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Promoting Aphasic Communication Effectiveness: The Interactive Role of Age and Gender in Therapeutic Outcomes

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ABSTRACT

This study examined the effectiveness of Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT) on communication skills among individuals with aphasia, considering age and gender as moderating variables. A quasi-experimental pretest–posttest control group design with a 3 × 2 × 2 factorial matrix was adopted. Fifteen participants diagnosed with post-stroke aphasia were purposively and randomly selected from tertiary and private speech clinics. The sample comprised six males (40.0%) and nine females (60.0%) aged between 55 and 85 years (M = 68.2, SD = 6.4). Participants were randomly assigned to three groups: ACE, MIT, and control, with five participants in each. Two validated instruments, the Mississippi Aphasia Screening Test (MAST) and the Communication Skills Rating Scale (CSRT) were administered as pretest and posttest measures. Treatments were conducted for twelve weeks, twice per week, with each session lasting forty-five minutes. Data was analysed using Analysis of Covariance (ANCOVA) at the 0.05 significance level. Results indicated a significant main effect of treatment on communication performance, while age and gender showed no significant moderating effects. Participants exposed to ACE and MIT recorded higher posttest scores than those in the control group. The findings demonstrate that both therapies effectively enhance expressive and receptive communication, supporting neuroplastic and compensatory adaptation mechanisms in aphasia rehabilitation.

Keywords

Aphasia, Aphasia Rehabilitation, Aphasic Communication Effectiveness (ACE), Melodic Intonation Therapy (MIT), Post-Stroke Aphasia, Communication Skills.

Introduction

Aphasia represents one of the most disabling consequences of neurological injury, particularly following stroke, and it interferes with a person's ability to produce, comprehend, and use language in everyday interaction. The condition affects not only spoken language but also reading, writing, and pragmatic communication, resulting in limited social participation and reduced emotional well-being [1]. Rehabilitation, therefore, seeks to restore functional communication that supports independence and enhances quality of life, as well as to help those who are in need of it acquire new ways of performing the expected tasks [2]. Research in speech and language pathology continues to affirm that systematic therapeutic intervention contributes substantially to linguistic recovery and psychosocial adjustment among persons with aphasia.

Two major therapeutic approaches, Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT), have received sustained attention in recent clinical research. Aphasic Communication Effectiveness is a functional, interactional approach that emphasises the pragmatic use of language within authentic communicative contexts [3]. It views communication as a social activity and trains individuals to convey meaning effectively despite linguistic limitations. Through structured yet naturalistic conversation, the therapy helps individuals develop strategies for message conveyance, conversational repair, and turn-taking [4]. It also encourages adaptive communication through gestures, prosody, and other compensatory techniques when verbal fluency remains compromised [5]. These techniques not only enhance communicative competence but also rebuild confidence, self-efficacy, and social participation. By prioritising functional success over linguistic accuracy, ACE facilitates reintegration into everyday communication and fosters meaningful participation in social interactions.

Melodic Intonation Therapy, in contrast, employs musical and rhythmic elements of speech to stimulate expressive language in individuals with non-fluent aphasia. It operates on the principle that melodic contour and rhythmic pacing can engage right-hemisphere regions involved in prosody, auditory-motor integration, and articulatory timing when left-hemisphere language centres are impaired [6]. During therapy, patients are taught to intone common phrases using controlled melodic patterns, often accompanied by rhythmic tapping to synchronise motor output and improve speech fluency [7]. The method capitalises on preserved musical and rhythmic processing networks to stimulate verbal production. MIT, therefore, differs from ACE in its cognitive and neural foundations: while ACE focuses on communicative adaptability within real contexts, MIT emphasises neurophysiological reactivation of speech through melody and rhythm. Both approaches aim to enhance communication, but they operate through distinct mechanisms that engage different aspects of cognitive and neural processing.

Empirical research consistently demonstrates that both therapies produce measurable benefits in linguistic and communicative domains. Haro-Martínez et al. reported that Melodic Intonation Therapy significantly improved expressive language and spontaneous speech among adults with non-fluent aphasia, particularly when combined with conversational practice. García-Casares et al. [6] reported that rhythmic and melodic-based therapies helped reorganise right-hemisphere neural networks responsible for speech initiation, articulation, and the control of prosody. Their findings show that music and rhythm can stimulate cortical regions that remain active even when traditional language areas are impaired. Popescu et al. [7] also found improvements in speech fluency after intervention, though the extent of progress differed among participants. They noted that outcomes were shaped by motivation, therapy intensity, and the initial severity of the impairment, suggesting that individual engagement plays a critical role in recovery.

Further evidence by Van der Meulen, van de Sandt-Koenderman, Heijenbrok-Kal, Visch-Brink, and Ribbers [8] revealed that demographic factors such as age, gender, and the chronic stage of aphasia significantly influenced response to Melodic Intonation Therapy. Together, these findings highlight that while both approaches are effective, their impact is not uniform; instead, it reflects a complex interaction between biological readiness, cognitive flexibility, and psychosocial support. Gender differences in language recovery have also been well established in neuroscientific and clinical literature [9]. Women tend to exhibit more bilateral representation of language functions [10,11], while men display stronger left-hemisphere dominance. This hemispheric asymmetry suggests that women may more readily recruit right-hemisphere homologues after left-sided injury, potentially enhancing their response to Melodic Intonation Therapy, which relies on right-hemisphere activation for melodic and rhythmic processing [7]. In addition to biological differences, gender-related sociocultural and motivational factors affect engagement with therapy. Haro-Martínez et al. found that female participants maintained higher motivation and responsiveness during conversational therapy, whereas male participants demonstrated stronger progress when rhythmic pacing and structured repetition were used. These differences highlight the need to consider gender not merely as a demographic descriptor but as a moderator influencing therapy engagement and communicative outcomes.

Although the efficacy of both ACE and MIT is well documented, few studies have directly compared their effectiveness while accounting for demographic moderators. Most meta-analyses and trials have examined overall outcomes without exploring whether age or gender modifies treatment response [6,7]. This omission limits understanding of how demographic variables interact with therapeutic mechanisms to influence recovery trajectories. Given the diversity of individuals affected by aphasia, such an understanding is critical for the development of tailored, evidence-based rehabilitation programs.

The present study, therefore, investigates the comparative effectiveness of Aphasic Communication Effectiveness and Melodic Intonation Therapy on communication outcomes among individuals with aphasia while examining the moderating roles of age and gender. Specifically, the study aims to determine whether the two approaches differ significantly in improving communicative effectiveness and whether demographic characteristics influence the extent of improvement. By employing a factorial design that allows for the analysis of main and interaction effects, this research extends current evidence on aphasia therapy from general efficacy toward individualised response profiling. The study aligns with the emerging paradigm of precision rehabilitation, which emphasises that treatment outcomes depend on the interplay of therapeutic method, neurological condition, and personal attributes. The findings are expected to generate empirically grounded recommendations for clinicians, strengthen the theoretical link between neuroplasticity and communication recovery, and contribute to the design of demographic-sensitive intervention frameworks for aphasia rehabilitation.

Literature Review

Understanding Communication Impairment and Aphasia

Communication is central to human interaction and cognitive development, yet it remains vulnerable to disruption following neurological or developmental challenges. Aphasia exemplifies a disorder in which brain injury, often caused by stroke or trauma, results in a partial or complete loss of previously acquired language skills. Individuals affected by aphasia experience limitations in comprehension, speech production, and social communication that restrict participation in family and community life. Research consistently shows that the ability to engage meaningfully through language is tied to psychosocial well-being and identity [12].

Abiodun, Osisanya, and Bamigboye [13] demonstrated that individuals with language impairment struggle with both receptive and expressive communication, resulting in difficulties in comprehension and social participation. Their findings highlight the intricate relationship between understanding and expression, showing that language disorders cannot be addressed through single-channel intervention. Similar interdependencies are evident in aphasia, where disruption of one linguistic domain affects others. Studies indicate that receptive deficits can interfere with feedback processing, while expressive limitations reduce self-correction and verbal negotiation, and that as age increases word recognition and speech discrimination ability decreases systematically [14,15]. These relationships form the conceptual basis for multimodal interventions such as Melodic Intonation Therapy (MIT) and Aphasic Communication Effectiveness (ACE), which integrate linguistic, motor, and cognitive elements of rehabilitation.

Language impairment has consequences that extend beyond speech production to social participation and emotional well-being. Individuals with aphasia often exhibit reduced confidence and withdrawal from interpersonal interaction, which aggravates the burden of the disorder. Abiodun et al. [13] and Best, Greenwood, and Grassly observed that communicative participation is an essential determinant of life satisfaction, reinforcing the need for therapy approaches that target not only linguistic accuracy but also real-world communication effectiveness. The emphasis on functional communication aligns with the growing consensus in rehabilitation that success should be measured by meaningful engagement rather than grammatical precision.

Therapeutic Interventions for Communication Recovery

Efforts to restore communication in aphasia have produced numerous intervention models. Two approaches, Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT), have gained prominence for their cognitive and social orientation. ACE, which is grounded in pragmatic language frameworks, focuses on improving communication in authentic conversational settings. Holland [3] argued that therapy for aphasia should replicate natural interaction and encourage individuals to use available linguistic and nonverbal strategies to express meaning effectively. The therapy involves turn taking, conversational repair, and topic maintenance, with the clinician serving as an interactive partner rather than an instructor. Johnson, Ferguson, and Simmons-Mackie [4] found that such interactional approaches promote spontaneous language use and strengthen confidence in communicative competence. Tetnowski, Steele, and Blake similarly observed that conversation-based therapies enhance self-monitoring and strategic flexibility, enabling individuals to sustain dialogue despite residual impairments. Amodu et al. [16] provided empirical support for expressive and articulatory therapies by showing that structured oral motor exercises and expressive speech tasks significantly improved speech intelligibility among individuals with articulation disorders. Although their participants differed from adults with aphasia, the therapeutic mechanism, which combines repetitive motor engagement with expressive feedback, mirrors processes that underpin Melodic Intonation Therapy. Both interventions rely on auditory feedback, rhythmic pacing, and repeated articulation to strengthen motor control and verbal fluency. The evidence suggests that oral motor reinforcement, whether through melody, rhythm, or structured practice, contributes to improved communicative clarity.

Melodic Intonation Therapy utilizes the melodic and rhythmic properties of speech to stimulate language production. García-Casares, Roldán-Tapia, Muñoz-Herrera, and Haro-Martínez [6] reported that melodic intonation activates right hemisphere regions involved in prosody and rhythm, thereby compensating for left hemisphere damage. Rhythmic tapping and melodic repetition enhance motor coordination and timing, promoting smoother speech initiation. Popescu, Bujoreanu, and Alexandru [7] confirmed these findings in a meta-analysis and noted that MIT significantly improves fluency, phrase length, and articulation across multiple studies. The authors also highlighted individual variability in outcomes, suggesting that demographic factors, including age and gender, may influence treatment effects. This variability emphasizes the need for integrative frameworks that combine biological, cognitive, and social perspectives to explain therapy responsiveness.

Jacob, Adigwe, Pillay, Osisanya, and Olatunbosun [17] provided further evidence that structured cueing and pacing techniques facilitate communication improvement. Their study found that prompt response and cues-pause-point therapies enhanced verbal responsiveness and pragmatic fluency. Importantly, they reported gender differences, with female participants demonstrating higher responsiveness and motivation. This observation corresponds with earlier evidence of gender-linked linguistic processing patterns, where women tend to use more bilateral neural pathways for language and exhibit stronger social communication motivation [10,11]. Although Jacob et al. [17] studied children with autism, their findings provide a useful parallel: communication therapies that incorporate structured pacing, feedback, and social engagement benefit from accounting for gendered communication styles. These insights justify examining gender as a moderating variable in aphasia rehabilitation.

Functional therapies such as ACE have been recognised for promoting real-life communication rather than isolated linguistic competence. Wilkinson and Wielaert [5] emphasised that conversational approaches allow individuals to negotiate meaning through multiple channels, including verbal, gestural, and contextual forms, which reduces communication anxiety. Abiodun et al. [13] supported this finding, noting that social interaction and feedback are essential to improving communicative performance, implying that structured participation, rather than mechanical repetition, drives meaningful recovery. Functional interventions enhance self-efficacy and motivation, which are predictors of sustained therapy engagement. Therefore, ACE and MIT, though different in method, share a common foundation: both promote communicative participation by reinforcing linguistic, cognitive, and affective processes simultaneously.

Auditory and Environmental Factors in Communication Rehabilitation

The ability to communicate effectively relies greatly on auditory processing, as hearing sensitivity shapes both understanding and speech production, due to the fact that auditory processing plays significant roles in determining communication efficiency [18,19]. When hearing is impaired, language difficulties often become more pronounced, and recovery through therapy may slow down. Fada and Osisanya [20], Fasola and Osisanya [21] found that people exposed to high levels of environmental noise over long periods experienced a decline in hearing acuity and overall mental alertness. Their work suggests that persistent auditory strain can disrupt speech discrimination and interfere with verbal learning processes. In aphasia rehabilitation, this becomes particularly important because rhythm and melody—two core features of Melodic Intonation Therapy—depend on precise auditory perception. Lawal and Osisanya [22] reported similar findings in their study on prolonged exposure to loud mobile phone audio. They observed that continuous high-volume listening raised hearing thresholds and reduced clarity in speech perception. Taken together, these findings emphasise that effective language therapy requires attention to the listener's auditory condition. Without adequate hearing sensitivity, even well-designed rehabilitation strategies may not achieve optimal results.

Age-related hearing loss is another factor that complicates recovery. Osisanya [15] noted that many older adults with aphasia also experience varying degrees of auditory decline, which often limits their participation in everyday communication and affects emotional well-being. This pattern underscores how sensory health and language performance are interdependent. García-Casares et al. [6] showed that using rhythmic auditory stimulation in therapy improved speech initiation and verbal fluency among individuals with aphasia. Their findings suggest that engaging the auditory system through melodic and rhythmic cues strengthens neural activation during speech production. Similarly, Wilson et al. [12] demonstrated that the auditory and linguistic regions of the brain work together during speech processing. Strengthening auditory feedback, therefore, enhances the brain's capacity to reorganise and recover language functions. These collective insights point to a key principle in aphasia rehabilitation: language recovery is most effective when auditory training and communication therapy are integrated within the same therapeutic framework. These convergent findings suggest that auditory and environmental factors should not be treated as peripheral variables but as integral components of communication rehabilitation. Adequate hearing sensitivity, controlled acoustic conditions, and rhythmic auditory input contribute to improved therapy outcomes. This view aligns with the understanding of communication as a multisensory process that involves coordinated functioning of perceptual, cognitive, and motor systems.

Gender and Age as Moderating Variables in Therapy Outcomes

Demographic factors such as gender and age influence not only cognitive processing but also motivation, engagement, and neuroplasticity. Jacob et al. [17] found that gender significantly affected responsiveness to therapy, with female participants showing greater consistency and verbal engagement. Their results parallel neurological evidence from Cao, Vikingstad, George, Johnson, and Welch, who identified more bilateral activation of language centres in women, enhancing their potential for cross-hemispheric compensation following brain injury. Fridriksson et al. [9] confirmed that such neural flexibility contributes to faster recovery rates in female participants undergoing speech therapy. In contrast, male participants may respond more strongly to rhythmically structured approaches such as MIT, which use right hemisphere auditory-motor synchronisation [7].

Gender-related sociocultural factors also shape communication behaviour. Research indicates that women often engage more openly in conversational exchanges, which facilitates adaptive learning during interaction-based therapy [11]. ACE, which relies on participation and feedback, may therefore be particularly effective among individuals who demonstrate higher verbal motivation and willingness to take conversational risks. Understanding these differences enables clinicians to adapt therapy approaches to individual strengths rather than applying uniform procedures.

Age also moderates the course of rehabilitation through its influence on neural plasticity. Neuroplasticity refers to the brain's capacity to reorganise and form new neural connections following injury [12,14]. Kiran, Meier, and Maddy [23] observed that younger individuals typically exhibit more flexible cortical reorganisation, allowing faster acquisition of compensatory language strategies. Kristinsson, Yourganov, and Rorden [24] demonstrated that age predicts distinct lesion adaptation patterns, with younger adults relying on rapid neural recruitment and older adults depending on compensatory mechanisms involving contextual inference. These findings suggest that therapy design should reflect developmental and cognitive differences rather than assuming uniform recovery rates. Although older adults exhibit slower neural adaptation, they retain the ability to learn through repeated rhythmic and contextual stimulation. García-Casares et al. [6] found that melodic and rhythmic therapies improved speech production even among older adults, suggesting that right hemisphere activation compensates for age-related cognitive decline. Osisanya [15] observed that older adults experiencing hearing decline often depend on contextual clues and visual information to maintain conversational flow. This kind of behavioural adjustment mirrors what is often seen in aphasia rehabilitation, where people learn to work around language difficulties by relying more on tone, gesture, and rhythm. The similarity suggests that compensatory communication draws on many of the same cognitive processes, whether the challenge comes from hearing loss or a neurological condition. Overall, these observations point to the idea that both age and gender can shape how a person's cognitive flexibility and motivation come together to influence the outcome of communication therapy.

Theoretical Framework: Neuroplasticity and the Interactive Compensatory Model

This study draws on two complementary frameworks, Neuroplasticity Theory and the Interactive Compensatory Model, to explain how people with aphasia regain language and communication abilities.

Neuroplasticity Theory highlights the brain's extraordinary ability to reorganise itself after injury. When areas responsible for language are damaged, the brain can form new synaptic connections, allowing other regions, including those in the opposite hemisphere, to take over the lost functions [12,14]. This adaptability forms the foundation of much of the progress observed during speech and language therapy for individuals with aphasia. One therapy that demonstrates this principle is Melodic Intonation Therapy (MIT), which uses melody, rhythm, and repetition to activate right-hemisphere networks that handle prosody and timing. Findings from neuroimaging and behavioural research show that rhythmic and repetitive speech activities can help re-engage dormant neural pathways, supporting gradual improvements in fluency [6,7]. In essence, neuroplasticity provides the biological explanation for why music and rhythm can be powerful tools in restoring language, as they promote functional rewiring within the brain.

The Interactive Compensatory Model, by contrast, addresses the behavioural and pragmatic aspects of recovery. It views communication not solely as a linguistic skill but as a process that draws on multiple cues. Individuals with aphasia often rely on gestures, facial expressions, gaze direction, and contextual understanding to express themselves. Holland [3] emphasised that therapy should nurture these adaptive strategies rather than discourage them, guiding clients to use them intentionally to sustain interaction. The Aphasia Communication Enhancement (ACE) approach embodies this principle by helping clients identify moments of communication breakdown and apply repair strategies such as clarification, rephrasing, or cueing. Studies by Johnson et al. [4] and Tetnowski et al. reported that participants who received ACE training showed reduced frustration, increased confidence, and improved social participation.

These two perspectives offer a holistic view of recovery. Neurological repair enables the brain to re-establish lost connections, while behavioural adaptation empowers individuals to communicate effectively using every available channel. In this way, aphasia rehabilitation becomes both a biological and a social process—one that blends neural recovery with human resilience and creativity in communication. Both frameworks also acknowledge that recovery outcomes differ among individuals. Studies in neuroplasticity have shown that younger adults tend to experience stronger cortical reorganisation, whereas older adults often depend more on compensatory routes to maintain communication [24]. Biological and gender-related differences in hemispheric lateralisation may further influence how efficiently these new pathways are established [9]. In essence, while the capacity for recovery is universal, the routes through which it occurs are shaped by age, neural flexibility, and individual experience. By integrating these complementary views, the present study positions MIT and ACE within a multidimensional model of recovery in which biological restoration and functional adaptation work together, moderated by age and gender, to shape individual outcomes.

Empirical Gaps and Rationale for the Study

Although research on aphasia rehabilitation has advanced significantly, important empirical gaps remain. Few comparative studies have systematically examined the combined and differential effects of Aphasic Communication Effectiveness and Melodic Intonation Therapy within the same population. Most available studies focus on developmental disorders [13,16,17] or on hearing-related communication issues [15,20,22], leaving limited evidence concerning adult language rehabilitation. Furthermore, the moderating roles of age and gender are rarely explored empirically as variables influencing therapy outcomes [6].

Addressing these gaps is essential for refining theoretical and practical approaches to aphasia treatment. The integration of ACE and MIT provides an opportunity to explore how conversational and melodic interventions complement each other in enhancing communicative effectiveness. By including age and gender as moderating variables, this study advances understanding of personalised rehabilitation and recognises that individual characteristics shape both the pace and pattern of recovery. The study contributes to the growing movement in rehabilitation science that emphasises evidence-based, demographically sensitive, and functionally oriented approaches to language restoration.

Methodology

Research Design

The study employed a quasi-experimental pretest–posttest control group design within a 3 × 2 × 2 factorial matrix, structured to examine the effects of two therapeutic interventions, Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT), on the communication skills of persons with aphasia, while considering age and gender as moderating variables. The quasi-experimental approach was selected because it allows for systematic comparison of treatment outcomes in natural clinical settings where full randomisation is often impractical. This design facilitates the examination of both main and interaction effects among the independent variables, thereby providing insight into how treatment type interacts with demographic characteristics to influence communication recovery.

The three levels of the independent variable, therapy type, were represented by Experimental Group I (ACE), Experimental Group II (MIT), and Control Group, which received conventional therapy. The two levels of gender (male and female) and two levels of age (younger adults and older adults) served as moderating variables. The dependent variable, communication effectiveness, was operationalised through post-intervention scores on standardised measures of language performance and communication functionality. The pretest–posttest framework allowed for the assessment of improvement attributable to the interventions while statistically controlling for baseline differences through Analysis of Covariance (ANCOVA).

This design aligns with recommendations in clinical rehabilitation research that emphasise experimental control, ethical feasibility, and ecological validity [25,26]. The factorial structure also enabled the study to analyse not only the direct effects of therapy but also the interactive influence of age and gender on rehabilitation outcomes, contributing to a more comprehensive understanding of therapeutic efficacy in aphasia treatment.

Population and Sampling Technique

The population for this study comprised individuals diagnosed with post-stroke aphasia who were receiving language rehabilitation in both tertiary and private speech clinics in Lagos, Nigeria. The participants were selected through a purposive random sampling technique, which ensured that all participants met clearly defined inclusion criteria while maintaining random assignment to treatment conditions. This technique was appropriate given the specialised nature of the population and the need to recruit participants who had comparable communication impairments and treatment histories.

A total of 15 participants were recruited for the study. Out of these, 6 (40.0%) were male and 9 (60.0%) were female. Most of the participants, 11 individuals (73.3%), were within the 55–76-year age range, while the remaining 4 participants (26.7%) were between 75 and 85 years. All participants were post-stroke patients who had been clinically identified as experiencing expressive and receptive language difficulties, consisting of aphasia.

Participants were drawn from speech therapy clinics and neurorehabilitation units affiliated with private and tertiary hospitals. The inclusion criteria ensured homogeneity and clinical appropriateness of the sample. Specifically, participants were required to:

1. Have experienced a stroke resulting in communication difficulties.
2. Be between 50 and 80 years of age.
3. Have English as their first or second language to ensure comprehension of the intervention content.
4. Demonstrate clinically identifiable aphasia confirmed through screening.
5. Be cognitively stable and able to participate actively in therapy sessions.

Individuals with severe hearing impairment, psychiatric comorbidity, or multiple neurological diagnoses were excluded. Prior to participation, informed consent was obtained, and participants were briefed about the purpose and voluntary nature of the study.

Research Instruments

Two standardised instruments were employed to assess expressive, receptive, and functional communication skills: the Mississippi Aphasia Screening Test (MAST) and the Communication Skills Rating Scale (CSRT), an adapted version of the Communication Effectiveness Index (CETI).

Mississippi Aphasia Screening Test (MAST)

The scale is a brief and reliable screening tool developed by Nakase-Thompson, Manning, Sherer, Yablon, and Nick [27] to evaluate expressive and receptive language abilities among individuals with aphasia. It includes subtests that measure naming, repetition, automatic speech, writing, comprehension, and verbal fluency. Each subtest is scored on a weighted scale, with higher scores indicating better communication performance. The MAST has been validated for clinical use with stroke survivors and is widely recognised for its sensitivity to change during rehabilitation. In this study, the MAST served as both a pretest and posttest measure, providing quantitative data on participants' language recovery over the 12-week intervention period.

Communication Skills Rating Scale (CSRT)

The instrument used in this study was a modified form of the Communication Effectiveness Index (CETI), first developed by Lomas, Pickard, Bester, Elbard, Finlayson, and Zoghaib [28]. The original CETI contains 16 items presented on a visual analogue scale and is widely used to measure functional changes in the communication abilities of people with aphasia. It focuses on everyday communicative behaviour, such as how well a person can start a conversation, respond appropriately to others, or use nonverbal cues like gestures and facial expressions. For this study, the scale was carefully adapted and standardised to reflect both verbal and nonverbal aspects of interaction, ensuring a more complete picture of each participant's communicative progress after therapy. Each item was rated on a ten-point continuum, where higher scores represented stronger overall communication skills.

Procedure for Intervention

The intervention spanned a period of twelve weeks and was organised into three distinct stages: the pretest assessment, the intervention itself, and the posttest evaluation.

Phase One: Pretest Assessment

In the initial two weeks, participants underwent a comprehensive baseline assessment using the Mississippi Aphasia Screening Test (MAST) and the Communication Skills Rating Tool (CSRT). These instruments were used to gauge each participant's expressive, receptive, and pragmatic communication abilities before treatment began. The resulting scores provided reference points for comparison and were later employed as covariates to adjust for any pre-existing variations among participants. In addition, demographic details including age, gender, and the duration of aphasia were collected to give a fuller profile of each individual and to assist in interpreting later outcomes.

Phase Two: Intervention Phase (8 Weeks)

Participants were randomly assigned to three groups:

- Experimental Group I: Received Aphasic Communication

Effectiveness (ACE).

- Experimental Group II: Received Melodic Intonation Therapy (MIT).
- Control Group: Received conventional speech stimulation therapy (standard clinic routine).

Each group consisted of five participants. All interventions were conducted by licensed speech-language therapists with at least five years of clinical experience in neurological rehabilitation. Sessions lasted 45 minutes each, delivered twice per week in a structured therapeutic environment. The content, pacing, and complexity of each session were tailored to the cognitive and linguistic capacities of the participants.

Aphasic Communication Effectiveness (ACE) Sessions

The ACE approach focused on developing pragmatic and conversational competence. Participants were guided through exercises involving role-play, topic maintenance, conversational repair, and turn-taking. Activities encouraged verbal and nonverbal strategies such as gesturing, paraphrasing, and the use of key words to sustain communication. The therapist's role was primarily facilitating, promoting self-expression and peer feedback. Communication tasks were drawn from everyday contexts, including family discussions, community interactions, and basic decision-making scenarios. The goal was to build confidence and communicative independence through real-life engagement rather than purely linguistic drills.

Melodic Intonation Therapy (MIT) Sessions

The MIT sessions were based on structured melodic intonation techniques that use rhythmic pacing and musical patterns to stimulate speech. Each participant was taught to produce short, functional phrases through melodic intonation, accompanied by **rhythmic tapping** with the left hand to enhance motor synchronisation. The therapy progressed from simple automatic sequences, such as greetings, to complex sentence structures. As participants mastered each level, the intonation pattern gradually faded to approximate natural prosody. The approach aimed to activate right-hemisphere regions associated with rhythm and motor coordination, facilitating verbal fluency through neural compensation [6].

Control Group Sessions

Participants in the control group continued with their standard speech therapy sessions, which included basic articulation and naming drills. Unlike ACE or MIT, the conventional therapy emphasized repetition and word recall without the structured conversational or melodic elements. The inclusion of a control condition allowed the study to isolate the specific effects of ACE and MIT from general therapy-induced improvement.

Phase Three: Posttest Evaluation (2 Weeks)

Following the 8-week intervention, posttest assessments using the MAST and CSRT were administered to all participants under the same conditions as the pretest. The goal was to evaluate improvements in expressive, receptive, and pragmatic communication. Data collected at this stage provided the basis for statistical comparison between groups.

Data Analysis

Data was analysed using the Statistical Package for the Social Sciences (SPSS, Version 25). Descriptive statistics such as mean, standard deviation, and percentage distribution were used to summarise demographic and baseline characteristics.

The primary analysis involved Analysis of Covariance (ANCOVA) to compare posttest communication scores across the three groups while controlling pretest performance. ANCOVA was chosen because it adjusts for baseline variability, thereby increasing statistical precision and reducing potential confounding effects. The model tested both main effects (therapy type, age, and gender) and interaction effects (e.g., therapy × gender, therapy × age). Statistical significance was set at the 0.05 level. Effect sizes (partial eta squared) were calculated to determine the magnitude

Table 1: Summary of 3 × 2 × 2 Analysis of Covariance (ANCOVA) of Treatment, Gender, and Age on Communication Skills of the Participants

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3631.084a	9	403.454	7.622	.019*	.932
Intercept	831.485	1	831.485	15.709	.011*	.759
Treatment	1895.220	2	947.610	17.903	.005*	.877
Gender	90.727	1	90.727	1.714	.247	.255
Age	151.197	1	151.197	2.857	.152	.364
Pre_Test	107.184	1	107.184	2.025	.214	.288
Treatment × Gender	105.022	2	52.511	.992	.434	.284
Treatment × Age	21.431	2	10.715	.202	.823	.075
Gender × Age	6.184	1	6.140	.025	.540	.034
Treatment × Gender × Age	3.022	2	3.110	.020	.640	.024
Error	264.649	5	52.930			
Total	34,904.000	15				
Corrected Total	3895.733	14				
$R^2 = .932$ (Adjusted $R^2 = .810$)						
$p < 0.05$ indicates statistical significance.						

of treatment effects. Where significant main or interaction effects were found, post hoc pairwise comparisons using Bonferroni correction were conducted to identify the specific group differences responsible for the observed effects. This analytical approach provided a nuanced understanding of how therapy type interacted with age and gender to influence communication improvement. To ensure validity, assumptions of ANCOVA normality, homogeneity of regression slopes, and independence of observations were tested and met. Outlier inspection and residual analyses confirmed that the data satisfied the assumptions necessary for robust inference. The results were presented in tabular form and interpreted in light of the study's theoretical framework on neuroplasticity and compensatory adaptation.

Ethical Considerations

Ethical clearance for the study was obtained from the Institutional Review Board overseeing the participating clinics. Informed consent was obtained from all participants and their caregivers before data collection. Participants were assured of the confidentiality of their information, and codes were used instead of names on all data forms.

The intervention was designed to conform to professional ethical guidelines for speech-language pathology. Participation was entirely voluntary, and individuals were free to withdraw at any stage without penalty. Control group participants were offered additional therapy sessions after the study to ensure equitable access to treatment benefits. Data were securely stored in password-protected files, accessible only to the research team.

Results

The ANCOVA results in Table 1 reveal a statistically significant main effect of treatment on the communication skills of persons with aphasia, $F(2,5) = 17.903$, $p = .005$, $\eta^2_p = .877$. This suggests that the type of therapeutic intervention had a strong and meaningful influence on posttest communication performance after controlling for pretest scores. The partial eta squared value (.877) indicates that approximately 88% of the variance in participants' communication outcomes can be attributed to differences in treatment type, representing a very large effect size. In contrast, the main effects of gender ($F = 1.714$, $p = .247$, $\eta^2_p = .255$) and age ($F = 2.857$, $p = .152$, $\eta^2_p = .364$) were not statistically significant. This indicates that although there were observable mean differences between males and females and between younger and older adults, these differences did not reach statistical significance at the 0.05 level. Nevertheless, the moderate effect sizes suggest that both gender and age accounted for some variance in communication outcomes and may still play a role in moderating treatment responsiveness.

The interaction effects among treatment, gender, and age were also found to be statistically non-significant. Specifically, the treatment × gender interaction ($F = .992$, $p = .434$, $\eta^2_p = .284$) and treatment × age interaction ($F = .202$, $p = .823$, $\eta^2_p = .075$) indicate that the effect of therapy did not differ substantially across gender or age categories. Similarly, the three-way interaction among treatment, gender, and age ($F = .020$, $p = .640$, $\eta^2_p = .024$) was negligible, suggesting that the combined influence of these variables did not produce differential outcomes in communication improvement. Overall, the corrected model was statistically significant ($F = 7.622$, $p = .019$, $R^2 = .932$), explaining approximately 93% of the total variance in posttest communication scores. The adjusted R^2 value of .810 further confirms that the model provided a strong fit even after accounting for the number of predictors. These results collectively indicate that the treatment interventions were highly effective in improving communication skills, whereas demographic variables such as gender and age exerted minimal moderating influence.

Summary of Findings for Objective One

1. **Treatment Effect**
   The type of therapeutic intervention significantly influenced communication performance among people with aphasia. Both ACE and MIT were found to be highly effective compared to the conventional approach.
2. **Gender Effect**
   Gender differences were not statistically significant, though female participants demonstrated slightly higher mean scores, consistent with earlier findings that females often exhibit stronger bilateral activation during language processing [11].
3. **Age Effect**
   Age differences were not statistically significant, though younger participants showed marginally faster improvement. The pattern supports previous evidence that younger brains exhibit higher neuroplastic potential [23].
4. **Interaction Effects**
   The non-significant interaction terms suggest that the influence of treatment on communication improvement did not differ meaningfully across gender and age groups.

Discussion of Findings

Overview of the Findings

This study investigated the effects of Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT) on the communicative competence of individuals with aphasia, while also exploring whether age and gender moderate treatment outcomes. A three-way Analysis of Covariance (3 × 2 × 2 ANCOVA) revealed a statistically significant main effect of treatment on post-intervention communication scores. Participants who received ACE or MIT demonstrated markedly greater gains than those who underwent the conventional therapy approach. The large effect size ($\eta^2 = .877$) further highlights the practical significance of both interventions within clinical language rehabilitation.

This consistency indicates that, when therapy is structured and systematically implemented, individuals of different ages and genders respond comparably well. Such findings align with emerging large-scale studies showing that treatment fidelity, duration, and task specificity are stronger predictors of post-stroke language recovery than demographic characteristics [24,29]. Collectively, these results reinforce the reliability and generalisability of both interventions in promoting communicative recovery among people with aphasia.

Efficacy of Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT)

The significant main effect of treatment observed in this study provides strong evidence that both Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT) are effective, evidence-based methods for enhancing expressive, receptive, and pragmatic communication among individuals with aphasia. Participants who received either intervention demonstrated marked improvements in fluency, conversational balance, and spontaneous speech. These outcomes reaffirm that meaningful language recovery is attainable, even for people with long-standing or moderate impairments, when therapy is delivered systematically, with sufficient intensity, and within communicative contexts that feel purposeful and relevant.

The clear advantage of structured intervention over routine stimulation supports an emerging consensus in aphasia rehabilitation research. Monnelly et al. [30] found that Intensive Comprehensive Aphasia Programs (ICAPs) produced more substantial gains than conventional therapy because they integrate multiple treatment components while maintaining a high frequency of practice. Similarly, Peitz et al. [29] observed that the degree of improvement in real-world clinical settings was closely tied to the total hours of therapy, and the diversity of communicative experiences offered. These findings resonate with the principles underpinning both ACE and MIT in the present study, underscoring that consistent, goal-oriented engagement yields greater functional recovery than factors such as diagnosis type or impairment duration alone.

The progress achieved by participants in the ACE group further illustrates the logic of the Interactive Compensatory Model. According to this framework, individuals with aphasia can communicate effectively by drawing upon alternative strategies—gesture, paraphrasing, contextual cues, or facial expression—when linguistic abilities are constrained [3,4]. The ACE approach operationalises this idea by teaching clients to recognise communication breakdowns and to use conversational repair strategies that sustain dialogue. Through guided practice, participants learn to maximise their remaining linguistic capacity, which in turn strengthens the neural and behavioural systems responsible for everyday communication [5]. These interpretations align with the recent findings of Larweh et al. [31], who reported that therapy models centred on conversation and everyday participation foster not only measurable speech gains but also improvements in confidence, motivation, and social connection. Collectively, these results reinforce the view that effective aphasia rehabilitation extends well beyond language restoration—it nurtures adaptability, emotional resilience, and a renewed sense of agency in communication.

Conversely, MIT achieves its therapeutic effect through rhythmic and melodic scaffolding that facilitates speech-motor planning. Structured melodic phrasing and rhythmic tapping engage right-hemisphere networks linked to prosody, timing, and motor synchronisation [6]. Neuroimaging studies provide converging evidence: Martínez-Molina et al. [32] and Sihvonen et al. [33] observed that singing-based interventions elicit measurable changes in both functional activation and white-matter connectivity in chronic aphasia. These findings suggest that melodic intonation stimulates bilateral auditory–motor integration, allowing undamaged cortical regions to assume compensatory roles in language production. The present outcomes therefore affirm that both ACE and MIT derive their strength from complementary mechanisms, one social and compensatory, the other neurobiological and rhythmic, each contributing to the restoration of communicative competence. Marcotte and Ansaldo [34] similarly demonstrated that targeted melodic stimulation strengthens perilesional connectivity, illustrating that therapy-induced neuroplasticity is both task-specific and durable. Collectively, the evidence affirms that both ACE and MIT operate through complementary pathways, with ACE enhancing functional adaptation and MIT facilitating neural restoration, consistent with the dual-mechanism framework advanced by Crosson, McGregor, and Gopinath [14], Wilson and Schneck [12].

Gender as a Moderating Variable

Although the effect of gender was not statistically significant, female participants showed slightly higher mean communication scores than males. This finding aligns with established neuroscientific evidence indicating greater bilateral distribution of language networks among women, which enhances cross-hemispheric compensation after left hemisphere lesions [10,11]. Recent work by Sharma and Briley [35] reaffirmed this pattern, noting that female patients generally exhibit faster lexical retrieval and stronger engagement in therapy tasks, whereas male patients often benefit more from structured rhythmic pacing.

The behavioural tendencies observed in this study correspond with those of Jacob, Adigwe, Pillay, Osisanya, and Olatunbosun [17], who reported that female participants in cue-based therapy showed higher verbal responsiveness and motivation. These differences may be attributed not only to neuroanatomical factors but also to sociocultural conditioning that encourages expressive communication among women. Despite these nuances, the lack of statistical significance suggests that both genders are equally capable of benefiting from well-structured interventions when therapy is individualised and motivation is reinforced.

Furthermore, Harnish, Kirby, and Schwartz [1] observed that therapy outcomes in aphasia are more strongly influenced by task relevance, patient engagement, and therapist-patient interaction quality than by gender itself. This reinforces the conclusion that gender, while theoretically relevant to neural activation patterns, is not a limiting factor in recovery potential under conditions of consistent and meaningful therapeutic engagement.

Age and Communication Recovery

The findings indicate that age did not significantly influence therapy outcomes, although younger participants tended to recover slightly faster than older ones. This pattern is consistent with prior research showing that neuroplastic capacity decreases with age, leading to slower but still meaningful improvement [24]. Watila and Balarabe [36] also identified age as a modest predictor of post-stroke aphasia recovery, explaining that older adults rely on compensatory networks rather than rapid cortical reorganisation. However, the significant posttest gains among older participants in this study confirm that functional recovery remains possible well into later adulthood when therapy is repetitive, multimodal, and emotionally engaging. The incorporation of rhythm and melody in MIT appears particularly beneficial for older adults by enhancing temporal attention and auditory motor coupling [32]. Likewise, ACE's reliance on contextual conversation allows older individuals to draw upon preserved social cognition and pragmatic competence, offsetting age-related declines in working memory and processing speed [37].

Aghaz and Salem [38] asserted that both experience-dependent and injury-induced neuroplasticity remain active in older adults, especially when therapy involves sensory and motor enrichment. The present findings, therefore, align with the broader conclusion that age moderates the rate rather than the possibility of recovery. The non-significant interaction between age and treatment further implies that both younger and older adults can achieve communicative gains if intervention intensity and task relevance are optimised.

Interaction Effects of Treatment, Gender, and Age

The absence of statistically significant interaction effects suggests that ACE and MIT exert similar benefits across demographic subgroups. This consistency underscores the universality of therapeutic mechanisms underlying both approaches. Neuroplasticity processes and pragmatic adaptation are fundamental human capacities that function irrespective of demographic variation, provided that therapeutic input is systematic and sustained.

These findings are compatible with recent meta-analyses by Wilson and Schneck [12] and Peitz et al. [29], who observed that the magnitude of therapy-induced brain reorganization is determined primarily by treatment intensity rather than by age or gender. In particular, Sihvonen et al. [33] found that singing interventions produced similar cortical activation patterns among younger and older adults, indicating that the neural substrates of rhythmic processing are robust across the lifespan. Furthermore, Fridriksson et al. [9] described two parallel recovery routes, the reactivation of residual perilesional networks and the recruitment of homologous contralateral regions, both of which can be engaged through either pragmatic or melodic stimulation. This dual-pathway model explains why demographic factors did not significantly alter treatment efficacy in the present study. As long as therapy activates both linguistic and nonlinguistic pathways, recovery potential remains consistent across individuals.

Comparative Analysis with Previous Studies

The outcomes of this study align with global evidence supporting the effectiveness of conversation-based and rhythm-based therapies. Holland [3], Wilkinson and Wielaert [5] both argued that meaningful rehabilitation in aphasia should prioritise restoring the *function* of communication rather than merely rebuilding its *form*. The progress demonstrated by participants in the ACE programme supports this view, showing that interventions focused on real-life participation and communicative intent can lead to tangible improvements in everyday social interaction.

More recent research has expanded on this idea. Griffin-Musick et al. [39] reported that individuals achieved better outcomes when therapy incorporated personalised conversational context settings that invited emotional expression and mirrored the dynamics of genuine communication. Their findings highlight that recovery is not only a matter of linguistic accuracy but also of rebuilding confidence, connection, and self-expression within meaningful social exchanges. Similarly, Larweh et al. [31] concluded that pragmatic and community-based communication interventions improved both verbal and nonverbal responsiveness, mirroring the conversational tasks integrated in the ACE sessions of this study.

The positive impact of MIT likewise echoes findings from Popescu et al. [7] and García-Casares et al. [6], who reported substantial improvements in fluency, rhythm, and prosody following structured melodic intonation. Martínez-Molina et al. [32] and Sihvonen et al. [33] further demonstrated that such interventions induce functional neuroplasticity, enhancing connectivity within right-hemisphere motor auditory circuits. The present findings, therefore, contribute to a growing body of evidence that melody-based therapy can serve as an effective neuromodulatory tool in chronic aphasia.

In the African context, these results build upon earlier contributions by Abiodun, Osisanya, and Bamigboye [13] and Amodu et al. [16], who established that functional and expressive therapies yield substantial improvements in linguistic performance among individuals with language disorders. The current study extends that line of inquiry to adults with acquired aphasia, demonstrating that communication rehabilitation principles are transferable across populations.

The significance of auditory health also resonates with prior research by Fada and Osisanya [20], Lawal and Osisanya [22], who emphasised the interdependence between hearing acuity and speech performance. Because MIT employs rhythmic auditory feedback, its effectiveness may partially depend on auditory sensitivity, a factor worth exploring in future studies.

Theoretical Implications

The findings strongly reinforce two interrelated theoretical perspectives, Neuroplasticity Theory and the Interactive Compensatory Model.

Neuroplasticity Theory postulates that the brain retains the ability to reorganise neural pathways following injury, and that structured, repetitive stimulation can facilitate this reorganisation [12,14]. The significant improvement among MIT participants aligns with neuroimaging studies showing therapy-induced changes in right hemisphere activation after melodic or singing-based interventions [32,33]. Marcotte and Ansaldo [34] demonstrated that rhythmic entrainment can strengthen the functional linkage between auditory and motor cortices, showing that music-mediated neuroplasticity supports not only compensation but also true neural restoration. Their findings reinforce the principle that rhythm and melody can reactivate dormant pathways essential for speech–motor coordination, providing a neurobiological rationale for the success of MIT.

The Interactive Compensatory Model complements this perspective by focusing on behavioural adjustment. Holland [3] proposed that when linguistic competence is compromised, communicative success may still be achieved through gesture, contextual inference, and shared understanding. The performance gains observed among ACE participants reflect this adaptive process. Griffin-Musick et al. [39] likewise reported that conversational therapies enhance both verbal output and social connectedness, outcomes that parallel the improvements documented in the present study.

The theoretical and empirical evidence suggests that language recovery evolves through the interaction of neural reactivation and functional compensation. The absence of significant demographic moderation implies that these recovery mechanisms operate broadly across age and gender, supporting the adaptability of ACE and MIT to diverse clinical populations. By linking neurobiological restoration with pragmatic adaptation, the present findings deepen theoretical understanding of aphasia rehabilitation, showing that melodic and conversational interventions mobilise complementary systems that together optimise communicative recovery.

Clinical and Practical Implications

From a clinical standpoint, the results of this study highlight the value of adopting multimodal, person-centred approaches in aphasia rehabilitation. Both the Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT) programmes can be flexibly tailored to an individual's cognitive strengths, personal interests, and communicative goals. This adaptability enables clinicians to align therapeutic content with each participant's motivation and capacity for engagement. For instance, ACE tends to be more suitable for individuals who can produce some speech but struggle with pragmatic or interactive components of communication, whereas MIT may be particularly beneficial for those with pronounced expressive limitations yet preserved sensitivity to rhythm and melody.

The absence of significant effects for gender and age also carries an important implication: these interventions appear broadly equitable, offering similar benefits across diverse demographic groups when delivered with sufficient intensity and consistency. Research by Peitz et al. [29] and Monnelly et al. [30] underscores that the total amount of active therapy time, rather than the number of sessions per week, is one of the strongest predictors of recovery. The present study's twelve-week, twice-weekly structure aligns with these findings, showing that noticeable progress can emerge within a manageable timeframe when sessions remain focused, interactive, and purposeful.

In practical terms, these insights hold particular relevance for low-resource or community-based rehabilitation contexts. Both ACE and MIT can be implemented effectively without sophisticated equipment or advanced technological support. This makes them especially suitable for outpatient clinics and local rehabilitation centres where access to specialised resources is limited, yet the need for effective, evidence-based therapy remains high. The flexibility to adapt conversational topics and melodic patterns to local languages and cultural contexts increases their feasibility in African clinical practice, where individualised therapy remains limited [15]. The results also highlight the importance of therapist training and interdisciplinary collaboration. As Harnish et al. [1] noted, adjuvant techniques such as rhythmic pacing, caregiver education, and digital feedback tools can amplify therapy effects when combined with traditional interventions. Implementing hybrid therapy programs that merge ACE and MIT principles may therefore enhance both efficiency and sustainability in post-stroke rehabilitation.

Implications for Future Research

Despite the robust findings, several research directions emerge. First, future studies should employ larger samples and longitudinal follow-ups to validate the generalizability and durability of treatment effects. Intensive therapy programs such as those described by Monnelly et al. [30] and Peitz et al. [29] could be replicated locally to determine the optimal dose-response relationship for ACE and MIT in diverse populations.

Second, incorporating neuroimaging and electrophysiological measures would clarify the neural substrates of therapy-induced recovery. Functional MRI and EEG studies, such as those conducted by Wilson and Schneck [12] and Martínez-Molina et al. [32], can objectively map cortical reorganisation during intervention.

Third, future work should explore hybrid therapy designs that integrate conversational pragmatics with rhythmic melodic cues, as proposed by Griffin-Musick et al. [39]. Such multimodal approaches may simultaneously target neural reactivation and functional compensation, maximising communicative gains.

Cross-cultural investigations are warranted to determine how linguistic structure and cultural interaction styles influence therapy responsiveness. Comparative research between tonal and non-tonal languages, for instance, could reveal how prosodic familiarity modulates MIT outcomes.

Conclusion

This study provides clear evidence that structured, evidence-based interventions, such as Aphasic Communication Effectiveness (ACE) and Melodic Intonation Therapy (MIT), can lead to marked gains in the communicative abilities of people living with aphasia. Both treatments supported improvements in expressive and receptive language, showing that meaningful rehabilitation is not confined to restoring linguistic accuracy but also involves rebuilding communicative intent and cognitive flexibility. Participants showed not only greater fluency and responsiveness but also increased confidence and willingness to engage socially. These outcomes reaffirm that aphasia recovery is as much a psychosocial process as it is a linguistic one.

The pronounced effect of treatment, together with the minimal influence of age and gender, suggests that the *quality, focus, and consistency* of therapy are more critical to progress than demographic factors. The ACE approach, guided by the Interactive Compensatory Model, encouraged participants to use gestures, contextual cues, and conversational repair strategies to maintain interaction and express meaning. In contrast, MIT, which draws on Neuroplasticity Theory, relied on rhythm and melodic patterns to stimulate right-hemisphere pathways and promote neural reorganisation linked to speech production. Taken together, the two interventions demonstrate that communication recovery depends on a dynamic interaction between behavioural adaptation and cortical restructuring, each reinforcing the other to re-establish functional, confident communication.

Clinicians are encouraged to integrate pragmatic and melodic techniques to enhance outcomes. Therapy should be culturally relevant, using familiar speech patterns and songs to strengthen engagement. Continuous professional training in these methods is essential, particularly in resource-limited settings, to ensure consistent, evidence-based practice. Rehabilitation should extend beyond the clinical setting, incorporating family participation and follow-up sessions to maintain gains. Policymakers should also recognise communication rehabilitation as central to social reintegration and quality of life.

The study acknowledges certain limitations. The sample size was small, and the twelve-week duration limited the evaluation of long-term effects. Quantitative measures could not fully capture qualitative aspects of communicative interaction. Future studies should use larger samples, mixed methods, and longitudinal designs to assess the durability of improvements and explore hybrid ACE–MIT approaches.

In conclusion, this research demonstrates that language recovery after aphasia is attainable through structured, person-centred interventions that combine functional communication practice and melodic stimulation. ACE and MIT empower individuals to rebuild speech, self-expression, and social participation. When therapy is contextually meaningful and sustained, it restores not only linguistic ability but also dignity, confidence, and human connection.

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