

*The effectiveness of music  
therapy approach focused  
on 'subjective tempo'*

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*Abstract*

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In this study, we confirmed that people with severe senile dementia, the disease of irreversible deterioration, still possess ability to learn, and the approaches focused on subjective tempo and the continuous music therapy sessions could enable them to learn new songs. Subjective tempo, first defined by Perilli in 1993, is the tempo in which each individual can respond spontaneously to music, such as singing, playing drums, clapping hands or performing in other ways.

For approximately 4 years, we examined 70 subjects (the mean ages:  $82.74 \pm 1.19$  years, the mean MMSE:  $14.6 \pm 5.7$ ), who were clients in our

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## 1. Introduction

weekly music therapy group sessions and individual sessions. In every session, first, we identified the subjective tempo of each subjects through his/her responses to a well-known familiar song, then played an unfamiliar song to each individuals with their just identified subjective tempo and observed the process of learning this particular song.

The results demonstrated that 1) severely demented clients have potential to learn a new song, although more time was required than slightly demented clients, and that 2) the approach using subjective tempo is effective to support and maintain learning ability of elderly people with dementia.

### *1. Introduction*

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#### **1.1. MUSIC THERAPY RESEARCH TO DEMENTED CLIENTS**

The latest findings from medical science, using noninvasive examinations of brainfunction such as MRI and CT scan, have shown that performing cognitive tasks such as numerical calculation or reading out loud can have an effect on the cognitive abilities of the elderly people. These visually measurable examinations indicate that the above behaviors, especially reading out and singing would activate the frontal and back channels of brain map(Kawashima 2002).

Since 1998, we have held group and individual sessions for people suffering from senile dementia in Japan and examined the efficacy of music therapy practice through physiological and behavioral evaluations (Saji, Sugai & Saji, 2004a). Previously, we have reported the first physiological evaluations of our research in the 10<sup>th</sup> world congress of music therapy at Oxford (Saji, Ueno & Sugai, 2002, in press) and the International Musiological Congress at Shizuoka (Saji, Sugai & Ueno, 2004b). These

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## 1. Introduction

reports demonstrated that severely demented subjects showed significant differences at the alpha-2 bands only on right channels while they listened to familiar songs ( $<.05$ ) and familiar songs played with subjective tempo ( $<.01$ ). We considered familiar songs and subjective tempo produced a big active change in the EEGs of severely demented subjects. EEG analysis of non-severely demented subjects also showed significant differences in the theta-1 and theta-2 bands on the right and left channels while they listened to familiar songs ( $<.05$ ) and familiar songs played with subjective tempo ( $<.05$ ) and non-subjective tempo ( $<.05$ ). We considered that non-severely demented subjects had ability to adjust themselves to familiar songs played with both subjective tempo and non-subjective tempo, so their EEGs showed active changes in the right and left channels. Therefore music therapy sessions with subjective tempo are effective for subjects with dementia, particularly for those with severe dementia, and we also confirmed that EEG analysis is useful to assess the efficacy of music therapy for subjects suffering from dementia (Saji, Sugai & Ueno, 2004b).

Many music therapy researches (Aldridge 2000, Brotons 1996, Clair 1991 and 1996, Clair & Berstein 1990a and 1990b, Hanser 1990 and others) based on behavioral evaluation of people with Alzheimer's disease have pointed out that "musical functions may be retained longer than speech functions" (Aldridge, 1996) and that "music therapy is a viable approach to promote meaningful and purposeful activities even into the last stages of dementias" (Hanser & Clair 1995, p. 346). While we examined the processes of acquisition and deterioration of musical skills of demented clients in the nursing home, we also found they had potential to learn a new song. Sugai (1994) hypothesized that the learning process of human linguistic ability was linked to the information system of the

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## 1. Introduction

human brain. He examined the process through the early phonetic and linguistic behavior of children with developmental delays, examining their behavior when they sang popular Japanese nursery songs. His process of the early development of speech behavior was from auditory and visual to tactile reception

Today, we will present the second behavioral evaluation from the same research focused on 'subjective tempo'. Examining this process in which demented clients acquired music is important in informing treatment to support improvement in clients' quality of life.

### 1.2. THE TEMPO IN MUSIC THERAPY

We found the 'tempo' is extremely important to communicate with demented clients in music therapy sessions, particularly with those who are severely demented.

Since we first began working at a nursing home for elderly people with dementia, including Alzheimer's disease, cerebral infarction, Parkinson's disease and others, we were interested in reactions of clients to music. When familiar music was played, every client immediately made relaxed expressions and released tension from their bodies. Soon, they began to show responses to the music. Some of them moved their mouths, some of them tapped their hands in time with the music, and others nodded slowly. However, very few of them showed different reactions. They either became agitated and frustrated or made no responses as if they heard nothing. In such cases, we assumed that there was a gap between the tempo we played and their subjective tempo. In another words, we understood that the tempo of the given music was beyond the capacity of which they could understand and make responses to. On the other hand, we understood that for those who showed musical responses, the tempo

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## 1. Introduction

of the music was closely matched with their subjective tempo. In this way, we assumed that the receivable tempo could be a crucial factor, which allowed the clients to make musical responses.

### 1.3. GROUP SESSIONS

Japanese elderly people generally enjoy singing and playing familiar music together in groups but show strong resistance to sing or play alone. Maybe it is because they are very shy and feel embarrassed to perform in front of someone. However, playing together seems to bring joy to them and enables them to relax. Aldridge stated group music therapy was “generally used to expand socialization and communication skills, with the intention of reducing problems of social isolation and withdrawal, to encourage clients to interact purposefully with others, assist in expressing and communicating feelings and ideas, and to stimulate cognitive processes, thereby sharpening problem-solving skills ” (Aldridge 1996, p.195). In our group sessions, however, there were some clients who need special support in a group session. Some of them were in the severe stages of their illness and their subjective tempos were remarkably slower than others. Some of them wandered around during the whole session and could not sit together with others. Then our individual sessions were started for them.

### 1.4. WHAT IS ‘SUBJECTIVE TEMPO’?

The term ‘Subjective Tempo’, first stated by Perilli in 1995, however, has also been called in other ways. In 1933, psychologist Frischeisen-Koehler used the term ‘personal tempo’ and, in 1951, Mischima, who was also a psychologist, used the term ‘mental tempo. Both psychologists examined the subjective tempo from natural spontaneous finger tapping of healthy students. Stern (1985) and Fraisse (1982) also talk about ‘spontaneous tempo’. Based on this ‘spontaneous tempo’, Perilli assumed that subjective tempo might change or vary between people and

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## 1. Introduction

also within each person, according to emotional and pathological states. She examined each tempo of natural spontaneous finger tapping of healthy students and adults with mental illness. From this research, Perilli concluded that the tempo of which individuals spontaneously tapped are directly connected with their psychomotor, cognitive and emotional processes. In other words, this subjective tempo is the speed in which each individual could apprehend, register and understand incoming stimuli. Also, the subjective tempo is the speed in which each individual could react, plan and perform behavioral responses to stimuli (Perilli 1995, p.104).

### 1.5. THE DEFINITION OF 'SUBJECTIVE TEMPO'

We thought, however, the examination by finger tapping would not be suitable for clients with dementia because they had difficulties in understanding and following the instructions and also had poor physical functions. Therefore, we carefully examined the overall responses of every participant during the sessions and searched for each individual subjective tempo, the tempo that elicits smile or allows either spontaneous drum beating, hand clapping or singing. Through these observable responses, we concluded that it is the subjective tempo that enabled elderly people with dementia to listen, to understand, and to express themselves spontaneously. At the same time, these reactions indicate that the interpersonal communication had been formed between the clients and the therapist, who is the performer of the music. However, the identification of subjective tempo was done through observation and they were determined by the therapist's experience.

The purpose of this study is to examine the effectiveness of music therapy approach focusing on subjective tempo to elderly people with dementia.

## *2. Methods*

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**2.1. DEMENTED CLIENTS** During 4 years of this research, 70 people (mean age:  $82.74 \pm 1.19$ , mean MMSE:  $14.6 \pm 5.7$ ), participated in our weekly music therapy group sessions and individual sessions. We classified these clients into two groups: The severely demented group, the group of those who were less than MMSE 8, and the non-severely demented group, the group of those with MMSE 11 to 23. Table 1 shows the attributes of the clients in severely and non-severely demented groups (mean  $\pm$  standard deviation).

**TABLE 1. Severe group and non-severe group (2001)**

<b>Groups</b>	<b>Numbers</b>	<b>Mean Age</b>	<b>Mean MMSE</b>
<b>Severe</b>	<b>36(12/24)</b>	<b><math>84.06 \pm 7.54</math></b>	<b><math>5 \pm 3.27</math></b>
<b>Non-severe</b>	<b>34(9/25)</b>	<b><math>81.62 \pm 8.90</math></b>	<b><math>19.47 \pm 5.39</math></b>

**2.2. SUBJECTIVE TEMPO** In every session, we identified and recorded the subjective tempo of each client through his/her response to the well-known familiar songs and examined each client's behavioral change, which occurred over the four years.

In this research, we understood that when clients responded spontaneously to given music, it indicated that subjective tempo was closely connected with client's current conditions. The therapist made a judgment whether the music was played in suitable tempo or not, through clients' behaviors. If they responded to the given music by singing or tapping hands and other positive behaviors, the therapist considered that they could understand the music and respond to it. On the other hand, if they began to speak something unrelated to the song, stand-up and walk around, fall asleep or perform other passive behaviors, as if they heard nothing, the therapist considered that they could not understand the

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## 2. Methods

music and respond to it. Beside these, the therapist found the middle responses. Some of them seemed to be willing to respond to the music, but could not figure out how to respond. Even if the clients did not make any responses, or even if the therapist could not recognize any intension of making responses to the music from their behavior, it was important for the therapist to keep the musical contact with them. The therapist hoped and waited for them to respond spontaneously.

We reported previously that the mean subjective tempo of a familiar working song, 'Saitaro-bushi', in non-severely demented group rose above  $M.M.\downarrow=80$ , but in severely demented group, the mean subjective tempo was kept under  $M.M.\downarrow=80$  (Saji & Muzuno, 2003). This study examined mainly subjective tempo of children's songs or old Japanese school songs.

### 2.3. THE LEARNING SONG: THE UNFAMILIAR SONG

For the unfamiliar music, we chose a pop music kind of song, called 'Present My Love'. This song was composed specially for this nursing home in 1998. So it was new for every body and truly an un-familiar music for clients. The words of the song expressed appreciation to nature and life and it was very touching for elderly people, but the melody was complicated with many phrases with up beats, syncopations and jumping tones and others. The tempo was indicated in  $M.M.\downarrow=108$  by the composer, but of course it was too fast for the all demented clients. We thought the song was unsuitable for music therapy sessions, but the director of this nursing home strongly requested us to play this song in the sessions. Reluctantly, from May 1998, we started to play it at the end of every session as an ending song. While the song was played, clients returned to their own rooms. We did not expect them to sing or play with

## 2. Methods

this music, but only hoped that, one day, all the staffs and residents would become familiar to this song and be able to sing together on ceremonies.

FIGURE 1. Score of the new unfamiliar song, 'Present My Love'

**Present My Love**

Words: Mimina Hoshino  
Composition: Akira Yuyama

Cantabile (ca. ♩=108)

1. かぜはふくまに はなはさくまに  
2. はしはきらめくまに みずはながれるまに

ひとはいきるまにめぐるきせつのなかで  
ひとはいきるまにめぐるきせつのなかで

ゆめをこえるおもいではいのちのきらめき  
ときをこえるあこがれはいのちのきらめき

になりえがおはきょうのやさしさをそだてる  
になりなみだはあしたのつよさをそだてる

プレゼントマ イラブ プレゼントマ イラブ  
プレゼントマ イラブ プレゼントマ イラブ

ありがとうとおいしいひび いまだきしめーる  
ありがとうなつかしいひび いまだきしめーる

あたらしいおもい  
あたらしいおもい

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Notes: This song is a new styled music. For examples 'a' in the score indicates the phrase beginning with up-beat, 'b' indicates syncopation rhythm and 'c'

### 2.4. THE STANDARD EVALUATION OF A LEARNING SONG

Unexpectedly, soon after we began to play this unfamiliar song, 'Present My Love', some clients requested for a score. Therefore, we thought that

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### 3. Results

this song could be a good material to observe the process of learning of a new song. We played this song for approximately 4 years at the end of every session and observed the process of changes occurred in responses of each member. We classified them into three stages.

The first stage: The stage of Negative responses; this is the stage when clients showed no responses to music, or began to speak something unrelated to the song, or when he/she fell asleep. The second stage: The stage of Non-negative responses; this is the stage when the clients showed little reactions, such as looking at other members singing or the-therapist. The third stage: The stage of Positive responses. We subdivided this stage into two levels: when the clients moved mouths or heads with the music, we identified as they are in the first level. When the clients sang the song loudly or sang from the beginning to the end of the song, we identified as they are in the second level.

### *3. Results*

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#### **3.1. RECORDED SUBJECTIVE TEMPOS**

Subjective tempos of every individual were video recorded from 1998 to 2001. Before we played the new unfamiliar song, 'Present My Love' as an ending song, we played the familiar children's songs and old Japanese songs and identified the subjective tempos of each member from their singing, nodding head, tapping hands and others. Figure 1 shows the mean subjective tempos of their responses to the familiar songs in both severely demented group and non-severely demented group.

The mean subjective tempo of non-severely demented group was faster than that of severely demented group. Particularly in 'Yuhyake-koyake' (a children's song), 'Kono-michi' and 'Sakura-sakura' (old Japanese

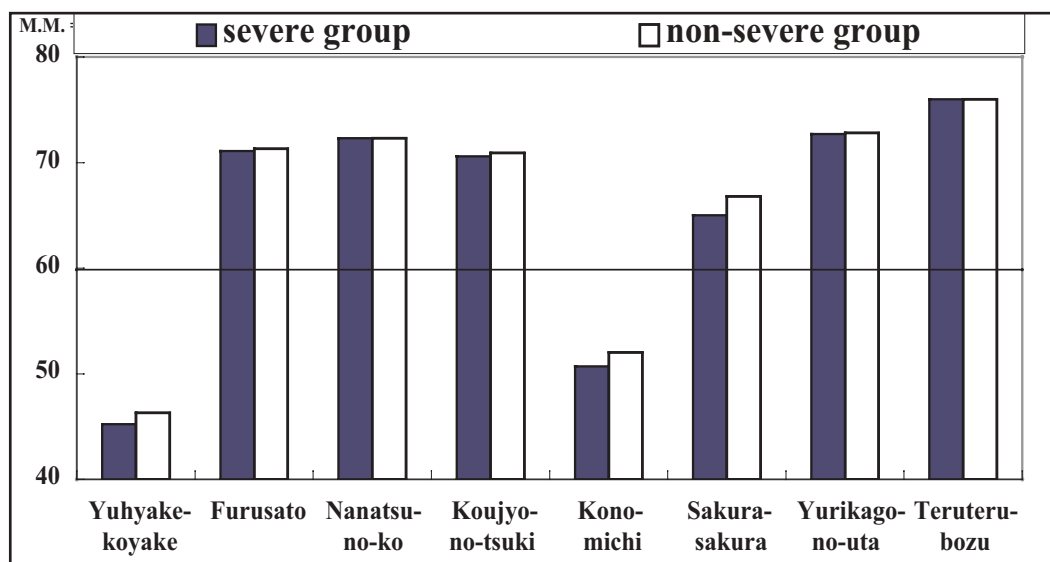
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### 3. Results

songs) the mean subjective tempos of non-severely demented group were clearly different from those of severely demented group. Other songs in Figure 1 showed close or same subjective tempos.

Mean subjective tempo of ‘Yuhyake-koyake’ (a children’s song) and ‘Kono-michi’ (an old Japanese song) was under M.M.♩=60 in severely and non-severely demented groups. On the other hand, mean subjective tempo of other songs were among M.M.♩ 60-80 similarly in both groups

**FIGURE 2. Mean subjective tempo recorded in music therapy**



#### sessions

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‘Severe group’ indicates severely demented group and ‘non-severe group’ indicates non-severely demented group. ‘MM =’ indicates M.M. (Metronome Marking)♩ equals.

### 3.2. LEARNING PROCESS OF A NEW UNFAMILIAR SONG.

Every session, the new unfamiliar song, ‘Present My Love’ was played with the subjective tempo, which was identified from familiar songs. I

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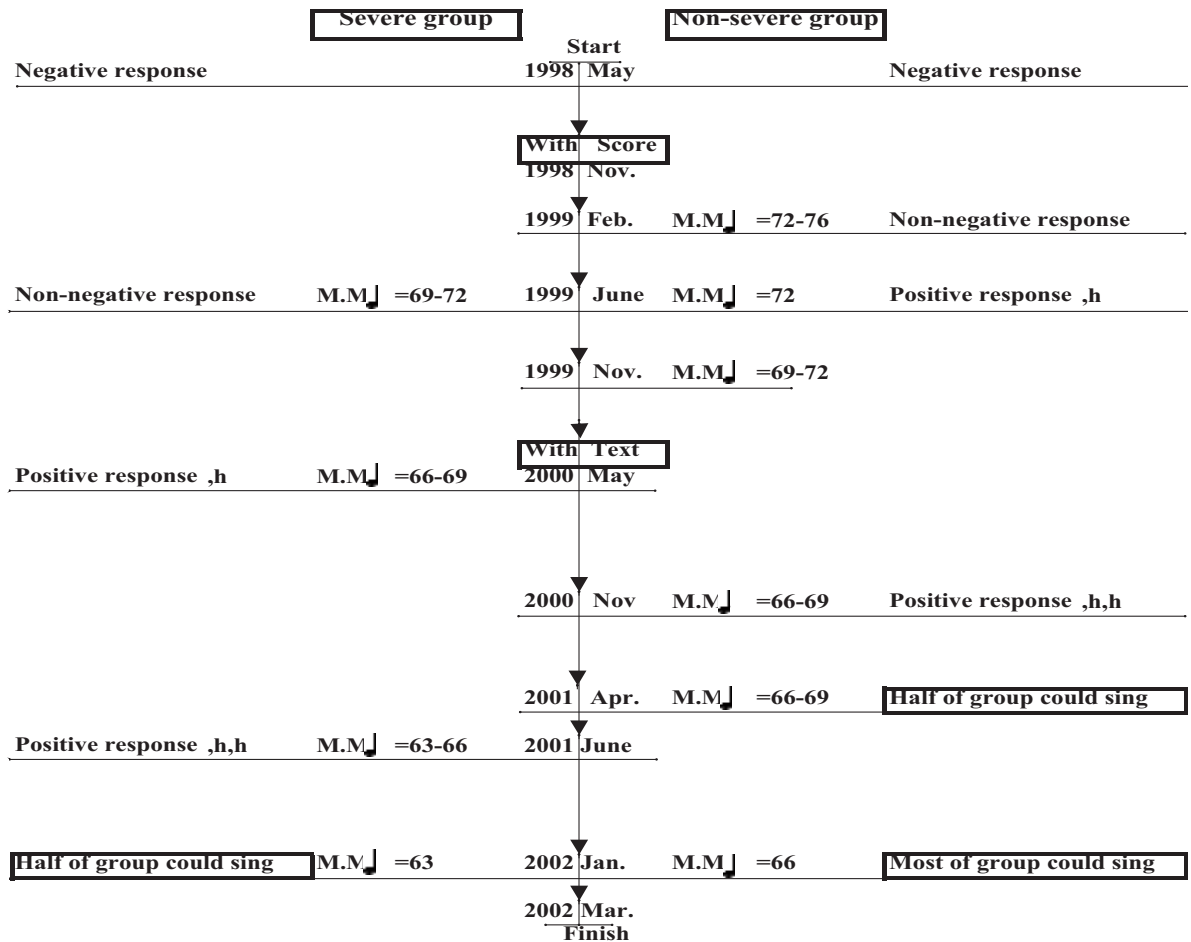
### 3. Results

have noted the mean subjective tempo we played in each stage. The tempo of non-severely demented group on each stage was faster than those of severely demented group. For instance the tempo of the non-severely demented group in Positive response level I and II was M.M.♩=66-72. However, the tempo of the severely demented group in Positive response level I and II was M.M.♩=63-69.

Figure 2 shows the difference in learning process between the severely and non-severely demented groups of 'Present My Love'. It took approximately three years for the severely demented clients to reach the Positive responses stage.

3. Results

FIGURE 3. Learning process of the new song, 'Present my love'



Severe group' indicates severely demented group and 'non-severe group' indicates non-severely demented group. 'M.M.' indicates M.M. (Metronome Marking) equals.

### *4. Discussion*

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#### **4.1. REGARDING 'SUBJECTIVE TEMPO' IN MUSIC THERAPY PRACTICE**

As above-mentioned, from our studies the mean subjective tempo of a familiar working song, 'Saitaro-bushi', was above M.M.♩=80 in non-severely demented group, but in severely demented group, the mean subjective tempo was under M.M.♩=80 (Saji et al. 2003). From Figure 1, however, the mean subjective tempos of familiar children's songs and old Japanese songs in both groups were under M.M.♩=80. Perhaps, because these familiar songs might be in client's childhood memory, and many clients seemed to call them to their mind, while they played together with the song. Therefore it is generally considered that these children's songs and old Japanese songs will become slower and be suitable for the last songs on calming down sessions.

Though the subjective tempo of 'Yuhyake-kotake', 'Kono-michi' was under M.M.♩=60 and suitable for the last closing songs, we considered them not to be suitable for the songs before the last song, 'Present My Love'. Because the tempos under M.M.♩=60 would be in reminiscences for demented groups, in particular severely demented group. Therefore, in order to allow the demented people to learn new songs, we concluded that the song should be played with the subjective tempos of familiar songs within M.M. ♩60-80. Then the clients will join and play the song without strain.

#### **4.2. REGARDING MUSIC THERAPY FOCUSED ON SUBJECTIVE TEMPO**

Figure 2 showed that the tempo of non-severely demented group on the each stage was faster than those of severely demented group. When the half of the severely demented group were able to sing, the tempo of 'Present My Love', was M.M. ♩=63 and when the half of the non-severely demented group were able to sing together, the tempo of

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#### 4. Discussion

‘Present My Love’, was M.M. ♩=66-69. From this longitudinal research on ‘subjective tempo’, we found each client had a different subjective tempo according to his/her condition. The subjective tempo of each individual changes subtly and sensitively from session to session. Therefore from continuous recordings of subjective tempo, we could get hold of the current physical condition of the clients and the progress and the degree of deterioration of their illness.

Also we considered that music therapy focused on subjective tempo led the clients to relax and to take an active part in musical performance, which also allowed them to experience interpersonal communication. Although half of the severely demented group members remained unable to sing or hum the melody of the new song, they did show that they had ability to sense the rhythm of the song, by nodding their heads or tapping their hands with the song. In these ways, some parts of learning ability of every client seemed to have recovered during this research. It was useful to use the subjective tempo of familiar songs in order to introduce and allow clients to learn unfamiliar song. This may indicate that music therapy focusing on subjective tempo do have a great possibility for cerebral revitalization.

**TABLE 2. The learning period of each stage**

Response	Negative	Non-negative	Positive I	Positive II	
				Half of clients	Most of clients
Severe group	13 months	11 months	13 months	7 months	
Non-severe group	9 months	4 months	17 months	5 months	9 months

Notes: Participants' responses were classified into three stages of Negative response, Non-negative response, Positive response I and II. In Table 2, severe group indicates severely demented group and non-severe group indicates non-severely demented group. Half or Most of group indicate that the half or most of the group could sing the song. Months show the period spent in each stage.

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## 5. Conclusion

Table 2 showed there was difference in learning process of 'Present My Love' between the two groups. Non-severely group reached each stage earlier than severely demented group except for Positive responses level I. This research may suggest that the severely demented group is capable of learning a new song, if the song was played to them continuously and in their subjective tempo.

However, we still need more investigations and further researches to confirm the effectiveness of the music therapy approach focused on subjective tempo.

### *5. Conclusion*

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The evidences obtained were as followed:

5.1. The Most of non-demented clients have potential to learn a new unfamiliar song, and the half of severely demented clients will be able to sing or listen to it.

5.2. It suggests the approach using subjective tempo is effective to support and maintain learning ability of elderly people with dementia

### *Acknowledgment*

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We are grateful to our patients for showing us that they still possess many potentials. We also pay special appreciation to the nursing home for elderly people with dementia in Miyagi, and to Doctor Takashi Ueno, who is a professor of University of Tohoku, for their cooperation. Lastly, I would like to add that this study was supported by the Division for Pro-

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*Reference*

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Aldridge, David (1996). *Music therapy research and practice in medicine. From out of the silence*. London: Jessica Kingsley Publishers, 186-209.

Aldridge, David (2000). *Music therapy in dementia care: more new voice*. London: Jessica Kingsley Publishers, 9-62.

Brotons, Melissa E., & Pickett-Cooper, Patricia. (1996). The effect of music therapy intervention on agitation behaviours of Alzheimer's disease clients. *Journal of Music Therapy*, 33, (1), 2-18.

Clair, Alicia A. (1991). Music therapy for a severely regressed person with a probable diagnosis of Alzheimer's disease. Bruscia, Kenneth E. (Ed) *Case studies in music therapy*. Gilsum, NH: Barcelona Publishers, 571-580

Clair, Alicia A. (1996). *Therapeutic uses of music for older adults*. Baltimore, MD: Health Professions Press, 61-90.

Clair, Alicia A., & Bernstein, Barry. (1990a). A preliminary study of music therapy programming for severely regressed persons with Alzheimer's-type dementia. *Journal of Applied Gerontology* 9(3), 299-311.

Clair, Alicia A., & Bernstein, Barry. (1990b). A comparison of singing vibrotactile and non-vibrotactile instrumental playing responses in

---

## Reference

- severely regressed persons with dementia of the Alzheimer's type. *Journal of Music Therapy*, 27, 119-125.
- Fraisse, Paul (1982) Rhythm and tempos. In Deutsch, Diana (Ed.), *Psychology of music*. New York: Academic Press, (pp.149-180).
- Frischeisen-Koehler, I (1933). Feststellung des weder langsamen noch schnellen (mittelmässigen)
- Tempos. *Psychologische Forschung*, 18, 291-298.
- Hanser, Suzanne B. (1990). A music therapy strategy for depressed older adults in the community. *Journal of Applied Gerontology*, 9, 283-298.
- Hanser, Suzanne B., & Clair, Alicia A. (1995). Retrieving the losses of Alzheimer's disease for clients and care-givers with the aid of music; In Wigram, Tony, Saperston, Bruce & West, Robert (Eds.) *The Art & Science of Music Therapy* (pp.342-360), HAP.
- Kawashima, Ryuta. (2002). *Functional Plain Imaging Neuropsychology Collections*. Tokyo: Igakushoin.
- Mishima, Jiro (1951). Fundamental research on the constancy of "mental tempo". *Japanese Journal of Psychology*, 22(1), 12-27.
- Perilli, Gabriella G. (1995). Subjective tempos in adults with and without Psychiatric Disorders. *Music therapy perspectives*, 13(2), 104-109.
- Saji, N., Sugai K., Ueno T. & Saji, R. (2002). Subjective Tempos on Music Therapy for Persons with Senile Dementia. The 10th World Congress of music Therapy, Abstract book, 206.

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## Reference

Saji, N., & Mizuno, Y. (2003). Qualitative research of the efficacy of music therapy for older adults with dementia based on three-year examination of 'subjective tempo' and EEG. 2003 *The reports of health care research for elderly people with dementia*, 90-101.

Saji, Nobuko, Sugai, Kuniaki, & Saji, Ryoya (2003). Evaluating the efficacy of music therapy for elderly people with dementia, based on a three-year examination of 'subjective tempo', *Japanese Journal of Music Therapy*, 3(1), 46-53.

Saji, Nobuko & Ueno, Takashi (2004a). Behavioral and EEG Analysis of the efficacy of music therapy for an elderly person suffering from Parkinson's disease and dysarthria. *The Annual Report of Department of Education, Tohoku University*, 52, 377-389.

Saji, Nobuko, Sugai, Kuniaki, & Ueno, Takashi (2004b). Assessment by EEG analysis of music therapy for persons with senile dementia, *International Congress Reports of Musicological Society of Japan*.

Saj, N., Sugai K., Ueno T. & Saj, R. (in press). Subjective Tempos on Music Therapy for Persons with Senile Dementia. Reports of The 10th World Congress, Oxford, UK.

Stern, Daniel N. (1985). *The Interpersonal World of the Infant*. New York: Basic Books, 249.

Sugai, Kuniaki (1994). A new evaluation method of early speech behavior. Using a Japanese playing song, 'Genkotsu-yama-no-tanukisan'. *The Annual Report of Department of Education, Tohoku University*, 42, 97-131.

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