



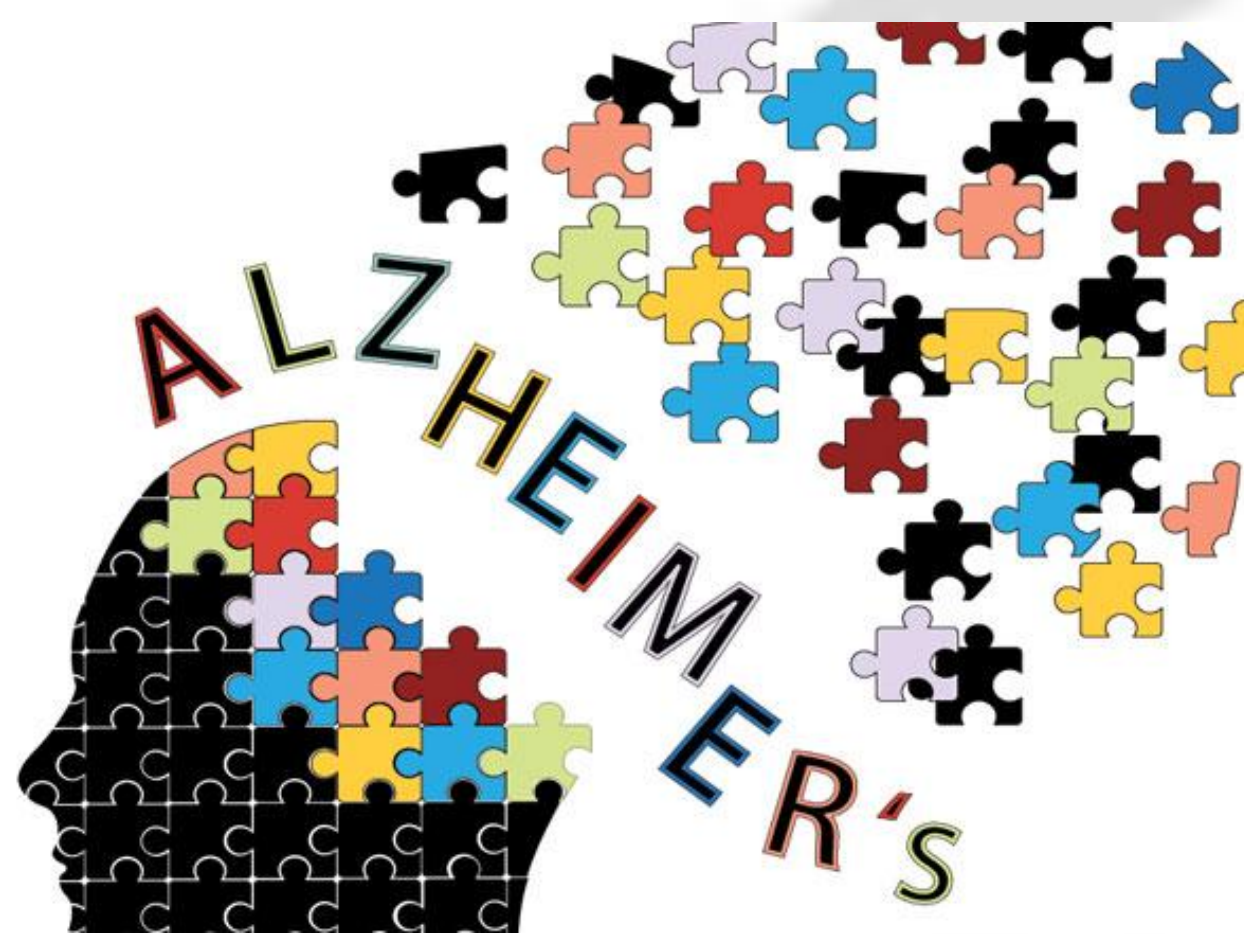
# The Effects of Musical Training on Alzheimer's Patients in the Geriatric Population

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## Background

It is evident through research that music therapy can be an effective treatment for individuals who have Alzheimer's disease. Non-pharmacological treatments have recently been used in order to aid those who suffer from Alzheimer's disease to work towards optimally retaining close to their best quality of life. Alzheimer's disease can cause deteriorating effects on brain function. Therefore, musical interventions have been used as a form of treatment for these individuals. Musical interventions ultimately consist of listening to music, musical therapy, or performing musical tasks. Musical interventions have displayed the positive effects that music has on the symptoms caused by Alzheimer's Disease including psychological effects like depression and anxiety as well as decreased cognitive, behavioral, and memory functions. As a result of the detection of an increased prevalence of Alzheimer's and the lack of effectiveness in pharmacological treatments, researchers and investigators posed the question to look into how musical interventions affect geriatric patients with Alzheimer's Disease. Furthermore, the research study will decipher a selection of studies that look at the effects of musical interventions on Alzheimer's Disease in the geriatric population and determining whether musical interventions help to improve symptoms of Alzheimer's Disease.



	Mean	SD	p value
NPI			
Before	8.0	6.3	
After	3.2	2.3	<b>0.042</b>
Barthel Index			
Before	95.0	8.2	
After	88.5	9.4	0.064
IADL			
Before	4.1	2.2	
After	3.4	1.8	0.111
DAD			
Before	24.9	8.2	
After	20.1	9.4	<i>0.002</i>
ZBI			
Before	20.6	13.2	
After	16.3	11.6	0.312
Sleep time, h			
Patients			
Before	7.5	1.0	
After	8.2	1.4	<b>0.039</b>
Caregivers			
Before	6.7	1.1	
After	6.9	0.9	0.522

p values were assessed by the two-sample t test; bold = significantly improved; italic = significantly worsened.

Results for study conducted by Satoh et al. (2015)

## Methods

### Participants

- Geriatric males and females who suffer from Alzheimer's Disease, all of which were of age sixty five or above.
- Individuals who were diagnosed with mild to moderate Alzheimer's Disease.

### Materials

- Electronics included computers, speakers, as well as musical equipment and instruments (Onieva-Zafra et al., 2018; Kim, 2020; Lyu et al., 2018; Keough et al., 2016; Wang et al., 2020; Gallego & Garcia, 2017; Palisson et al., 2015; Baird et al., 2017).
- Questionnaires were used to examine the mental state, memory, activity, stage of dementia, and presence of depression or anxiety in the participants (Onieva-Zafra et al., 2018; Kim, 2020; Lyu et al., 2018; Wang et al., 2020; Gallego & Garcia, 2017; Palisson et al., 2015; Baird et al., 2017; Satoh et al., 2015).
- Neuropsychological measuring tools were used to look at the participants cognitively (Palisson et al., 2015; Satoh et al., 2015; Gallego & Garcia, 2017; Lyu et al., 2018).

- Tests assessed auditory, verbal, and reading capabilities.

### Procedures

- Music intervention programs with experimental and control groups.
- Recollection based occupational therapy program with evaluation and reevaluations of experimental and control groups (Kim, 2020).
- Combination of drug and musical therapy measured in experimental and control groups (Wang et al., 2020).
- Use of statistical tests to analyze data.
- Baseline data was collected as well as at least one or more times to look at the relationship between the musical interventions/therapies and the effects on patients with Alzheimer's Disease.

### Music can activate all areas of the brain

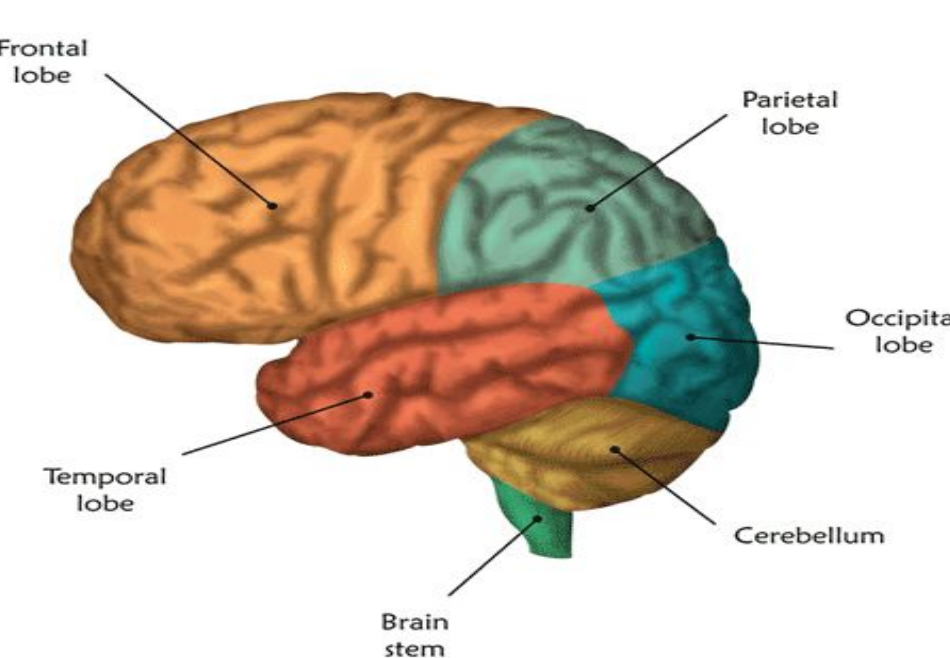


Table 2. Mean for total learning, recall, and recognition accuracy for the sung and spoken information in musicians and nonmusicians with and without Alzheimer's dementia.

Variable	Modality	Group			
		Musicians		Nonmusicians	
		AD (n = 5)	Healthy (n = 15)	AD (n = 6)	Healthy (n = 7)
Total learning (max = 30)	Sung	20.40 (5.81)	28.00 (3.09)	14.00 (6.90)	29.14 (1.22)
	Spoken	17.00 (9.61)	29.07 (1.44)	19.67 (6.65)	29.57 (0.79)
Trials to criterion (min = 1)	Sung	4.60 (2.19)	2.00 (1.20)	5.50 (1.22)	1.43 (0.53)
	Spoken	5.00 (2.24)	1.40 (0.51)	4.83 (2.04)	1.29 (0.49)
30-min recall (max = 6)	Sung	1.60 (2.30)	3.33 (2.06)	0.00 (0.00)	3.57 (2.07)
	Spoken	1.20 (2.17)	2.53 (2.20)	0.00 (0.00)	3.57 (1.99)
24-hour recall (max = 6)	Sung	1.20 (1.79)	3.53 (2.07)	0.00 (0.00)	2.86 (2.34)
	Spoken	1.20 (2.68)	2.87 (2.50)	0.00 (0.00)	3.43 (1.62)
Recognition accuracy <sup>a</sup> (max = 1)	Sung	.20 (.77)	.80 (.28)	-.40 (.37)	.66 (.27)
	Spoken	.33 (.41)	.60 (.44)	.33 (.33)	.66 (.27)

Note. Recall at 30-min and 24-hour delay. AD = Alzheimer's dementia. Standard deviations in parentheses.

<sup>a</sup>Accuracy = hit rate minus false-alarm rate.

Results for study conducted by Baird et al. (2017)

## Results

- Musical intervention programs reduced levels of depression, but did not affect symptoms of anxiety (Onieva-Zafra, et al., 2018).
- Overall cognitive functioning, such as verbal fluency, memory, orientation, and emotion, improved in the experimental groups who participated in music programs such as singing, listening to music, and dancing (Keough et al., 2016; Cheung, et al., 2018; Gallego & Garcia, 2017; Kim, 2020; Lyu et al., 2018; Onieva-Zafra, et al., 2018).
- Music with movement and singing along were found to be more effective than reading the lyrics aloud or listening to music (Lyu et al., 2018; Keough et al., 2016; Cheung, et al. 2018).
- The overall quality of life for patients with Alzheimer's and their caregivers was improved as a result of musical training (Kim, 2020).

TABLE 5: Change in outcome measurements after intervention.

	Pretest	Posttest	<i>p</i>
SMCQ			
Experiment group	5.83 ± 3.68 <sup>†</sup>	4.16 ± 2.09 <sup>a*</sup>	0.012 <sup>b*</sup>
Control group	5.52 ± 2.03	6.05 ± 2.10	
K-MMSE			
Experiment group	18.70 ± 1.68	19.56 ± 2.17 <sup>*</sup>	0.005 <sup>**</sup>
Control group	18.10 ± 1.58	17.68 ± 1.64	
SGDS-K			
Experiment group	6.55 ± 3.50	4.10 ± 3.66 <sup>*</sup>	0.048 <sup>*</sup>
Control group	7.05 ± 3.30	7.05 ± 4.16	
GQOL-D			
Experiment group	30.11 ± 7.06	33.50 ± 7.22 <sup>*</sup>	0.003 <sup>**</sup>
Control group	28.64 ± 6.50	26.88 ± 4.68	

<sup>†</sup>Mean ± SD, \**p* < 0.05, \*\**p* < 0.01. <sup>a</sup>A significant difference from baseline after intervention in each group using paired *t*-test. <sup>b</sup>A significant difference between the 2 group using independent *t*-test. SMCQ: Subject Memory Complaint Questionnaire; K-MMSE: Korean Mini-Mental Status Examination; SGDS-K: Short-Form Geriatric Depression Scale-K; GQOL-D: Geriatric Quality of Life-Dementia.

Results for study conducted by Kim (2020)



## Discussion

It was concluded that music interventions had a beneficial effect in diminishing patients' susceptibility of mental and psychiatric symptoms caused by the suffering of Alzheimer's Disease. Furthermore, many mental symptoms of Alzheimer's Disease showed improvement such as delusions, hallucinations and aggression after receiving music therapy. In addition, music with movement also showed benefits to one's mental and psychiatric functioning and had a significant difference specifically on patients with Alzheimer's diseases' anxiety and depression levels. It was also concluded in a variety of music therapies that cognitive abilities and behavioral functioning were improved as Alzheimer's patients participated in the programs. The music with movement programs also improved cognitive functioning which may suggest that interventions that require active participation such as singing or dancing has more of an impact on cognitive abilities than sedentary programs. The different music programs implemented throughout these studies consistently showed how music therapy benefited memory enhancement in Alzheimer's patients.

## Conclusion

Throughout this research study, it is evident that music therapy has multiple benefits for patients with Alzheimer's Disease. It has been found that individuals that received some form of music therapy had improvement with cognition and behavioral functioning, mental and psychiatric side effects as well as memory. Data has supported the ideology of music therapy being beneficial to patients with Alzheimer's Disease. The data provided through multiple studies has helped to form the conclusion that music therapy can help lessen some of the symptoms of Alzheimer's Disease by allowing patients to familiarize themselves with music. For example, these studies indicated that allowing patients to listen to music in a therapeutic context helped patients become more interactive with one another, helped provoke memory as well as lessened psychiatric symptoms such as depression and anxiety.

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