

The Influence of Background Music on the Performance of the Mini Mental State Examination with Patients Diagnosed with Alzheimer's Disease

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The purpose of this study was to determine whether background music had an influence on the scores of patients with Alzheimer's disease during the Mini Mental State Examination (MMS). Eighteen patients diagnosed with dementia from a day care center participated in the study. Eleven (experimental group) were examined 3 times, each time 1 month apart. The first examination, called pretest, served as a baseline and was done without background music. The second and third examinations (test and posttest) were done with background music. Seven people (control group) were examined 3 times, each time one-month apart. The three tests (pretest, test, posttest) were done without background music. The Wilcoxon matched-pairs test was used to compare the results within each group. No significant differences were found between the three tests for both groups. The Mann-Whitney test was used to compare the results between the experimental and control groups. No significant differences were found between these two groups. This suggests that background music used with persons affected by dementia at this second stage of the disease plays a neutral role during the MMS. Another suggestion is that perhaps people at this stage of the disease do not feel any stress or threat that may have an impact on their concentration during the MMS. Other suggestions are made for possible further research.

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Alzheimer's disease is one of the biggest concerns and preoccupations of the present generation and of coming ones. In Israel, some 50,000 people suffer from some kind of dementia, which is about 10% of the geriatric population in the country (Habib, Barnea, & Briff, 1992). Alzheimer's disease is a progressive decline of the cognitive functions; it is also accompanied by a deterioration of the behavioral and affective apparatus of the patient (Reisberg, et al., 1987). This inability to think clearly represents a threat that can be manifested by behavioral changes such as depression, anxiety, social withdrawal, and psychomotoric agitation. According to Davison and Neale (1978), anxiety is an unobservable state which can be measured in terms of subjective self-reports (Barker, 1991; Stein, 1991) and according to physiological responses (Miluk-Kolosa, Matajek, & Stupnicki, 1996; Robb, Nichols, Rutan, Bishop, & Parker, 1995). These symptoms may be related to and influence the patient's cognitive functions in general and his concentration in particular. Although the diagnosis of Alzheimer's disease can be confirmed by an autopsy, another way to identify this kind of dementia is the elimination of other disorders through psychiatric and neurological tests. One of the most popular tests used for screening dementia of Alzheimer's type is the Mini Mental State Examination (MMS), developed by Folstein (Folstein, Folstein, & McHugh, 1975). It is quickly administered, valid and reliable (Katzman, 1986). It is translated into many languages and used in many countries throughout the world. It tests the person's orientation, immediate memory, calculation, recall, naming, reading, and writing. The total possible score is 30; a score of 23 and below is an indication of possible dementia. The MMS does not, however, take into consideration the affective state of mind of the patient, so that a low score could be the result of a depressive state, a lack of concentration, or feelings of threat in front of the examiner. Whether background music influences the patients' anxiety feelings, raises their concentration, and improves their scores during the MMS, is the question that is raised in this study.

Many studies have shown the importance and the efficiency of music therapy with elderly with regard to their different problems. Bartlett and Snelus (1980) have shown that older adults recall popular songs from their young adult years, which may confirm a long-term memory for music. People with Alzheimer's disease actively engaged in music activities improved their social, physical, and

emotional behavior (Olderog-Millard & Smith, 1989; Pollack & Namazi, 1992). A study by Prickett and Moore (1991) found that singing familiar songs helps the patients learn new material. Listening, playing, and singing improve reality orientation of patients with dementia (Riegler, 1980). Patients at an advanced stage of dementia still remain capable of playing percussion instruments (Brotons & Pickett-Cooper, 1994; Clair & Bernstein, 1990, 1995).

Music Listening/Background Music

Music listening. Music listening is an activity in which the people are more passively involved. It demands a minimum of attention from the listener. In music therapy, listening to music has been studied in a wide variety of settings. Hanser and Thompson (1994) demonstrated that music listening reduced anxiety and depression in old people. Music therapy sessions based on music listening with a withdrawn depressed older female helped in reducing feelings of anxiety and raised the patient's sense of satisfaction (Redinbaugh, 1988). Music listening has been studied with other populations for reducing anxiety. O'Connell (1984) found that sedative music reduced anxiety feelings of students prior to examination. Davis and Thaut (1989) showed a decrease in anxiety with students after listening to music of their own choice.

Background music. Music used as a background does not require the person's attentiveness, but rather creates a nonthreatening atmosphere and acts as a facilitator. In the 1940s, with the creation of the Muzak Corporation, the aim of background music was to encourage productivity in industry (Schullian & Schoen, 1948). More recently, objective studies have indicated the benefits of background music in a variety of settings such as advertising (Kellaris & Cox, 1989) and counseling (Devlin & Sawatzky, 1987). Other studies found that background music had a positive effect on recall: Boltz, Schulkind, and Kantra (1991) showed that filmed episodes were recognized better when they were cued by their corresponding musical background. In the field of education, Davidson and Powell (1986) found that listening to background music during a science class increased the on-task performance of 5th graders. In music therapy, the use of background music has been studied with the handicapped population as well (Groeneberg, Stan, Celser, MacBeth, & Vrbrancic, 1988; Wentworth, 1991). Used with handicapped

adults, background music had a positive influence on their working behavior (Groeneberg et al., 1988; Wentworth, 1991). Background music was also beneficial to the task performance of children with psychosis (Burleson, Center, & Reeves, 1989). In geriatrics, a few recent studies used background music with persons suffering from dementia and the results are not clear; these studies tried to determine whether background music had or did not have a positive effect on the agitated behavior of the patients. Claire and Bernstein (1994) found that there were no significant differences in the percentage of agitated behavior of patients with severe dementia under the following conditions: no music, sedative, or stimulative background music. Thomas, Heitman, and Alexander (1997) found that there was a decrease in physical aggressiveness of residents suffering from dementia with the use of background music during bathing time.

Purpose of the Study

In this study, music was used more in terms of background music than music listening. The music used for the study was James Last's "Violins in Love." The therapist chose it because of the absence of rhythmical beat and the uniformity of the dynamics. This, as well as the unchanged amplitude, gave to the music a monotonous-like mood, which corresponded to the rationale of this research: the role of the background music was not to captivate the patients' attention but rather to produce a comfortable atmosphere and be nonthreatening. Patients were asked whether they could hear the music playing in the background. The persons who were either unaware of it, or couldn't hear it were excluded from the study.

This research tries to determine whether background music has a facilitative effect on persons with dementia during the MMS and consequently raises their final scores. The hypothesis was that there would be no significant differences in the MMS scores between the control and the experimental groups.

Method

Subjects

Subjects were 18 people chosen from a day care center for people with Alzheimer's disease. They were diagnosed either by a psy-

chiatrist or a family doctor as suffering from dementia. They were all at the second stage of Alzheimer's disease (Berg, 1988). They had severe memory losses, were disoriented in time, place, and person, but could understand everyday language and could express themselves fluently although not appropriately. They all had a minimum of basic school education, which is a criterion for pursuing the MMS. Their selection was made randomly by the therapist with the assistance of a nurse.

Subjects were randomly divided into two groups. The experimental group, which was examined prior to the control group, included 11 patients (10 females and 1 male). Ages of these subjects ranged from 63 to 84 with a mean age of 76.9. The control group included seven patients, 4 females and 3 males. Ages of these subjects ranged from 68 to 86 with a mean age of 79.2. In the experimental group, 13 patients participated originally in the study but two were excluded, one because of severe deterioration during the study, and one because of illness. In the control group, 12 patients participated originally in the study but five were excluded for the following reasons: three left the day care center during the study, one refused to cooperate with the therapist toward the end, and one was excluded because of rapid mental deterioration.

Procedure

The patients were examined individually three times with an interval of 4 weeks between each examination. All examinations took place on the same day of the week, at the same time in the morning in a private bedroom. The examiner and the patient were sitting face to face. A tape recorder (Sony CFS B 55) was placed on a night table about 1.5 meters from both patient and examiner. In the experimental group, the first test, called "pretest," was performed without background music and served as a baseline. The second test, called "test," was performed with background music and the third test called "posttest," was performed with background music as well. For this experimental group, the music was turned on as the patient entered into the room and each person was asked if she/he could hear the music that was played. It was set at a volume low enough so that it would not interfere by covering the voice of the examiner.

TABLE 1

Test Scores for Experimental Group

Subjects	Experimental group's scores		
	Pretest	Test	Posttest
1	11	12	9
2	6	5	6
3	20	20	20
4	13	14	12
5	7	10	8
6	11	13	11
7	11	13	11
8	12	12	11
9	21	21	22
10	14	13	15
11	17	17	16
Average	13.00	13.64	12.82
Standard deviation	4.77	4.48	4.96

In the control group, the three tests, "pretest," "test," and "posttest," were performed without background music. For both groups, the "posttests" were used for reliability purposes.

Results

The statistical test used to compare the results within each group was the Wilcoxon matched pairs test.

In the experimental group no significant difference was observed between the pretest and the test ($\alpha = .05$), the pretest and the posttest, and the test and the posttest (see Table 1).

In the control group, no significant difference was observed between the pretest and the test ($\alpha = .05$), the pretest and the posttest, and the test and the posttest (see Table 2).

A Mann-Whitney test was used to compare between-group results. No significant difference was observed between groups for the three examinations: pretest, test, and posttest ($\alpha = .05$).

Discussion

This study tried to determine whether background music had an influence on the patients' total scores during the MMS examina-

TABLE 2

Test Scores for Control Group

Subjects	Control group's scores		
	Pretest	Test	Posttest
1	9	11	13
2	13	14	12
3	14	13	12
4	8	9	8
5	9	8	7
6	19	19	21
7	16	17	17
Average	12.57	13.00	12.86
Standard deviation	4.12	4.04	4.88

tion. All tests showed no significant differences between one test and another within each group as well as between the experimental and the control groups. The decreases or increases in the scores are reasonably consistent from one test to another in both groups. Because of the small sample of participants, the validity of this study is questioned. Therefore, a larger number of participants should be taken into consideration.

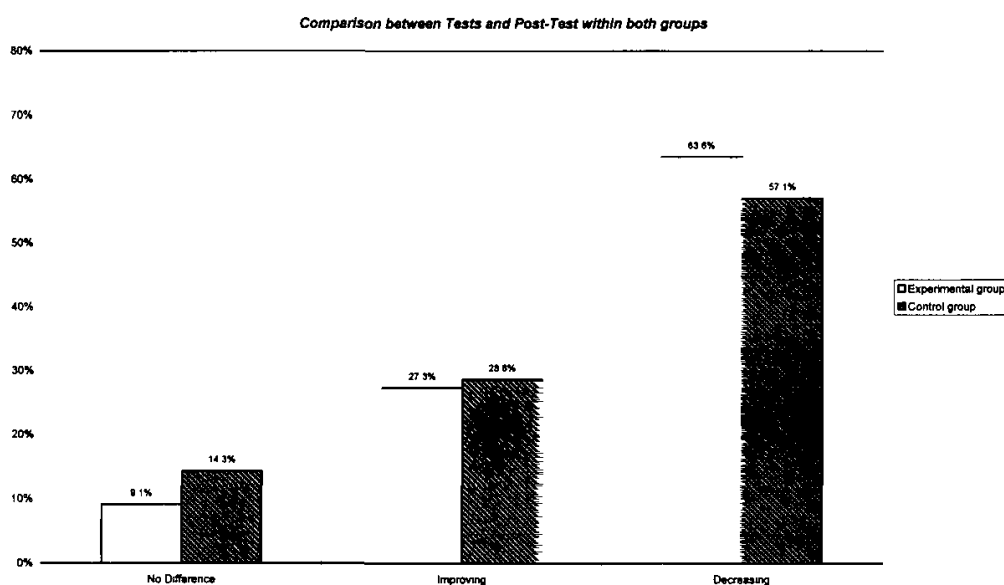


FIGURE 1.
Comparison between test and posttest results for both groups.

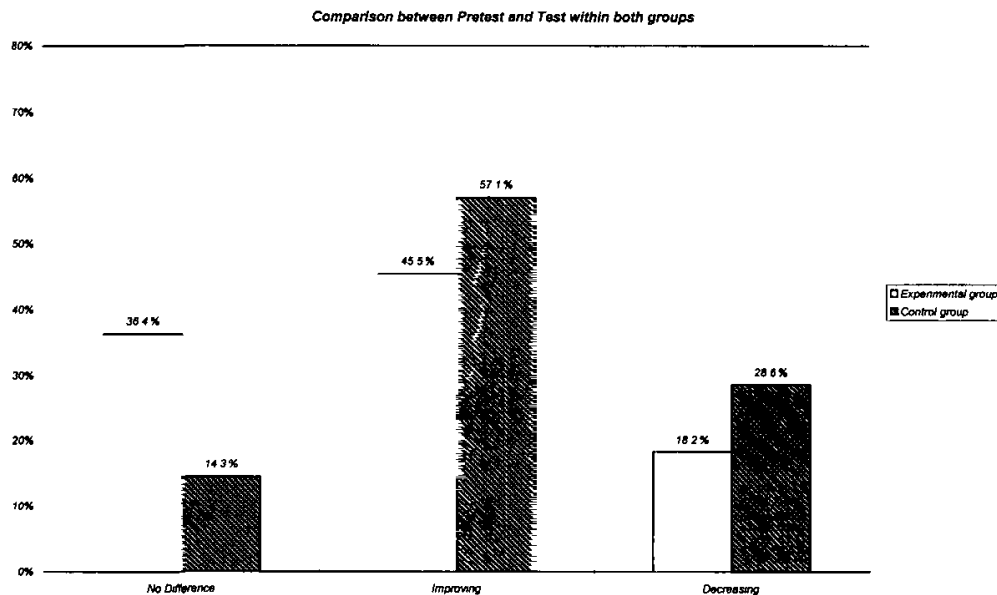


FIGURE 2.

Comparison between pretest and test results for both groups.

In percentage, the most considerable decrease in scores occurred at the posttest for both groups: 63.6% for the experimental group and 57.1% for the control group (see Figure 1). This may be evidence for normal progression of the disease after an 8-week period since the pretest.

The most important increasing score occurred for both groups during the test, with the best improving score for the control group: 57.1% compared to 45.5% for the experimental group (see Figure 2).

Considering the fact that music was added to the experimental group for the test, this could support the belief that background music had no negative or positive effect on these patients during the test compared with the control group which was examined without music during the same test.

The statistical tests showed no significant differences within and between both groups and the results in percentage do not lead to any particular conclusion with regard to the influence of the music on the patients' final scores during the MMS examination. The consistency resides more in the scores themselves of all the patients with very small changes from one examination to the other for both groups (see Tables 1 & 2). This may confirm the neutral role

of the background music of this particular research and with this particular population: the music had neither a facilitating nor a disruptive effect. Perhaps the uniformity of the timbre, added to the colorless aspect of the music, was one reason for not affecting in one way or the other the participants' concentration. Moreover, the music was played at a low volume and the patients became rapidly unaware of it during the examinations. Another assumption that might explain the neutral role of the background music is the fact that the participants were all from European origin and were not familiar with James Last's music. James Last was not part of the musical repertoire of their youth and is not part of the music heard today in Israel; therefore, these elements could have contributed to the patients' indifference to the music played in the background. One suggestion is either to choose some background music they are familiar with or to offer them to select their own preferred music.

Another possible explanation is that at this stage of the disease, the MMS does not represent a threat strong enough to enhance feelings of anxiety and thus reduce the concentration of the persons suffering from dementia. This might explain why the role of the music was neither facilitative nor disruptive. Anxiety and feelings of threat are more prevalent at the early stage of dementia than at the middle and late stages. (Reisberg et al., 1987). Perhaps people at an earlier stage of the disease are more vulnerable to this kind of emotion occurring during the cognitive examination so that the MMS could affect their concentration. Therefore additional studies should evaluate the influence of background music during the MMS, among persons suffering from Alzheimer's disease at its early stage.

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