

*Brief Report*

## The Effectiveness of a Music Therapy Protocol for a Person with Nonfluent Aphasia: A Preliminary Case Report

Anita L. Gadberry<sup>1</sup>, Vijayachandra Ramachandra<sup>1</sup><sup>1</sup>Marywood University, Scranton, PA, USA**Abstract**

Recent evidence emerging from neuroimaging studies suggests common neural substrates serving both language and music functions. Therefore, people with acquired language disorders such as aphasia may benefit from music therapy. This study was undertaken to measure the effects of a music therapy protocol for the rehabilitation of a person with aphasia. A male with nonfluent aphasia completed seventeen 45 minute music therapy sessions that utilized a music therapy protocol of the following interventions: singing familiar songs, breathing into single phonemes, musically assisted speech, dynamically cued singing, rhythmic speech cueing, oral motor exercises, and vocal intonation. Outcomes included increased use of and accuracy of speech, as well as a decrease in depression and anxiety. We believe that music therapy may facilitate language recovery in people with large left hemisphere lesions by activating areas important for both speech and music.

**Keywords:** *Mirror Neurons, Music Therapy Protocol, Nonfluent Aphasia, Oromotor Exercise, Singing*

multilingual abstract | [mmd.iamonline.com](http://mmd.iamonline.com)**Introduction**

It was believed for a long time that music and language were distinct and separate from one another. This conjecture was based on neuropsychological evidence from case reports, which indicated double dissociation between music and language processing [1,2]. More recently, electrophysiological and neuroimaging studies have contradicted this view of functional independence of the two faculties [3-5]. Given this evidence, which suggests common neural substrates serving both language and music, people with language disorders caused by a variety of neurological conditions may benefit from music therapy. Recently, a music therapy protocol that employed singing familiar songs, breathing into single-syllable sounds, musically assisted speech, dynamically cued singing, rhythmic speech cueing, oral motor exercises, and vocal intonation has been successful in enhancing speech in people with aphasia [6,7]. The current study uses the protocol similar to the one established by Tomaino [6,7] in treating RJ who is suffering from nonfluent aphasia.

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Anita L. Gadberry, Ph.D., MT-BC, Marywood University, 2300 Adams Ave., Scranton, PA 18509, Email: [agadberry@marywood.edu](mailto:agadberry@marywood.edu) | COI statement: The authors declared that no financial support was given for the writing of this article. The authors have no conflict of interest to declare.

**Case Description**

RJ is a 69-year-old right-handed man with a high school education. He was a successful businessman before his stroke. In August 2011, he suffered an acute ischemic stroke. A brain MRI scan showed a large chronic left middle cerebral artery infarct. The Psycholinguistic Assessments of Language Processing in Aphasia (PALPA) [8] was administered on him and the results indicated that he had Broca's aphasia which is characterized by relatively normal comprehension but reduced verbal output. He did not show any signs of speech apraxia. An informal evaluation and results from PALPA showed that he had severe problems on oral reading tasks. RJ started group speech therapy in September 2012 but was struggling to say words during the sessions. Neuroimaging studies have shown that people with large left hemisphere lesions may show activation of the right homologous language regions [9]. Since RJ had a large left hemisphere lesion, we thought he might benefit from music therapy, which may facilitate speech recovery by reorganizing neural structures in the right hemisphere [9]. He was sent to the department of music therapy for further evaluation and therapy.

**Method**

An undergraduate music therapy student in her seventh semester of clinical experience assessed RJ, planned, conducted, and documented each session. The student music therapist (SMT) conducted a non-standardized assessment of vocalization, communication, music skills, as well as music preferences. It was evident that RJ did not initiate conversations yet did answer yes/no questions by nodding or

shaking his head. He displayed discomfort when attempting to speak or answer questions verbally. RJ seemed to enjoy music and vocalized along to songs. He played the drum with the SMT and matched her rhythm. When initiating a rhythm, RJ played rapidly and often with an unsteady beat. Music was selected based on the client’s preferences as stated by his wife and RJ’s reactions when songs were presented to him. Selections were often made from the music of Johnny Cash, Roy Orbison, and Elvis Presley. Live music occurred with the use of guitar and keyboard (separately). Each session included the protocol established by Tomaino [6,7] as well as a greeting song and a farewell song. In total, RJ participated in seventeen forty-five minute music therapy sessions. Though sessions were scheduled twice a week, RJ missed several sessions throughout the semester due to further health issues. RJ did not attend any other therapies during the music therapy treatment period.

**Results**

The outcome data for RJ on the various interventions used in the study are shown in Table 1. The SMT mentioned that as RJ progressed in the music therapy sessions, he began to speak spontaneously in the sessions about topics unrelated to the phrases he was working on in the session. In addition to his increased verbalizations, RJ also renewed his interest in using an Augmentative and Alternative Communication (AAC) system to help him communicate with others. RJ had acquired the AAC system after his stroke yet had stopped using it. After the completion of seventeen sessions, RJ was able to successfully say many words and phrases without assistance, including “Hello, how are you,” “I want coffee,” and “I’m doing well.” Additionally, RJ’s wife reported, RJ had called his siblings to sing “Happy Birthday” to them on their birthdays and began tapping on a table and saying his words to a beat as he greeted his grandchildren when they visited. The tapping on the table most likely stemmed from the drumming interventions, in which RJ responded very well.

The SMT reported that drumming and singing familiar songs, even when the words were changed, were the most motivating and successful interventions for RJ. Though RJ made progress during all of the interventions, the SMT mentioned that RJ seemed to find the Breathing into Single-Phonemes odd and was not motivated during that protocol. Unlike the other interventions, this one did not have a component of melody and/or rhythm. This could have been one of the reasons for his poor motivation on this task. To examine RJ’s progress in language following MT, the PALPA was scheduled to be administered but unfortunately it could not be completed because of RJ’s health- related issues.

**Discussion and Conclusion**

The qualitative analysis of the progress made by RJ indicates that using Tomaino’s music therapy protocol may be helpful in the rehabilitation of patients with nonfluent aphasia. During music therapy, when melodic and rhythmic aspects of songs are added to speech, the mirror neuron system and other neural networks important for language and music functions may get co- activated [10]. This may result in cortical reorganization, which is crucial for speech recovery. In addition, the results of the Profile of Mood States (POMS) [11] which was administered before and after music therapy shows a reduction in depression and anxiety, which are two major components of mood. This reduction can be attributed to an increase in the hormone, melatonin, which is important for keeping a person in a calm and relaxed state but we cannot say this with certitude without a serum analysis [12]. In conclusion, there are several music therapy interventions that can be successfully used in the speech rehabilitation of patients with aphasia. However, these techniques need to be carefully documented using qualitative and/or quantitative methods. The neurobiological underpinnings of such methods should also be explored. This study may pave the way for other investigations examining the effectiveness of various music therapy interventions as well as combinations of music therapy and speech therapy techniques to assist persons with aphasia and other communication disorders.

Intervention Number	First session	Final session
1. Singing Familiar Songs	Sang 2 words correctly with verbal prompt	Sang 6 words correctly
2. Breathing into Single Phonemes	Held 1 vowel for 4 seconds with verbal prompt	Held 4 vowels and 1 consonant for 7 seconds
3. Musically Assisted Speech	Said 2 words correctly with verbal prompt	Said nine word phrase (2 sentences) correctly without prompt
4. Dynamically-cued Singing	Filled in 3 words correctly with verbal prompt	Filled in 6 words correctly
5. Rhythmic Speech Cueing	Said 2 word phrase correctly with verbal prompt	Said 3 separate 3-5 word phrases correctly without prompt
6. Oral Motor Exercises	Said 3 words correctly with verbal prompt	Said 6 words correctly
7. Vocal Intonation	Said 2 word phrase with verbal prompt	Said 5 word phrase correctly with proper intonation and no prompt

**Table 1. Outcome data for RJ on the seven different interventions used during therapy**

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