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Music as a therapeutic tool for primary progressive aphasia: a case study

Música como ferramenta terapêutica para afasia progressiva primária: um estudo de caso

La música como herramienta terapéutica para la afasia progresiva primaria: un estudio de caso

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Abstract

Introduction: Primary Progressive Aphasia (PPA) is a neurodegenerative disease characterized by the gradual and permanent loss of language components. **Objective**: This case report aims to investigate the feasibility and effects of music as a speech-language therapy tool in an intervention with an individual diagnosed with PPA. **Method**: An intervention was carried out with an 84-year-old male individual, with eleven years of formal education and a diagnosis of non-fluent/agrammatic PPA at a moderate stage. The music-based intervention aimed to stimulate speech fluency and memory and was conducted over 10 sessions, each lasting 45 minutes, in addition to daily reinforcements supervised by a family caregiver. The participant was evaluated before and after the experiment using the following instruments: Montreal-Toulouse Language Assessment Battery (MTL-Brazil), Functional Assessment of Communication Skills (ASHA-FACS Brazil), and a questionnaire assessing the participants' and caregivers' perceptions of the intervention's effects. **Results**: The use of music in speech-language intervention proved to be feasible, with engagement from both the participant and his family. Quantitative results indicated slight improvement in verbal abilities and non-verbal praxis tests, stability in comprehension tests, and decline

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in discourse tasks. Qualitative analysis revealed benefits in comprehension, mood, and overall well-being of the participant. **Conclusion**: Music had positive effects in the intervention with this individual with PPA. However, since the results were varied, it is not possible to attribute them solely to music, which appears to be a plausible resource for speech-language therapy.

Keywords: Primary Progressive Aphasia; Primary Progressive Nonfluent Aphasia; Music; Language Therapy; Speech Therapy; Speech, Language and Hearing Sciences.

Resumo

Introdução: A Afasia Progressiva Primária (APP) é uma doença neurodegenerativa caracterizada pela perda gradual e permanente de componentes da linguagem. **Objetivo**: Este relato de caso propõe investigar a viabilidade e os efeitos da música como ferramenta fonoaudiológica em uma intervenção com indivíduo com APP. **Método**: Realizou-se uma intervenção com um indivíduo do sexo masculino, 84 anos, com onze anos de escolaridade e diagnóstico de APP não-fluente/agramatical em estágio moderado. A intervenção com o uso da música teve como objetivo estimular a fluência da fala e a memória, realizada ao longo de 10 sessões, cada uma com 45 minutos de duração, além de reforços diários supervisionados por um cuidador familiar. O participante foi avaliado antes e após o experimento utilizando os instrumentos: Bateria Montreal Toulouse de Avaliação da Linguagem (MTL-Brasil), Avaliação Funcional das Habilidades de Comunicação (ASHA-FACS Brasil) e um questionário sobre a percepção do participante e seu cuidador a respeito dos efeitos da intervenção. **Resultados**: O uso da música na intervenção fonoaudiológica mostrou-se viável, com adesão tanto do participante quanto da família. Os resultados quantitativos indicaram ligeira melhora em provas de habilidades verbais e praxias não verbais, manutenção em provas de compreensão e piora em provas discursivas. A análise qualitativa apontou benefícios para a compreensão, humor e bem-estar do participante. **Conclusão**: A música teve efeitos positivos na intervenção com este indivíduo com APP. No entanto, como os resultados foram diversos, não é possível atribuí-los exclusivamente à música, a qual se apresenta como um recurso plausível para a terapia fonoaudiológica.

Palavras-chave: Afasia Progressiva Primária; Afasia Primária Progressiva não Fluente; Música; Terapia da Linguagem; Terapia da fala; Fonoaudiologia.

Resumen

Introducción: La Afasia Progresiva Primaria (APP) es una enfermedad neurodegenerativa caracterizada por la pérdida gradual y permanente de componentes del lenguaje. **Objetivo**: Este estudio de caso tiene como objetivo investigar la viabilidad y los efectos de la música como herramienta en la intervención fonoaudiológica en un individuo con APP. **Método**: Se realizó una intervención con un individuo de sexo masculino, de 84 años de edad, con once años de escolaridad y diagnóstico de APP no fluente/agramatical en etapa moderada. Esta intervención tuvo como objetivo estimular la fluidez y la memoria del habla, realizada en 10 sesiones de 45 minutos de duración, además de refuerzos diarios supervisados por un cuidador familiar. El participante fue evaluado antes y después del experimento utilizando los instrumentos: Batería Montreal Toulouse para la Evaluación del Lenguaje (MTL-Brasil), Evaluación Funcional de las Habilidades de Comunicación (ASHA-FACS Brasil) y un cuestionario sobre la percepción del participante y su cuidador respecto a los efectos de la intervención. **Resultados**: El uso de la música en la intervención demostró ser viable, con buena adhesión tanto por parte del participante como de su familia. Los resultados cuantitativos indicaron una mejora en las pruebas de praxis verbal y no verbal, el mantenimiento de la comprensión y un empeoramiento en las pruebas discursivas. **Conclusión**: La música tuvo efectos positivos en la intervención en este caso. No obstante, dado que los resultados fueron diversos, no es posible atribuirlos exclusivamente a la música, la cual se presenta como un recurso plausible para la terapia fonoaudiológica.

Palabras clave: Afasia Progresiva Primaria; Afasia Progresiva Primaria no fluente; Música; Terapia del linguaje; Logopedia; Fonoaudiología.

Introduction

Primary Progressive Aphasia (PPA) is a neurodegenerative disorder characterized by atrophy in the frontal and temporal regions of the left hemisphere, leading to the gradual and permanent loss of language abilities. It is an acquired language disorder that impairs the ability to comprehend and produce speech. Difficulties may include word retrieval, lexical access, naming, repetition, and the production of syntactically complex sentences, all of which negatively affect communication. Unlike aphasia caused by stroke, PPA is a progressive condition in which language abilities gradually deteriorate over time[1,2].

The clinical diagnosis of PPA is established according to the inclusion and exclusion criteria of the Mesulam guidelines. It requires evidence of language impairment with a gradual and progressive onset, leading to increasing difficulties in communication and daily activities dependent on linguistic function. Aphasia must constitute the most prominent deficit, both at symptom onset and at the time of clinical evaluation. Exclusion criteria include early symptoms of episodic or visual memory loss, visuospatial impairment, and the presence of non-degenerative neurological conditions such as stroke or tumor. Moreover, behavioral disturbances must not represent the primary complaint or the main cause of functional impairment, nor should other non-linguistic deficits[1,3].

PPA comprises three clinical variants, distinguished by clinical, neuroimaging, and pathological features: semantic, logopenic, and nonfluent/agrammatic. The semantic variant is associated with degeneration of the anterior temporal region, which is critical for language comprehension, leading to difficulties in understanding isolated words and naming. The logopenic variant involves degeneration of the left temporoparietal junction, resulting in anomia, impaired lexical access, and difficulties with phrase repetition. The nonfluent variant is characterized by agrammatism and/or apraxia of speech due to atrophy or hypometabolism in the left frontoinsular region, and may also cause difficulties in comprehending grammatically complex sentences[1,3].

Current pharmacological treatments are primarily aimed at managing symptoms. In this context, speech-language therapy is considered the main intervention. This non-pharmacological approach seeks to slow the progression of communication deficits and promote compensatory strategies, thereby contributing to an improved quality of life for individuals with PPA[4].

The use of music as a therapeutic tool in speech-language therapy for individuals with post-stroke aphasia is well documented, demonstrating positive effects on repetition, naming, cognition, and functional communication. Additionally, evidence indicates that music may alleviate negative moods and improve quality of life[5]. However, research on music-based interventions for individuals with PPA remains limited. A recent literature review identified only two relevant case studies[6]. The first involved a patient with frontotemporal dementia and global aphasia, who participated in tasks such as lengthening the initial sound, producing syllables in rhythm with the therapist, and following the rhythm of each word[2]. The second case concerned a patient with nonfluent PPA, who received music therapy incorporating both musical instruments and vocal exercises rehabilitation[7].

Music is a unique form of human expression, present in human history since ancient times and capable of transcending linguistic and cultural barriers. It plays a significant role across the lifespan, influencing emotions as well as linguistic and extralinguistic abilities. Beyond its aesthetic and artistic functions, music is often compared to language due to its structured organization of sounds, revealing profound aspects of human experience[8].

By stimulating cognitive and perceptual functions, music serves as an important long-term protective factor. In addition to enhancing specific cognitive skills, its effects on preserved brain regions may contribute to the functional maintenance of these areas over time. In the context of PPA, where language abilities are progressively declining, music may support the activation and preservation of these functions[9].

This study aimed to evaluate the feasibility and effects of a music-based speech-language therapy intervention in an individual with nonfluent/agrammatic PPA. It sought not only to assess the impact of this approach on communication abilities but also to explore its potential for enhancing the patient's overall well-being. The relevance of this research lies in its potential to expand the repertoire of therapeutic strategies in clinical speech-language therapy, highlighting music as an effective complementary tool to conventional PPA treatment. By in-

tegrating emotional, cognitive, and communicative dimensions, the musical approach may represent a promising resource for addressing the challenges associated with neurodegenerative conditions.

Case presentation

The inclusion criteria for this case study required that the participant had a diagnosis of PPA at a mild or moderate stage, an affinity for music, proficiency in Brazilian Portuguese, and no prior history of speech-language therapy. Additionally, the participant could not present any other neurological or psychiatric conditions, nor severe or uncorrected visual or auditory deficits.

This case study describes an 84-year-old male with 11 years of education, residing in the state of Rio Grande do Sul, Brazil. The participant was diagnosed with nonfluent/agrammatic PPA[1] and is classified as moderate stage according to the Clinical Dementia Rating (CDR) scale[10]. The initial diagnosis was made by the neurology team at a referral public hospital following complaints related to language and cognition, including difficulty formulating sentences and reduced verbal fluency. Consequently, the patient was referred to the speech-language therapy service of the same institution for a comprehensive evaluation aimed at establishing his linguistic profile and supporting the differential diagnosis between PPA and Alzheimer's disease.

In addition to the speech-language therapy evaluation, the diagnostic workup included neuroimaging and cerebrospinal fluid (CSF) biomarker analysis, all of which were negative for Alzheimer's disease. These findings supported the clinical diagnosis of nonfluent/agrammatic PPA. Following confirmation of the diagnosis, the patient was enrolled in the speech-language therapy rehabilitation program, focusing on strategies to optimize communicative and functional abilities while considering the natural progression of the condition.

At the time of evaluation, the participant's primary complaints included imprecise, slowed, and slurred articulation, accompanied by phoneme substitutions, as well as episodes of word repetition and omission. He also reported difficulties with reading and writing, primarily attributed to macular degeneration, a condition that markedly impairs visual acuity.

According to the participant's son, who served as an informant during the anamnesis, the first symptoms appeared around 2021 and included slowed speech, impaired comprehension—particularly in situations involving multiple speakers—and difficulties with short-term memory.

As the condition progressed and language-related complaints intensified, frequent episodes of anomia, apraxia of speech, and agrammatism were observed, which are symptoms characteristic of this PPA variant.

Prior to the intervention, an interview was conducted with the participant and a family member to explain the study procedures, potential risks and benefits, and to identify the participant's musical profile. After receiving this information, the participant provided written informed consent using the attached template. The study was approved by the local institution's Human Research Ethics Committee under protocol number 6.712.564.

Before and after the intervention, the participant's language skills were assessed using the Brazilian version of the Montreal-Toulouse Battery (MTL-Brazil)[11] (Table 1). Simultaneously, the family member—who also served as the primary caregiver—completed the Functional Assessment of Communication Skills for Adults (ASHA-FACS)[12] (Table 2) to evaluate the patient's communicative functionality in everyday contexts.

Table 1. Results of the Montreal-Toulouse Language Assessment Battery (MTL-Brazil) at pre- and post-intervention moments

Item evaluated	Subtest	Patient Score/Total Pre-Intervention	Patient Score/Total Post-Intervention	Z-Score Raw Score Pre-Intervention	Z-Score Raw Score Post-Intervention
Directed interview	-	26/26	26/26	0,37	0,37
Automatic language	Form	4/6	6/6	-6,33	0,33
	Content	2/6	5/6	-9,75	-2,25
Oral Comprehension	Total	11/19	11/19	-8,43	-8,43
	Words	4/5	4/5	-3,72	-3,72
	Phrases	7/14	7/14	-6,97	-6,97
Oral Narrative Discourse	Total UI	1/10	2/10	-2,42	-1,96
	Scenes	0/3	0/3	-2,5	-2,5
Repetition	Total	30/33	31/33	-8,2	-5,34
	Words	8/11	9/11	-8,2	-5,34
	Phrases	22/22	22/22	no change	no change
Semantic Verbal Fluency	-	6	9	-2,29	-1,81
Nonverbal Praxis	-	18/24	24/24	(Unable to calculate because standard deviation is 0.0)	no change
Oral Nomination	Total	30/30	30/30	no change	no change
	nouns	24/24	24/24	no change	no change
	verbs	6/6	6/6	no change	no change
Manipulation of Objects Under Verbal Order	-	15/16	16/16	-3	0,33
Phonological/ Orthographic Verbal Fluency	-	3	0	-2,76	-3,38
Body part recognition and notions of right and left	Total	8/8	8/8	no change	no change
	Body parts	4/4	4/4	no change	no change
	Notions of right and left	4/4	4/4	no change	no change

*Z-scores below -1.5 suggest a deficit.

Table 2. Results of the American Speech-Language-Hearing Association Functional Assessment of Adult Communication Skills (ASHA FACS) at pre- and post-intervention moments

Domains	Pre-intervention	Post-intervention
Social Communication	5.9	4.8
Basic Needs	6.5	5.8
Reading, Writing and Numerical Concepts	5.7	5.1
Daily Planning	4.5	3.25
Total	22.6	18.95

In addition to these measures, a qualitative assessment was conducted using a supplementary questionnaire developed by the researchers to investigate the perceptions of both the participant and their caregiver regarding the effects of the intervention. Conversations held with the participant at the end of each session also served as an additional source of qualitative information.

The feasibility of the intervention was evaluated based on the participant's and family's adherence to the sessions, the completion of assigned home tasks, and informal reports provided by both throughout the therapeutic process.

The intervention consisted of ten weekly 45-minute sessions, including an initial assessment and two reassessment sessions, all conducted on Fridays between June 7 and August 9, 2024. Considering the participant's musical preferences, non-instrumental Brazilian music was carefully selected, featuring artists such as Chico Buarque, Elis Regina, Natiruts, and Legião Urbana. These selections aimed to provide an experience that was not only therapeutic but also emotionally enriching, culturally meaningful, and engaging.

During all intervention sessions, the songs were presented to the participant, followed by specific activities repeated throughout the week. To ensure continuity of linguistic stimulation, the song lyrics, printed in enlarged format, were provided to the participant along with homework assignments, always with caregiver support. This approach aimed to enhance speech fluency and memory, creating an integrated and effective rehabilitation strategy. A detailed description of each session is presented in Chart 1.

Chart 1. Description of intervention sessions

Session	Objectives	Strategies
1	Explain the research project and its objectives to the participant and their caregiver. Identify the participant's musical preferences and music-related habits. Conduct pre-intervention assessments.	a) Informal conversation b) Administration of the MTL-Brazil c) Administration of the ASHA-FACS d) Administration of the Supplementary Questionnaire
2	Stimulate auditory perception using spoken language in combination with musical tones and music.	a) Instrumental and vocal production or imitation of phonemes. b) Reading and listening to the song *"A Banda"* by Chico Buarque, with emphasis on softening the onsets of words and phrases.
3	Stimulate speech fluency through syllabic segmentation, using rhythmic clapping to support speech coordination and prevent syllable omissions, while integrating alternating musical rhythms to facilitate proper prosody.	a) Reading and listening to the song "*João e Maria*" by Chico Buarque, incorporating alternating rhythms. b) Singing the song with emphasis on the first word of each sentence, softening and prolonging it. c) Rhythmic syllable segmentation of words using clapping.
4	Promote word memorization and phoneme discrimination through simple rhymes. Enhance speech fluency via syllabic segmentation, using rhythmic clapping to support speech coordination and prevent syllable omissions, while integrating alternating musical rhythms to facilitate proper prosody.	a) Sing the song "*Deixa o menino jogar*" by Natiruts, incorporating alternating rhythms and prolonging the onset of words and phrases. b) Complete the verses of the song by providing the final word. c) Clap hands in synchrony with each word of a verse. d) One Word, One Song: the participant identifies the song corresponding to a spoken word.
5	Automate everyday words and phrases through melody, while promoting appropriate prosody.	a) Name images using a musical cue. b) Mark each word of a verse with clapping. c) Recount everyday events using the melody of the song "*João e Maria*" by Chico Buarque.
6	Automate everyday words and phrases using melody.	a) Identify the song by listening to the instrumental version only. b) Complete the song "*Deixe o menino jogar*" by Natiruts using words from different grammatical classes. c) Tell a story using the intonation of the melodies of previously practiced song.
7	Enhance speech fluency through syllabic segmentation, using rhythmic clapping to support speech coordination and prevent syllable omissions. This activity also promotes memorization and the automation of words.	a) Complete the highlighted words in the song "*Pais e Filhos*" by Legião Urbana. b) Mark each word in the chorus with clapping. c) "One Word, One Song": the participant identifies which song contains the spoken word.
8	Enhance speech fluency through syllabic segmentation, using rhythmic clapping to support speech coordination and prevent word omissions. This activity also promotes memorization and the automation of words.	a) Complete the lyrics of the song "*O bêbado e o equilibrista*" by Elis Regina. b) Mark the words of the chorus with hand clapping. c) Identify the song by listening to the instrumental version.
9	Conduct post-intervention assessments	a) Administration of the MTL-Brazil. b) Administration of the Complementary Questionnaire.
10	Conduct post-intervention assessments	a) Administration of ASHA-FACS

The intervention proved feasible, as the participant and their family attended all sessions and completed the assigned home activities. During the sessions, a family member or caregiver accompanied the participant, reporting any difficulties encountered with the activities to the therapist. The therapist then adjusted the task difficulty for subsequent sessions, ensuring the intervention remained continuous and tailored to the participant's needs.

According to the supplementary questionnaire data presented in Chart 2, the caregiver reported no significant changes in language or other cognitive domains. In contrast, the participant reported improvements in language, noting greater ease in understanding conversations following exposure to music. Additionally, the participant described positive mood changes, including increased happiness and reduced frustration related to the PPA diagnosis.

Chart 2. Questionnaire on musical experience and patient expectations regarding music-based speech-language therapy.

Questions	Pre-Intervention Responses		Post-Intervention Responses	
	Voluntary	Caregiver	Voluntary	Caregiver
Have you noticed any improvement in your ability to communicate during or after listening to music?	Never noticed.	Never noticed.	Yes, I understand better.	No changes observed..
Does listening to music influence your ability to comprehend what others are saying?	Never noticed.	Never noticed.	Yes.	No changes observed.
Does listening to music help alleviate negative emotions associated with your condition?	Yes.	-	Yes. I feel happier and calmer.	-
Does listening to music help reduce negative emotions related to your condition?	Yes.	-	Yes. Mostly feelings of frustration.	-

Discussion

This case study aimed to investigate the feasibility and effects of a music-based speech-language therapy intervention for an individual with PPA, focusing on the participant's communication skills and overall well-being. The intervention proved feasible, as both the participant and their family demonstrated full adherence, reflecting commitment and engagement with the sessions and assigned activities.

The results of the MTL-Brazil[11] revealed deficits in some items, while others remained unchanged, with improvements ranging from 1 to 2 points. One indicator of success in achieving a therapeutic objective was the automatic language task (form) of the MTL-Brazil[11], in which the participant moved beyond the deficit zone and achieved the maximum Z-score, reflecting improved speech fluency, particularly in the motor aspect. This improvement was facilitated by hand movements performed in rhythm with a musical piece, a strategy known to engage the sensorimotor and premotor cortices, thereby supporting speech articulation[13]. Other MTL-Brazil[11] tasks, such as nonverbal praxis and object manipulation under verbal command, also demonstrated progress beyond the deficit zone.

Significant decline was observed only in the MTL-Brazil phonological/orthographic verbal fluency task[11], in which the participant was asked to produce as many words as possible beginning with the letter "M" (excluding proper nouns) within 90 seconds. In the pre-intervention assessment, the participant produced three words, whereas in the post-intervention assessment, he was unable to produce any. This result may indicate a decline in executive functions and lexical retrieval.

The literature indicates that music is associated with enhanced prefrontal cortex functioning—a region directly involved in executive functions—particularly in individuals without neurological

disorders who have received extensive musical training, such as music theory studies or instrumental practice[14]. However, in neurodegenerative conditions like PPA, the immediate effects of music on executive functions are generally more limited. In this context, music's potential as a long-term protective factor against executive decline is noteworthy, although its immediate therapeutic impact may vary depending on disease stage[14].

Among the subjective benefits reported in the supplementary questionnaire, music was noted to facilitate emotional expression and regulation, as well as promote more active engagement during sessions[9,14]. The participant also reported increased feelings of happiness after the intervention, noting that, until then, he had not recognized the positive influence of music in his daily life.

Although some studies report immediate improvements in speech perception following music exposure, evidence of a direct association remains limited[15]. Responses to external stimuli, such as music, are linked to neuroplasticity, which typically declines with age. In individuals with PPA, this response may be further constrained due to synaptic loss and cognitive decline characteristic of the condition. In the present case, the musical intervention proved beneficial, particularly in subjective and emotional domains.

Despite the promising results observed in this study, slowing disease progression remains a challenge. While improvements were identified in certain language tasks—as evidenced by the MTL-Brazil[11] and the supplementary questionnaire—the scores obtained on the ASHA-FACS scale[12] indicated a decline in communicative functionality.

Given the progressive nature of PPA, it is reasonable to assume that, in the absence of intervention, functional decline might have been even more pronounced. Nonetheless, confirming this hypothesis requires studies with larger sample sizes, controlled designs, and the inclusion of a control group.

It is worth noting that expressive language is often regarded by caregivers as one of the core aspects of communication in individuals with aphasia[16]. Nevertheless, human communication extends beyond verbal language, encompassing gestures, prosody, affectivity, and social interaction, dimensions that may show subtle improvements, not always readily perceived by those who interact daily with the person living with aphasia.

The findings of this study align with the scientific literature, which highlights multiple benefits of music in health contexts—particularly in dementia management—showing positive effects on mood and cognitive functions[9,14,16].

The structured use of music in therapeutic contexts is primarily reflected in music therapy, which is recognized by the World Health Organization (WHO) as an Integrative and Complementary Health Practice (PICS), aimed at health promotion, disease prevention, and the humanization of care[17].

Despite favorable evidence and recommendations supporting the use of music in clinical settings, studies specifically addressing musical interventions for PPA remain limited. Thus, further research is essential to explore this approach and to monitor its medium- and long-term effects, with the aim of consolidating its therapeutic potential and establishing more robust guidelines for clinical practice.

Final comments

The implementation of innovative approaches, such as the use of music as a therapeutic resource in speech-language therapy for patients with PPA, shows considerable promise but also presents significant challenges. A major obstacle lies in the need to systematize and disseminate effective interventions through studies that identify the patient profiles and clinical contexts in which such strategies yield the most beneficial outcomes.

Furthermore, the low incidence of PPA represents a significant limitation for conducting research with larger sample sizes and more robust methodologies, such as randomized clinical trials. This scenario underscores the urgent need for multicenter studies and interdisciplinary collaborations to consolidate evidence and broaden understanding of the therapeutic effects of music in this population.

Still, the value of music as a therapeutic tool cannot be overlooked, given its ability to activate and integrate multiple brain functions. When individuals already have a prior affinity with music, the effects of the intervention tend to be even more significant, as the stimulus arises from genuine interest rather than from an imposition dictated solely by the clinical condition. This emotional connection fosters greater engagement and may potentiate the

therapeutic benefits throughout speech-language therapy rehabilitation.

The results, although mixed, suggest that music may exert positive effects as a complementary activity within speech-language therapy. Nonetheless, addressing the degenerative nature of PPA remains a significant challenge, requiring therapeutic approaches that are both continuous and adaptive. It is also noteworthy that the intervention described in this study comprised only 10 sessions, a limited number when considering a progressive neurodegenerative condition that will affect the patient throughout life. Even so, the findings provide an encouraging indication of the potential of music as a therapeutic resource, underscoring the need for more comprehensive and longitudinal studies to validate and expand the evidence regarding its effectiveness in the context of PPA.

In conclusion, the findings of this study suggest that integrating innovative and creative approaches, such as music, can enrich the therapeutic repertoire of speech-language therapy, providing a novel perspective for language rehabilitation in individuals with PPA. While studies with greater methodological rigor and larger sample sizes are still needed, this intervention demonstrated potential not only for enhancing communication skills but also for promoting emotional well-being, reinforcing the value of music as a relevant complementary resource in clinical practice.

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