

## Full-Length Article

## Changes in States of Consciousness during a Period of Silence after a Session of Depth Relaxation Music Therapy (DRMT)

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### Abstract

Silence is often described as to be some kind of important and powerful phenomenon or acoustic appearance in music therapy and of course in other disciplines too. Therefore, it is pertinent to gain more knowledge about how people perceive silence, what effects it has on the individual's levels of relaxation and human perception of self, time and space. Silence lasting 6:30 minutes preceded by two different conditions consisting of either a university seminar or a session of Depth Relaxation Music Therapy (DRMT) were the two arms of this study carried out at a university with students as subjects. The silence after the DRMT was judged more relaxing than the silence after the seminar. Participants also had a lower sense of space and time, as well as a reduced future perspective. They estimated the silence as having lasted longer in the condition following the DRMT session. These effects support further investigations concerning the idea that silence (combined with DRMT) may be of preventive (e.g. regarding stress-related diseases, depression, burnout and anxiety disorders), relaxing and health-promoting interest for clinical and non-clinical applications.

**Keywords:** *relaxation, music therapy, silence, time, hypnotherapy*

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### Introduction and background

#### *Silence*

Is silence a peculiar ‘something’, a strange ‘nothing’, or, in case of music therapy, an inherent appearance somewhere between ‘everything’ and ‘anything’? Silence may be an ambivalent phenomenon. It is both presence and absence, although sometimes transcending or ‘being’ both at the same time. Above all, it is difficult to describe, verbalize, or comprehend. To make it even more complex, we have several words (silence, stillness, quietness, etc.) to describe this phenomenon, and there seem to be various forms or characteristics of silence. As a result, one may ask whether it is not sufficient to talk about ‘silence’ in the singular, but rather to introduce the term ‘silences’ into music therapy theory, research and practice [1-3], Wakao [4] considers music therapy to provide adequate grounds to do so:

We should not forget that music therapy is the therapeutic method most able to treat silence in a creative way.

Neither the English nor the German language expresses the

relevant terms (‘silence’ and ‘Stille’) in the plural (‘silences’ and ‘Stillen’). However, in German there is also the verb ‘stillen’. Etymologically, this verb has its roots in the 16<sup>th</sup> century and means to silence a baby that is crying due to hunger. In New High German, ‘stillen’ has become a word describing the process of a mother nourishing or breastfeeding her baby [5]. This linguistic relationship probably indicates that silence is able to nourish, to feed, or to provide something important in therapy and the therapeutic relationship. Taking this into account, it no longer appears to be surprising that silence is immensely powerful within musical work [1].

#### *Relevant research projects and studies*

While we have not really written about or researched the silences we experience and share in the music therapy room, it is not because we have not thought about them. (p. 548)[1]

Is silence a topic in contemporary music therapy research? Do research projects concerning music therapy address silence? Keeping the introductory thoughts by Sutton in mind, we can cite some publications and studies that have implemented or discussed silence among music therapeutic/musical methods, study designs, settings and outcomes. For example, music-induced relaxation applying music with a slow rhythm seems to have a greater effect when supported by randomly inserted periods of silence. This also decreases blood pressure, reduces

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the number of breaths per minute, slows down the heart rate and decreases the low-frequency/high-frequency ratio (LF/HF ratio) [6]. Live music and singing have helped decrease stress in the Neonatal Intensive Care Unit setting. In doing so, a preceding reduction of noise and a focus on silence are crucial factors [7].

Recent clinical studies have not only incorporated silence as part of a methodical approach, but also detected an absence of silence where it would be desirable: in hospitals. Noise affects the patient's recovery [8]. A study conducted by Short et al. [9] showed that equipping patients with MP3-Players and music made them feel better and helped them to 'escape' from noisy environments, such as in Emergency Departments. What if these patients had been offered silence instead of music? Silence may well have the potential to speed up recovery and support human health. Last but not least, in recent publications, proponents of music therapy have developed a growing interest in silence, quietness and pause. [1,2,10-13]

The present research project integrated silence as a receptive 'stimulus' following either a university seminar or a Depth Relaxation Music Therapy (DRMT) session. By comparing the two conditions, we aimed to discover more about the effects of silence on the level of relaxation and on the perception of space, self and time. The senses of space, time and self are basic dimensions of conscious awareness that fluctuate when one is awake. Different induction techniques, such as meditation, rhythm-induced trance, or listening to music, produce profound changes in states of consciousness. In other words, aside from affective responses, the senses of self, time and space can be altered. [14-16]

Various studies have focused on the application of music in a receptive (therapeutic) setting. Stegemann [17] provided an extensive overview on receptive music therapy – including Depth Relaxation Music Therapy – in childhood and adolescence affecting stress and relaxation.

Research projects related to music and silence with students as subjects have also been conducted. Investigations with psychology and music students reported that music, silence and verbal suggestions of relaxation affect the heart rate [18]. Further studies displayed a tendency for sedative music to have anxiety-reducing effects upon subjects with high levels of anxiety [19]. Some implied that stimulating music seems to evoke higher worry scores than sedative music does [20]. A study by Standley [21] with 130 students examined whether music affects aversion related to dental drills. Results were as follows:

Overall, music preceding the dental drill generally reduced the drill's aversive effects while the drill preceding music generally enhanced music's positive effects. Heart rate responses to music were varied. (p. 120)[21]

### *Depth Relaxation Music Therapy*

Depth Relaxation Music Therapy (DRMT) was the experimental condition in this study. The methodology was mainly developed by Hans-Helmut Decker-Voigt and consists of seven steps or 'building blocks'. The sequence of these 'building blocks' depends on the patient's physical and psycho-emotional condition and characteristics and is adjusted by the therapist according to the patient's needs. Each of these steps has its specific 'task' (e.g. 'sensitization to the feeling of "comfort" in the body'; 'sensitization to feelings, mental images, thoughts'; 'sensitization to the auditory perception of music', etc.). The DRMT methodology has been influenced by several meaningful techniques and approaches, such as Milton Erikson's hypnotherapy, autogenic training, guided imagery, psychoanalytic and humanistic psychology, expressive art therapy and Gestalt therapy. Decker-Voigt also suggests a time limit of between 3 and 8 minutes for the receptive music phase in DRMT. He argues that longer periods may generate difficulties with participants' re-orientation. Although DRMT mainly uses music (from CD or MP3 players, performed by a therapist, etc.) during the receptive phase, Decker-Voigt states that it is very important to 'always allow a little silence before playing the music, so that the music "comes out of silence" (p. 249)' [22,23].

The aim of our study was to compare the effects of a 6:30-minute silence preceded by either a session of DRMT or a university seminar. Altered states of consciousness induced through different psychological techniques, such as meditation, music, sensory deprivation, or rhythm-induced trance, lead to changes in the senses of self, time and space [14-16]. Therefore, in addition to assessing the affect and degree of relaxation, which have been studied extensively in music therapy, the dependent variables: intensity of awareness of self, space and several aspects of time, all of which have hardly been studied within our context of interest, were also evaluated. We assessed the subjective impressions of these dimensions of consciousness with subjective scales relating to the period of silence.

### **Methods**

#### *Participants and setting*

Students attending a regular seminar during their semester at the Catholic University of Applied Sciences in Freiburg, Germany, participated in this study. They were assigned to two groups. One group received a Depth Relaxation Music Therapy (DRMT) session lasting 16 minutes. The DRMT was preceded by a short introduction providing information on the procedure. The session was guided by a professional music therapist (the first author) using speech to induce depth relaxation by moving, step by step, from building block I to building block V. Although Decker-Voigt [22,23] includes

seven building blocks in DRMT, we did not integrate building blocks VI ('Reflection of these experiences and their transference into everyday life through connecting questions') and VII ('Rolling back') into our procedure, as these were neither relevant to nor necessary for our research focusing on the perception of silence. As pre-stimulation, the therapist invited participants to make themselves comfortable and to allow themselves to have a pleasant time. Leading into 'building block I', the focus was on fostering the sensitization to the feeling of physical comfort. Participants were invited to 'sense' their bodies from head to toe. It was suggested they change the positions of their feet, spines, heads, etc. to create the best possible and comfortable position and sense of physical comfort. The next step, building block II, focused on breath and breathing. A specific breathing rhythm was not dictated. Everyone's own individual breathing process – inhaling/taking in, pausing/allowing, exhaling/giving away – was accepted and considered therapeutically relevant. Building block III implemented a sensitization to feelings, mental images and thoughts. During this part of the process, the therapist suggested that all the feelings, images and thoughts that circulated in the participants' minds were acceptable. There was no need to try to avoid them or push them away ('Let your thoughts, images and feelings come and go the way they do.'). Subsequently, building block IV ('sensitization to the auditory perception of music' – or, as in our case, silence) encouraged participants to focus their attention on the acoustic surrounding. This was an invitation to listen to the subsequent silence. This was followed by a short phase of re-orientation to the 'here and now' (building block V) ending the DRMT session and initiating the final step, where the students filled out the scales. Throughout all stages of the DRMT process and its building blocks, the therapist always provided positive connotations relating to the addressed body parts and steps (e.g. 'All the thoughts circulating in your mind are allowed to do so...') [22,23].

The other group received a 16-minute seminar focusing on aspects of silence in therapy and counseling. To be more precise, following an introduction on the topic led by the music therapist, the students were invited to participate in a group discussion moderated by the music therapist. The main aim of the discussion was to gather and summarize the students' (professional) experiences, ideas and opinions concerning silence, its various forms of occurrence and applications in clinical and non-clinical (health-related) settings, to collect and provide case examples, and to talk about silence's therapeutic potentials and risks, as well as indications and contraindications.

These interventions were followed by a period of silence lasting 6:30 minutes, after which the states of consciousness during that period were assessed. After an interval of one week, each group received the alternative intervention, after which the same period of silence (6:30 minutes) followed and was then assessed. All sessions were conducted by the same

person, who is a qualified music therapist. The study was undertaken during two semesters (n = 33 students during the summer semester 2015 and n = 27 during the winter semester 2015/2016).

Students were informed about the study purpose and asked whether they wanted to take part during a lesson conducted a week before the study. If they agreed, they were told the location (in one of the university's seminar rooms) and time of the study for the following week. Regarding the study procedure (see Table 1), each participant in his or her assigned group first received a general introduction to the study aims relating to the question of altered states of time, space and self. Then they filled out a visual analog scale (VAS) indicating their level of relaxation and the data entry forms, including two questionnaires concerning traits (impulsiveness, mindfulness) which have been shown to be associated with time perception [24]. Then the groups received either a seminar focusing on silence in therapy and counseling or a session of Depth Relaxation Music Therapy lasting 16 minutes each. A period of silence of unknown duration to the students (which lasted 6:30 min) followed. Directly after this period of silence, participants received subjective scales to indicate how the self, time and space had been perceived during that silent period and how relaxed they had been just afterwards. In a second session one week later, each participant received the alternative intervention following the same procedure.

1. General introduction of study aims	5 minutes
2. Filling out of scale concerning level of relaxation and data entry forms, including the two trait questionnaires (impulsiveness, mindfulness)	10 minutes
3. Depth Relaxation Music Therapy (DRMT) / seminar focusing on silence in therapy and counselling	16 minutes
5. Period of silence	6:30 minutes
6. Filling out of scales concerning state of relaxation and states of consciousness pertaining to the sense of self, time and space	5 minutes
	Total of 42:30 min.

Table 1. Outline of the intervention session.

Measures

State Measures – Right before the seminar and/or the DRMT session, as well as just after the period of silence, participants were asked to indicate how relaxed they felt at the moment by marking their answer on a visual analogue scale (VAS) consisting of a line with the two endpoints signifying 'not at all relaxed' and 'extremely relaxed'. Following the period of

silence, two scales were employed with answer categories ranging from 1 to 7 to measure intensity of awareness of body and space during the period of silence. The questions in German were ‘How intensively did you perceive yourself?’ and ‘How intensively did you perceive time’ (see Figure 1). Higher scores indicate greater awareness of body and space. Two VASs were provided for participants to mark the point which reflected their awareness of time during the period of silence. The questions were ‘How intensively did you perceive time?’ and ‘How fast did time pass for you?’ The time-awareness scale ranged from 0 mm (not at all) to 100 millimeter (extremely intensively). The time-speed scale ranged from 0 mm (extremely slowly) to 100 millimeter (extremely quickly). See Figure 2 (two upper rows). In a further time-assessment scale, participants had to indicate how strongly past, present and future had been perceived during the period of silence [adapted from 25]. Finally, participants had to indicate how long they thought that the period of silence had lasted (in units of clock time).

*Trait Measures* – Two trait measures assessing impulsiveness (BIS-11 – Barrat Impulsiveness Scale) and mindfulness (FMI – Freiburg mindfulness inventory), which have been shown to relate to the sense of time, were filled out by the participants at the beginning of the first session. The German version [26] of the BIS-11 [27] consists of 30 4-point items ranging from 1 (rarely) to 4 (almost always). The resulting subscales are planning impulsivity (‘I plan tasks carefully’), motor impulsivity (‘I do things without thinking’), and attention/cognition impulsivity (‘I concentrate easily’). The 14-item version of the FMI [28] measures mindfulness on the basis of a two-dimensional structure with the factor ‘presence’ as ability to attend to the present moment (‘I am open to the present moment’) and the factor ‘acceptance’ as non-judgmental attitude (‘I am able to smile when I notice how I sometimes make life difficult’) utilizing a 4-point item scale.

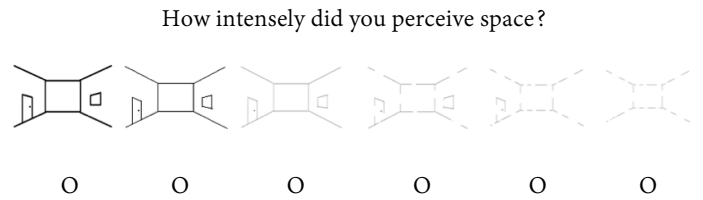


Figure 1. Scales for measuring relaxation and the intensity of the sense of body and space.

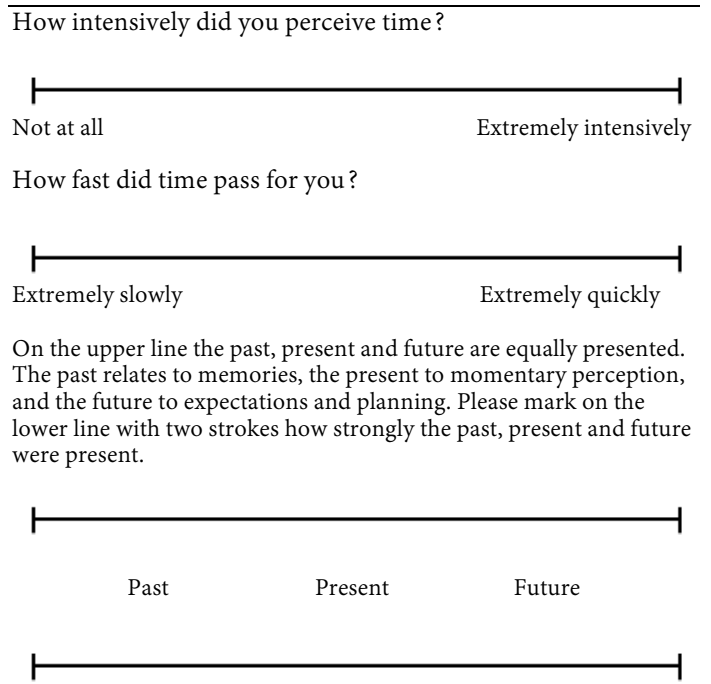
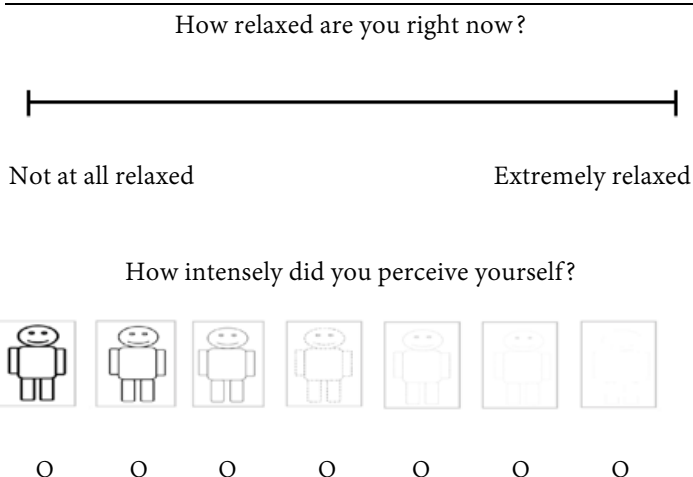


Figure 2. Visual analog scales for measuring the intensity of the sense of time, the speed of the passage of time, and the predominance of the past, present and future perspective.

*Statistical analyses*

The study design enables testing within-subject differences for type of intervention (DRMT vs. seminar). Dependent variables are the measures of states of consciousness relating to self, time, space and relaxation. T tests for dependent variables (the intervention differences) were calculated. Pearson correlations for associations between the trait variables and the responses to the intervention were additionally calculated. Initial significance levels were set to  $p < 0.05$ . The false discovery rate (FDR) method, a multiple comparisons correction procedure [29], was used to control for multiple tests.



**Results**

Of the 67 students included in the study, 60 completed both study interventions (45 female, 15 male; mean age: 22.9 years; S.D. = 2.6). After the silence following the Depth Relaxation Music Therapy (DRMT) condition as compared to after the silence following the seminar, students reported being significantly more relaxed ( $t = -3.8, p < 0.001$ ) (see Table 2). There was no difference in the sense of self between the two conditions ( $t = 0.3, p = 0.759$ ), but the sense of space ( $t = 2.6, p = 0.013$ ) and time ( $t = 2.5, p = 0.014$ ) were significantly reduced in the relaxation condition. No significant differences between intervention conditions were seen for the speed of

time passing ( $t = 1.5, p = 0.148$ ). Regarding the time perspective, the sense of the future was significantly reduced in the relaxation condition ( $t = -6.5, p < 0.001$ ), but there was not an increased awareness of the present during relaxation ( $t = -2.0, p = 0.056$ ) or a difference between the two conditions for the past perspective ( $t = 0.8, p = 0.412$ ). The subjectively judged duration of the period of silence (physical duration: 6.5 minutes) was significantly increased in the relaxation condition (10.3 min.) as compared to the lecture condition (6.8 min.) ( $t = -6.5, p < 0.001$ ). No significant associations were found between the trait variables impulsiveness and mindfulness (including subscales and sum scores) and the state variables for both conditions (DRMT, seminar).

Measure	Relaxation	Seminar	t =
	Mean (S.D.)	Mean (S.D.)	p < (df = 59)
State of relaxation [0 ... 100]	75.6 (18.3)	62.2 (24.0)	<b>-3.8</b> <b>0.001*</b>
State of relaxation [0 ... 100] Difference after-before silence	26.8 (21.0)	16.7 (25.7)	-2.1 0.038
Intensity sense of self [0 ... 7]	4.0 (1.4)	4.0 (1.3)	0.3 0.759
Intensity sense of space [0 ... 7]	2.1 (1.4)	2.8 (1.8)	<b>2.6</b> <b>0.013*</b>
Intensity sense of time [0 ... 100]	29.1 (23.3)	39.2 (25.4)	<b>2.5</b> <b>0.014*</b>
Speed of time passage [0 ... 100]	56.8 (24.6)	62.7 (22.8)	1.5 0.148
% Sense of past [0 ... 100]	21.1 (17.5)	23.5 (19.6)	0.8 0.412
% Sense of present [0 ... 100]	53.2 (26.7)	44.1 (27.8)	-2.0 0.056
% Sense of future [0 ... 100]	25.7 (16.6)	31.8 (22.7)	<b>-6.5</b> <b>0.001*</b>
Duration of period of silence [min.]	10.3 (4.2)	6.8 (2.3)	<b>-6.5</b> <b>0.001*</b>

**Table 2.** Measures for the states of consciousness for two types of intervention, namely after a period of 6:30 minutes of silence following a 16-minute Depth Relaxation Music Therapy (DRMT) session (relaxation) versus a seminar on silence in therapy and counselling lasting 16 minutes (seminar).

\*significant after FDR-adjustment

**Limitations**

This is the first study to investigate the effects of silence on the conscious awareness of self, space and time after Depth Relaxation Music Therapy (DRMT). The choice of control intervention is decisive because we can only make inferences on relative differences between the effects of DMRT and a control condition. Since we compared two identical intervals of silence which were embedded in different settings, we chose a seminar as our initial approach. However, different control interventions are potentially applicable in future studies to tease out specific effects. For example, one could look at differences between the specific DRMT method and other

body-centered relaxation techniques, such as autogenic training. Another comparison could examine possible differences between DRMT and unspecific music relaxation. For example, in one recent study, the effects of a yogic mindfulness meditation technique on subjective time were compared to a condition during which subjects listened to relaxing music [30]. In this study, subjects were also subjected to an individualized scheme. In our own study, we chose a group setting for pragmatic reasons. An individualized setting might prove even more effective.

## Discussion

Our study shows that silence combined with DRMT is effective in fostering relaxation, reducing the sense of space, slowing the perception of time and modifying the perspective of the future. Participants also felt the period of silence following DRMT to be significantly longer compared to the equally long period of silence after a seminar. The subjects' individual amounts or manifestations of impulsiveness and mindfulness did not affect the above-mentioned effects. This study confirms the notion that specific induction methods of altered states of consciousness change the awareness of time and space in the way that both dimensions of awareness are reduced as a function of absorption [14-16]. In the DRMT condition, participants judged the duration to last longer than in the control condition. An overestimation of duration is typically related to negative affects, such as boredom or depressed mood [14]. Here we were able to show that a relative overestimation of duration can also be related to a more relaxed state of being in the present moment.

## Conclusions

Our results suggest several useful applications. In light of the increasing number of stress-related illnesses in the world, silence and DRMT might offer cost-effective interventions to provide relaxation and to maintain health in the long run. Because the study was based on a group setting, positive effects were achieved for many individuals at the same time, meaning that this intervention can be economical and cost-efficient.

The independence of our research findings from associations with impulsiveness and mindfulness in subjects may facilitate clinical applications. Especially in treating mental disorders, such as depression or burnout, silence and DRMT could promote relaxation, as well as states of well-being, while reducing rumination and circular reasoning related to anxiety about the future.

Thanks to its relaxing effect, a combination of silence and DRMT could provide calmness and a reduction of anxiety preceding surgery, dental procedures, etc.

Adaptations for everyday non-clinical applications in hectic, noisy and stressful settings, such as schools, the workplace and hospitals, are conceivable.

DRMT is a complex methodology to be applied by a specifically trained music therapist and to be tailored to a patient's individual needs. The effects and outcomes of this study support generating a silence-implemented DRMT technique for individual and auto-suggestive applications. This could provide everyday access to a self-administered music therapy tool that enables relaxation, fosters focusing of thoughts in the here and now, and encourages reduction in rumination related to thoughts about the future.

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