Receptive Music Therapy for the Treatment of Depression: A Proof-of-Concept Study and Prospective Controlled Clinical Trial of Efficacy

Vera Brandes a, Darcey D. Terris b, Claudia Fischer c, Adrian Loerbroks d, Marc N. Jarczok e, Gernot Ottowitz a, Georg Tischer f, Joachim E. Fischer c, Julian F. Thayer e, g

aResearch Program MusicMedicine, Paracelsus Medical University, Salzburg, and bPsychocardiology Unit, Cardiology Department, Hanusch Hospital, Vienna, Austria; cMannheim Institute of Public Health, Social and Preventive Medicine, Universitätmedizin Mannheim, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany; dDepartment of Psychology, Ohio State University, Columbus, Ohio, USA

Current psychosocial and antidepressant treatments [1] result in similar response rates [2, 3] with mostly reduction, but not complete remission, of depressive symptoms [4]. Poor adherence to recommended treatment is a further issue complicating the management of depression and prevention of recurrent episodes [5, 6]. Therefore, new therapies, which alone or combined with present treatments can significantly improve outcomes, urgently need to be developed. Evidence suggests that music therapy should be further explored as a possible treatment [7]. Music therapy is generally not associated with negative side effects and can be easily implemented. These factors contribute to high adherence and favorable treatment outcomes. Previous efficacy studies of music therapy for depression treatment suffered from a lack of specific stimuli, methodological shortcomings, or utilization of small samples [8]. We conducted the largest trial to date investigating 2 forms of receptive music therapy among adults with depression.

Recruited through media and by contacting doctors, potential subjects were screened online using the Goldberg Depression Questionnaire (GDQ) [9]. All subjects provided written informed consent before participation in the study. The study was reviewed and approved by the Ethics Commission of Vienna and registered with the National Institute of Health’s clinical trial registry (www.clinicaltrials.gov, NCT00644527). The first 204 respondents who completed the GDQ and met the inclusion criteria (aged 18 years with a GDQ score between 15 and 65) underwent more comprehensive baseline assessments. Respondents were not accepted if they had changed therapists, therapeutic session frequency, antidepressants, or antidepressant dosage in the 6 months prior to study initiation. Further, individuals were only included if they agreed not to make any such changes during the course of the study period. Subjects with alcohol abuse or an associated disease, and those under psychiatric treatment for psychoses, were excluded. One subject was excluded due to cognitive disability. The remaining 203 subjects entered the study protocol. The study design included 4 arms: music therapy 1 (MT1), music therapy 2 (MT2), placebo (nature sounds), and waiting-list control. Assignment to study arms was based on subjects’ preferences for the date of their initial study appointment (only on working days).

The subjects were followed over 4 consecutive 5-week study periods (T1, T2, T3 and T4). The T1 period represents the central trial element of this study, while the additional study periods (T2, T3 and T4) were employed to explore wash-out effects, subject adherence, and treatment preferences. This report only draws on data from T1. During T1, the subjects were asked to strictly follow their assigned study protocol with the aim of determining the effects of MT1 and MT2. Subjects who received audio programs (i.e. MT1, MT2, or placebo) were blinded to the program they had received and could not switch from their assigned program to alternative music programs during T1.

MT1 and MT2 were individualized music-focused audio therapies developed by the study investigators as receptive music therapies for depression treatment. Both programs were developed and refined through a series of case studies and included 2 specific programs for different times of the day. MT1 incorporated newly composed polyphonic modern music and MT2 consisted of specifically arranged classical music. Subjects listened twice daily for 30 min.

Depression status was assessed at the beginning of T1 and T2 using the Hamilton Rating Scale for Depression (HAM-D) [10], the Beck Depression Inventory (BDI) [11], and the Hospital Anxiety and Depression Scale (HADS-D) [12]. HAM-D was administered by trained psychologists blinded to each subject’s arm assignment. A composite (COMP) depression scale was constructed based on the HAM-D (double weighted), BDI, and HADS-D z-scores. Change in scores on each individual scale and on the COMP between the beginning of T1 and T2 were calculated. At the beginning of T1, each subject also completed an extensive questionnaire covering various potential confounders. Separate multivariate linear regression models were constructed for each of the depression change variables with stepwise backward elimination of possible confounders. Analyses were carried out based on an intention-to-treat approach with significance assessed both at the p ^ 0.05 and p ^ 0.0125 levels [13].

The overall drop-out rate at the beginning of T2 equaled 17.2% (35/203). Compared to the control arm, a significant positive effect in COMP was observed for MT1 in T1 (β = 1.44, p = 0.030), but not for MT2 (table 1). Both MT1 and MT2 were associated with a sig-
significant positive effect on HAM-D and HADS-D scores. MT2 sub-
jects experienced a positive effect on BDI scores, but not MT1 sub-
jects. No significant change in any depression score was detected
in the placebo arm. HAM-D, BDI, and HADS-D scores changed
correlated only moderately, with the highest correlation observed be-
 tween BDI and HADS-D (r = 0.59). In bivariate analysis, a ‘worries’
scale was the only possible confounder significantly associated with
all 4 depression scores, suggesting that the HAM-D, BDI, and
HADS-D scales may focus on different aspects of the construct of
depression (e.g. cognitive and emotional factors).

A recent Cochrane review identified 16 potentially relevant
studies on music therapy for the treatment of depression, but only 5
studies met the methodological criteria for inclusion [8]. Of
these studies, 4 involved subjects listening to music [14–17], but
only 1 study [17] asked subjects to listen to music individually (in
contrast to group sessions [14–16]). Our study represents the larg-
est study to date and is the only controlled trial to investigate the
effect of audio programs without additional guided imagery or
relaxation techniques.

Our study included both subjects who used music therapy or
used music therapy combined with existing treatment approaches.
Due to our study’s sample size, we were unable to investigate inter-
actions between music therapy and concurrent treatments. To lim-
it potential bias, however, we excluded subjects who had changed
their therapeutic approach in the 6 months prior to study initiation.

Based on possible neurophysiologic and neurochemical effects
[7], receptive music therapy, as explored in this pilot controlled
trial, appears to be associated with reduced depressive symptoms
and high treatment compliance, and may therefore potentially
represent an effective depression treatment alternative, alone.

### Table 1. Final models, relationship between study arm and change in depression scales in T1

<table>
<thead>
<tr>
<th>Study Arm</th>
<th>β</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT1</td>
<td>3.12</td>
<td>0.013*</td>
<td>0.68 to 5.56</td>
</tr>
<tr>
<td>MT2</td>
<td>2.58</td>
<td>0.031*</td>
<td>0.24 to 4.91</td>
</tr>
<tr>
<td>Placebo</td>
<td>2.05</td>
<td>0.115</td>
<td>-0.51 to 4.61</td>
</tr>
<tr>
<td>MT1</td>
<td>1.23</td>
<td>0.361</td>
<td>-1.43 to 3.90</td>
</tr>
<tr>
<td>MT2</td>
<td>2.99</td>
<td>0.030*</td>
<td>0.30 to 5.67</td>
</tr>
<tr>
<td>Placebo</td>
<td>-1.13</td>
<td>0.430</td>
<td>-3.95 to 1.69</td>
</tr>
<tr>
<td>MT1</td>
<td>1.68</td>
<td>0.014*</td>
<td>0.35 to 3.02</td>
</tr>
<tr>
<td>MT2</td>
<td>1.56</td>
<td>0.024*</td>
<td>0.21 to 2.34</td>
</tr>
<tr>
<td>Placebo</td>
<td>0.80</td>
<td>0.303</td>
<td>-0.73 to 0.07</td>
</tr>
<tr>
<td>MT1</td>
<td>1.44</td>
<td>0.030*</td>
<td>0.14 to 2.73</td>
</tr>
<tr>
<td>MT2</td>
<td>1.14</td>
<td>0.059</td>
<td>-0.04 to 2.33</td>
</tr>
<tr>
<td>Placebo</td>
<td>0.57</td>
<td>0.397</td>
<td>-0.76 to 1.90</td>
</tr>
</tbody>
</table>

Depressive symptoms, based on the HAM-D, BDI, HADS-D and
COMP, were assessed at the beginning of T1 and at the begin-
ing of T2, 5 weeks later. The comparator group for all analyses
was the control arm. * p ≤ 0.05.

1 Adjusted for age, gender, family status, education, worries,
   self-rated health, and sleep quality.
2 Adjusted for age, gender, family status, psychosocial stress at
   work, exhaustion, and stressful life events.
3 Adjusted for age, gender, psychosocial stress at work, disruptions
   in social relationships, and sleep quality.
4 Adjusted for age, gender, family status, education, source of
   income, and worries.

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Vera Brandes
Research Program MusicMedicine, Paracelsus Medical University
Strubergasse 21
AT–5020 Salzburg (Austria)
Tel. +43 664 255 0102, Fax +43 662 442 002 1209
E-Mail vera.brandes@pmu.ac.at