be applied in various types of aphasia.[3] The participants involved in studies on SFA are predominantly affected by non-fluent aphasia (Broca's and Global Aphasia) and include both non-fluent and fluent individuals (particularly those with Anomic Aphasia). The sessions, which were performed 2 to 5 times a week, lasted between 45 and 90 minutes. The therapies have been particularly effective in improving naming skills. The findings of the studies indicate that SFA can also be effective in improving communication skills.[43-46]

Phonological Components Analysis

Naming impairments are among the most common speech issues observed in aphasia and, consequently, are a key focus of therapy in post-stroke speech rehabilitation. The ability to name requires semantic processing. This is also related to the word's form or phonology. The word form or phonology of words may be impaired in individuals with aphasia. There may also be impairment in the connection between word form and phonology. All of this leads to difficulties in naming. As a result, semantic and/or phonological tasks are typically used in the treatment of naming impairments to address these core cognitive components involved in word production.[47]

Phonological Components Analysis (PCA) is a phonological approach structurally similar to SFA and aims to address naming impairments.[16] to address naming impairments. The aim is to enhance word-finding skills by reinforcing the phonological networks associated with a word. The participants involved are asked to identify five phonological components related to the target word. PCA focuses on the phonological features of words to facilitate word-level processing and was developed as a phonological approach comparable to SFA, allowing for a comparison of the relative effects of each therapy on word acquisition.[16]

Participants in the studies on PCA include individuals with both non-fluent (especially Broca's) and fluent (especially anomic) aphasia. The duration of PCA sessions conducted in the studies varied between 45 and 60 minutes. The frequency of sessions and duration of the program vary depending on the program's intensity. PCA is effective in improving speech performance, particularly in improving naming skills.[16,47-49]

Response Elaboration Therapy

Response Elaboration Training (RET) aims to help patients regain the flexible and creative use of speech.[17] Some individuals with aphasia can communicate using a single word or short sentences right after a stroke. RET helps individuals with aphasia in expanding the range of words and expressions they use during communication. The responses of individuals with aphasia are assessed flexibly as part of this protocol, given that RET has been designed to encourage flexible and generalized speech by utilizing the utterances initiated by the individual. Instead of trying to elicit a specific response or grammatical structure, the clinician assesses the quantity and type of information conveyed in a response.[50] RET has a broad range of clinical applications due to its demonstrated positive effects on individuals with various types and severities of aphasia.[51]

In the RET therapy program, individuals with aphasia are encouraged to initiate speech on a topic using a picture. Then, clinician modeling is employed, which may involve repeating the response or providing an example of another possible response, to help expand on the topic. The 5W1H questions are also useful for ensuring expansion.[50]

The participants in the studies on RET are mainly individuals with Broca's aphasia. The sessions were held three times a week for one hour in the conducted studies. The number of correct information units produced in response to visual stimuli, along with increases in content production, has been observed, and RET has been reported to be particularly effective in individuals with Broca's aphasia.[51-53]

Schuell's Stimulation Approach

Schuell's Stimulation Approach has specific characteristics such as: (a) Therapy is based on providing intensive auditory stimulation to elicit verbal and written speech production, (b) The subject's incorrect responses are countered with increased stimulation rather than corrective feedback, (c) The highest possible number of responses should be achieved in each session, and (d) Target behaviors are elicited through repeated stimulation by the clinician in different modalities rather than through a single instruction (e.g., the word "pen" is elicited by the clinician repeatedly using different modalities, such as pointing to a picture of a pen, showing a picture of a pen, and saying the word "pen").[18] When working with an aphasic individual who has difficulty recalling the word "pencil" using the stimulus approach, in the first step of the auditory comprehension section, the aphasic individual is given the instruction "Show me the pencil," and then the word "pencil" is repeatedly presented to the aphasic individual both in other steps of the same section and in production and reading-writing tasks. Repeat the word "red pen," complete the sentence "A pen is used for writing..." appropriately, read the sentence "I bought a pen for my grandchild," etc. (e) Therapy tasks primarily focus on the semantic and syntactic components of

the speech system (e.g., in therapy, tasks progress in a hierarchy from simple to complex, both semantically and syntactically, including the production of single words, word clusters, sentences, and the retelling of a story).[50]

The auditory processes, according to Schuell, are an essential component of the complex speech acquisition, processing, and control system. Therefore, it is believed that the language-related disorders observed in individuals with aphasia, affecting all modalities, are due to deficiencies in basic auditory processing. The stimulation approach emphasizes delivering intense, controlled, and systematic auditory stimuli to enhance auditory comprehension. Thus, the approach is based on the gradual improvement of impaired speech systems. The theory behind the approach suggests that speech can be regained in a damaged system by offering repetitive, intensive auditory stimulation intended to elicit a response from the individual using multimodal (multiple modalities; auditory comprehension, reading, etc.) stimuli customized for the patient, thereby facilitating speech recovery. Schuell's aphasia therapy centers on supporting the individual in effectively accessing language and retrieving linguistic knowledge, rather than solely on teaching them. Furthermore, this approach suggests that speech impairments are caused by performance factors and that speech is never truly lost.[54]

The participants in two studies on Schuell's stimulation approach were individuals with non-fluent and fluent aphasia. In both studies, the therapy program was administered over 10 days, comprising a total of 30 sessions. Despite the limitations of the studies due to their small number of participants, Schuell's stimulation approach has been reported to be effective in aphasia therapy. The therapies offered participants improvements, especially in auditory comprehension and verbal production.[54,55]

Helm Elicited Language Program for Syntax Stimulation

The Helm Elicited Language Program for Syntax Stimulation (HELPSS), based on neurolinguistic studies of individuals with agrammatic aphasia, is a therapy program organized into a hierarchy of syntactic difficulties that aims to facilitate the production of morphosyntactic structures through a story-completion task with multiple examples.[19] This program is recommended for individuals with non-fluent aphasia (particularly Broca and Transcortical Motor). The following sentence types are used in the HELPSS therapy method:[26]

1. Intransitive Imperative Sentences (e.g., Get up)
2. Transitive Imperative Sentences (e.g., Turn on the light)
3. Interrogative Sentences (e.g., What are you drinking?)
4. Transitive Declarative Sentences (e.g., I read the book)
5. Intransitive Declarative Sentences (e.g., He/she is sleeping)
6. Comparative Sentences (e.g., Ali is taller than Ayşe)
7. Passive Sentences (e.g., The glass is broken)
8. Yes-No Questions (e.g., Did you go to school?)
9. Double Transitive Sentences (e.g., He bought flowers for his sister)
10. Embedded Sentences (e.g., He told her to come home)
11. Future Tense Sentences (e.g., He will drive the car).

The sentences with varying degrees of difficulty above are utilized to assist individuals with aphasia at two activity levels (A-B). Each sentence example in HELPSS is provided to individuals with aphasia, accompanied by a simple drawing. The clinician tells a story of about two sentences ending with a target sentence structure at Level A. At level B, the story is reread; however, target sentences are not produced by the clinician. The individual with aphasia must achieve a certain level of success to progress from level A to level B. The following sentence type is presented at level A in the hierarchy when the performance criterion is indicated at level B.[26]

A literature review on HELPSS revealed a single international study.[56] The participant in this study is an individual diagnosed with Broca's aphasia. The individual with aphasia participated in an 8-week therapy program consisting of 16 sessions, with two sessions each week. The study reported the following results: HELPSS was particularly effective in improving grammatical structures and producing correct information units;[56] however, the limited number of participants in the study makes it difficult to generalize the findings.

CONCLUSIONS

This review discusses aphasia therapy methods classified as impairment-based therapy approaches according to the ICF. The therapeutic approaches mentioned are briefly explained, and studies on their effectiveness are included. Therefore, the current review is expected to contribute to the area in a clinical context. This compilation study has highlighted the specific need for research on impairment-based approaches in aphasia therapy, particularly within the national literature. The research on the effectiveness of therapy for aphasia in Turkey is quite limited when viewed within the framework of impairment-based approaches. Therefore, national studies on the effectiveness of aphasia therapy implemented with impairment-based approaches are needed. Identifying the most effective approaches for different types of aphasia, as well as the number and frequency of sessions required, is crucial in guiding clinicians who work with individuals with aphasia in clinical settings.

This review has focused on therapy approaches commonly used in Turkey; however, future studies may discuss therapy approaches not included in the current review, along with their target populations and implementation steps. This will allow other approaches to aphasia rehabilitation to find their place in national studies and clinical practice. Another limitation of this review is that it does not encompass all international publications on impairment-based aphasia therapy approaches. For the sake of brevity, this review does not include all studies on effectiveness. We recommend conducting further studies to examine a larger number of studies and identify comprehensive reviews.

In conclusion, this review is expected to guide speech therapists working in the field, both in clinical practice and in the literature, as well as to inspire future studies on therapeutic approaches in aphasia. The current review evaluates whether, how long, how often, and in which individuals with aphasia a particular therapy approach was implemented and proven effective. Therefore, the information obtained from this study can serve as a foundation for future research on the effectiveness of therapy intended for Turkish individuals with aphasia.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - S.S.B.; Design – S.S.B., E.G.C.; Supervision - S.S.B.; Resources – E.G.C.; Materials - S.S.B., E.G.C.; Data Collection and/or Processing E.G.C.; Analysis and/or Interpretation – S.S.B., E.G.C.; Literature Search – S.S.B., E.G.C.; Writing Manuscript – S.S.B., E.G.C.; Critical Review - S.S.B.

Declaration of Interests: The authors have no conflicts of interest to declare.

Funding: The authors declared that this study has received no financial support.

REFERENCES

1. Ardila A. *Aphasia Handbook*. Miami, FL: Florida International University; 2014.
2. Toğram B, Maviş İ. Afazi dil değerlendirme testi'nin geçerlik, güvenirlik ve standardizasyon çalışması. *Turk J Neurol.* 2012;18(3). [CrossRef]
3. Sheppard SM, Sebastian R. Diagnosing and managing post-stroke aphasia. *Expert Rev Neurother.* 2021;21(2):221-234. [CrossRef]
4. American Speech-Language-Hearing Association. *Scope of Practice in Speech-Language Pathology* [Scope of Practice]; 2016. [CrossRef]
5. American Speech-Language-Hearing Association. *Aphasia* [Practice Portal]; 2024. [CrossRef]
6. Boyle M. Semantic feature analysis treatment for anomia in two fluent aphasia syndromes. *Am J Speech Lang Pathol.* 2004;13:236–249. [CrossRef]
7. Thompson CK, Shapiro L. A linguistic approach to treatment of agrammatic aphasia. *Aphasiology.* 2005;19:1021–1036. [CrossRef]
8. Lubinsky R. Environmental approach to adult aphasia. In: Chapey R, ed. *Language Intervention Strategies in Adult Aphasia*. 5th ed. Baltimore, MD: Lippincott, Williams and Wilkins; 2008:319-348.
9. Kagan A. Supported conversation for adults with aphasia: methods and resources for training conversation partners. *Aphasiology.* 1998;12:851-864. [CrossRef]
10. Simmons-Mackie N. In support of supported communication for adults with aphasia: clinical forum. *Aphasiology.* 1998;12(10):831–838. [CrossRef]
11. Martin N, Thompson CK, Worrall L. *Aphasia Rehabilitation: The Impairment and Its Consequences*. San Diego, CA: Plural Publishing Company; 2008.
12. Albert ML, Sparks RW, Helm NA. Melodic intonation therapy for aphasia. *Arch Neurol.* 1973;29(2):130-131. [CrossRef]
13. Pulvermüller F, Neininger B, Elbert T, et al. Constraint-Induced Therapy of Chronic Aphasia After Stroke. *Stroke.* 2001;32(7):1621-1626. [CrossRef]
14. Loverso FL, Prescott TE, Selinger M. Cueing verbs: a treatment strategy for aphasic adults (CVT). *J Rehabil Res Dev.* 1988;25(2):47-60.
15. Haarbauer-Krupa J, Moser L, Smith G, et al. Cognitive rehabilitation therapy: Middle stages of recovery. In: Ylvisaker M, ed. *Head Injury Rehabilitation: Children and Adolescents.* Austin, TX: Pro-Ed; 1985:287-310.
16. Leonard C, Rochon E, Laird L. Treating naming impairments in aphasia: Findings from a phonological components analysis treatment. *Aphasiology.* 2008;22(9):923-947. [CrossRef]
17. Kearns KP. Response elaboration training for patient-initiated utterances. In: Brooks-Shire RH, ed. *Clinical Aphasiology.* Minneapolis, MN: BRK; 1985:196-204.
18. Schuell H, Jenkins JJ, Jimenez-Pabon E. *Aphasia in Adults: Diagnosis, Prognosis, and Treatment*. New York, NY: Hoeber Medical Division, Harper & Row; 1964.
19. Helm-Estabrooks N. *Helm Elicited Language Program for Syntax Stimulation*. Austin, TX: Pro-Ed; 1981.
20. Cherney LR, Merbitz CT, Grip JC. Efficacy of oral reading in aphasia treatment outcome. *Rehabil Lit.* 1986;47(5-6):112-118.
21. Moyer S. Rehabilitation of alexia: A case study. *Cortex.* 1979;15:139-144. [CrossRef]
22. Beeson PM, Hirsch F, Rewega MA. Successful single-word writing treatment: Experimental analysis of four cases. *Aphasiology.* 2002;16:473–491. [CrossRef]
23. Martikainen AL, Korpilahti P. Intervention for childhood apraxia of speech: A single-case study. *Child Lang Teach Ther.* 2011;27(1):9-20. [CrossRef]
24. Norton A, Zipse L, Marchina S, Schlaug G. Melodic intonation therapy: shared insights on how it is done and why it might help. *Ann N Y Acad Sci.* 2009;1169:431-436. [CrossRef]
25. Morrow-Odom KL, Swann AB. Effectiveness of melodic intonation therapy in case of aphasia following right hemisphere stroke. *Aphasiology.* 2013;27(11):1322-1338. [CrossRef]
26. Helm-Estabrooks N, Albert M. Manual of Aphasia and Aphasia Therapy. *2nd ed. Austin,* TX: Pro-Ed; 2004.
27. Hough MS. Melodic intonation therapy and aphasia: Another variation on a theme. *Aphasiology.* 2010;24(6-8):775-786. [CrossRef]
28. Conklyn D, Novak E, Boissy A, Bethoux F, Chemali K. The effects of modified melodic intonation therapy on nonfluent aphasia: A pilot study. *J Speech Lang Hear Res.* 2012;55(5):1463-1471. [CrossRef]
29. Haro-Martínez AM, Lubrini G, Madero-Jarabo R, Díez-Tejedor E, Fuentes B. Melodic intonation therapy in post-stroke nonfluent aphasia: A randomized pilot trial. *Clin Rehabil.* 2019;33(1):44-53. [CrossRef]
30. Pulvermüller F, Berthier ML. Aphasia therapy on a neuroscience basis. *Aphasiology.* 2008;22(6):563-599. [CrossRef]
31. Taub E, Uswatte G, Elbert T. New treatments in neurorehabilitation founded on basic research. *Nat Rev Neurosci.* 2002;3(3):228-236. [CrossRef]
32. Faroqi-Shah Y, Virion CR. Constraint-induced language therapy for agrammatism: Role of grammaticality constraints. *Aphasiology.* 2009;21(7-8):977-988. [CrossRef]
33. Taub E, Uswatte G. Aphasia therapy or the importance of being earnest. *NeuroRehabilitation.* 2006;21(2):93-95. [CrossRef]
34. Basso A, Caporali A. Constraint-induced movement therapy: Answers and questions after two decades of research. *Aphasiology.* 2001;15(4):307-332. [CrossRef]
35. Kirmess M, Lind M. Spoken language production as outcome measurement following constraint induced language therapy. *Aphasiology.* 2011;25(10):1207-1238. [CrossRef]
36. Mozeiko J, Coelho CA, Myers EB. The role of intensity in constraint-induced language therapy for people with chronic aphasia. *Aphasiology.* 2016;30(4):339-363. [CrossRef]
37. Kristensen LF, Steensig I, Pedersen AD, Pedersen AR, Nielsen JF. Constraint-induced aphasia therapy in subacute neurorehabilitation. *Aphasiology.* 2015;29(10):1152-1163. [CrossRef]
38. Furnas DW, Edmonds LA. The effect of computerised Verb Network Strengthening Treatment on lexical retrieval in aphasia. *Aphasiology.* 2014;28(4):401-420. [CrossRef]

39. Edmonds LA, Nadeau SE, Kiran S. Effect of verb network strengthening treatment (VNeST) on lexical retrieval of content words in sentences in persons with aphasia. *Aphasiology.* 2009;23(3):402-424. [CrossRef]

40. Yıldırım C, Tetik-Hacıtahiroğlu K, Balseçen B, Düzenli-Öztürk S. Transkortikal sensöriyel afazide VNeST terapi yönteminin sonuçları: Bir olgu sunumu. Dil Konuşma ve Yutma Araştırmaları Dergisi. 2022;5(2):184-207.

41. Torinsson M, Saldert C, Smith SR, Kristensson J, Longoni F. Telerehabilitation with verb network strengthening treatment (VNeST) in two participants with mild-to-moderate and moderate-to-severe aphasia: A single-case experimental design study. *Aphasiology.* 2024. [CrossRef]

42. Boyle M. Semantic feature analysis treatment for aphasic word retrieval impairments: What's in a name? *Top Stroke Rehabil.* 2010;17(6):411-422. [CrossRef]

43. Efstratiadou EA, Papathanasiou I, Holland R, Varlokosta S, Hilari K. Efficacy of elaborated semantic features analysis in aphasia: A quasi-randomised controlled trial. *Aphasiology.* 2019;33(12):1482-1503. [CrossRef]

44. Coelho CA, McHugh RE, Boyle M. Semantic feature analysis as a treatment for aphasic dysnomia: A replication. *Aphasiology.* 2000;14(2):133-142. [CrossRef]

45. Antonucci SM. Use of semantic feature analysis in group aphasia treatment. *Aphasiology.* 2009;23(7-8):854-866. 5 [CrossRef]

46. Kristensson J, Behrns I, Saldert C. Effects on communication from intensive treatment with semantic feature analysis in aphasia. *Aphasiology.* 2015;29(4):466-487. [CrossRef]

47. Van Hees S, Angwin A, McMahon K, Copland D. A comparison of semantic feature analysis and phonological components analysis for the treatment of naming impairments in aphasia. *Neuropsychol Rehabil.* 2013;23(1):102-132. [CrossRef]

48. Sadeghi Z, Baharloei N, Zadeh MA, Ghasisin L. Comparative effectiveness of semantic feature analysis (SFA) and phonological components analysis (PCA) for anomia treatment in Persian-speaking patients with aphasia. *Iran Rehabil J.* 2017;15(3):259-268. [CrossRef]

49. Simic T, Leonard C, Laird L, Stewart S, Rochon E. The effects of intensity on a phonological treatment for anomia in post-stroke aphasia. *J Commun Disord.* 2021;93:106125. [CrossRef]

50. Roth FP, Worthington CK. Treatment Resource Manual for Speech-Language Pathology. 6th ed. San Diego, CA: *Plural Publishing;* 2021. [CrossRef]

51. Wambaugh JL, Wright S, Nessler C. Modified response elaboration training: A systematic extension with replications. *Aphasiology.* 2012;26(12):1407-1439. [CrossRef]

52. Wambaugh JL, Martinez AL. Effects of modified response elaboration training with apraxic and aphasic speakers. *Aphasiology.* 2000;14(5-6):603-617. [CrossRef]

53. Wambaugh JL, Martinez AL, Alegre MN. Qualitative changes following application of modified response elaboration training with apraxic-aphasic speakers. *Aphasiology.* 2001;15(10-11):965-976. [CrossRef]

54. Hughes SK. Schuell's stimulation approach administered intensively for an individual with chronic, severe non-fluent aphasia [*Master's thesis*]. 2017. [CrossRef]

55. Marsalisi CA, Hughes S, Mozeiko J. The therapeutic effect of Schuell's stimulation approach for severe chronic aphasia. *Aphasiology.* 2023;37(9):1427-1455. [CrossRef]

56. Murray LL, Ray AH. A comparison of relaxation training and syntax stimulation for chronic nonfluent aphasia. *J Commun Disord.* 2001;34(1-2):87-113. [CrossRef]