

Retention of Cognitive Abilities Through Music in Alzheimer's Disease

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Abstract

Worldwide, around 50 million people have Alzheimer's, and there are nearly 10 million emerging cases every year (Shimizu, 2022). Recent studies have found that music, in one's native language, is captured and able to be subconsciously recalled in implicit memory and improve cognition. The proposal argues that music for memory can remain intact for people with Alzheimer's, even while experiencing a cognitive decline (Cuddy et al., 2012). This can happen because music is spread out beyond the temporal lobes, a larger network in the brain (Jacobsen et al., 2015). This proposal reports on the literature published on music's connection to memory, as well as the further implications and uses of implicit memory. After reviewing the research, it was shown in the three studies reviewed that not only did patients with Alzheimer's improve their orientation and cognition but also their mood. Music can be used as non-invasive and drug-related therapy for patients with Alzheimer's disease.

Keywords: Music, Alzheimer's, Implicit memory, Cognition

Introduction

Alzheimer's victims should be exposed to music as therapy, in order to improve cognitive function or stave off the effects of cognitive decline. Music stimulates a broad network in the brain rather than a single "music area" (Raglio and Oasi, 2015). This vast network may provide musical memory functions to last longer than other parts of the brain in Alzheimer's disease. The ability of individuals to remember music makes it a specific variable that engrossed persons with Alzheimer's disease. Jacobsen et al. (2015) used a PET scan to examine just how much music-listening areas are affected by Alzheimer's disease, looking at amyloid buildup and glucose. Additionally, music retention is confined to the parts of your brain responsible for

implicit, rather than explicit memory (Halpern, A. R., & O'Connor, M. G., 2000). In an experiment done by Halpern, A. R., & O'Connor, M. G., short, unfamiliar melodies were presented to young and older adults and to Alzheimer's disease patients in an implicit and an explicit memory task. The explicit task yielded no recognition, and the implicit task showed improved recognition of old melodies. The authors considered and rejected several artifactual reasons for this null effect in the context of the many studies that have shown implicit memory among AD patients (Halpern, A. R., & O'Connor, M. G., 2000). The three studies being presented in this review incorporate music therapy, music listening, and general listening. Music therapy involves the use of music to support development, health, and well-being. It can comprise active techniques such as singing or clapping, and/or receptive techniques, and a key component is the client-therapist human interaction (Issac & Burrows, 2016). Next, music listening involves a music therapist creating a music playlist for the client (Raglio and Oasi, 2015). Music listening is used to "stimulate verbalization, memories, or to encourage relaxation" (Raglio and Oasi, 2015). Finally, generalized music interventions involve the use of music without a music therapist; the goal being to improve the welfare of the patient. These studies were in English, included persons with Alzheimer's Disease, and whose protocol gathered pre- and post-intervention outcome measures (Leggeri et al. 2019). While non-invasive therapy for Alzheimer's is a growing area in research, many scientists have found mixed reports in their results when examining the literature (Leggeri et al. 2019).

Methods

In the first study by Li. et al. (2015) people with Alzheimer's were asked to listen to Mozart's Piano Concerto for Two Pianos and Pachelbel's Canon in D major for Violins, before they went

to sleep and during the day. The results of a study by Li et al. used a non-individualized general music listening approach, that involved listening to classical music daily with their caregivers and family. They used headphones and were in the presence of other humans while listening to their playlist (Li et al. 2015). Earlier in 2013, the Sakamoto et al. team hypothesized people with Alzheimer's Disease often experience a poor quality of life because of behavioral and psychological symptoms of dementia (Sakamoto et al. 2013). While music therapy can reduce BPSD (Behavioral Psychological Symptoms of Dementia), most studies have focused on patients with mild-to-moderate dementia, therefore, Sakamoto hypothesized that music intervention would have beneficial effects compared with a no-music control condition and that interactive music intervention would have stronger effects than passive music intervention. In the second , conducted in 2013, by Sakamoto et al., individuals were set-up with the experiment as follows. Thirty-nine individuals with severe Alzheimer's disease were randomly and blindly assigned to two music intervention groups (passive or interactive) and a no-music Control group. Later, the short-term effects were evaluated via emotional response and stress levels measured with the autonomic nerve index and the Faces Scale (Sakamoto et al. 2013). Conversely, the approach used by Guétin et al. (2009) used a specific method of music listening to induce relaxation, where rhythm, orchestral formation, frequency, and volume is slowly reduced, then increased again in a "re-enlivening" phase. The 24-week-study asked participants to listen to their given music program and focus in a quiet room with headphones and without distractions, and without others in complete isolation.

Results

The results of a study conducted by Li et al. (2015) did not find any changes in behavior correlated to their intervention and found only minor changes in cognition when looking into

sub-categories of cognitive tests. An app-based approach to interventions that provided individualized music playlists has been shown to positively affect the cognition and behavior of its participants (Guétin et al., 2009; Sakamoto et al., 2013) mood, behavior, or cognition.

Individualized playlists of music were found to improve outcomes for active music therapy and music listening, compared to methods that used experimenter-chosen music as well. (Guétin et al., 2009; Sakamoto et al., 2013). Sakamoto et al. (2013) uniquely compared their music listening intervention to an active music therapy group and found that both methods of treatment showed significant results in behavioral symptoms such as anxiety and affective disturbance. They deduced that the effects of active music therapy sessions may be based more on arousal techniques to reduce behavioral symptoms, and while music listening may train participants in relaxation techniques, it also provides parasympathetic regulation and long-lasting benefits to the patients (Sakamoto et al., 2013). Sakamoto et al. (2013) measured heart rate immediately after active and music listening as part of their protocol and found that heart rate was elevated after active music sessions. Guétin et al. (2009) found improvement in anxiety and depression in their individualized music-listening interventions. From week 4 and until week 16, the effects were observed, up until 8 weeks after the discontinuation of sessions between weeks 16 and ending on the 24th (Guétin et al. 2009).

	Music Listening	Music Therapy	General Listening	No Music
Li et al.				
Sakamoto et al.				
Guétin et al.				

Figure 1. Studies focusing on which one type of music socialization approach taken with patients.

	Behavioral	Cognitive	Anxiety
Li et al.			
Sakamoto et al.			
Guétin et al.			

Figure 2. Studies result in behavioral, cognitive, and anxiety correlations. Red shows no improvement, yellow shows slight improvement, green shows major or significant improvement, and white shows that it was not tested.

Conclusion

The aim of this narrative review was to determine the impact of various music intervention approaches specifically for persons with Alzheimer's disease. The studies included varying aspects that may affect the results, such as participant age, disease severity, cognitive level, outcome measures, length of intervention, and more. Music interventions that use individualized

music playlists and focused on relaxation techniques yielded greater benefits for Alzheimer's disease persons. As cognitive decline is a primary effect of Alzheimer's disease, further examination of music on cognition is essential.

References

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