

# BMJ Case Reports

## Treatment of anxiety from musical obsessions with a cognitive behaviour therapy tool.

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**BMJ Case Studies.**

Published Early online 8<sup>th</sup> of November 2013

DOI: [10.1136/bcr-2013-201064](https://doi.org/10.1136/bcr-2013-201064)

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<b>TITLE OF CASE</b>
Treatment of anxiety from musical obsessions with a cognitive behaviour therapy tool
<b>SUMMARY</b>
<p><b>Musical obsessions and hallucinations are disturbing experiences of repeating internal music. Antipsychotic medication can sometimes reduce these symptoms but can also trigger or augment them. We report about a female patient suffering from schizophrenia with drug-resistant obsessive musical hallucinations. The patient volunteered in a nine months pilot study to follow the development of the condition using an involuntary music and mood inventory. The patient perceived benefits from the intervention, including reduced anxiety, increased feeling of being in control and understanding the condition better. Findings from this case study suggest that cognitive therapy can be a useful complementary method of care for persons suffering from musical obsessions. The presented tool requires further investigations among those suffering from this rare condition.</b></p>
<b>BACKGROUND</b>
<p>The involuntary perception of music is a symptom that relates to a spectrum of mental disorders<sup>1</sup>. Musical hallucinations are among most commonly encountered hallucinations in clinical institutions. Although not foreign to schizophrenia, involuntary music perceptions also occur among people without apparent mental disorders and no deterioration of subjective wellbeing. Recent studies of involuntary musical imagery (INMI) in psychology<sup>2-4</sup> reveal a high frequency of involuntary music episodes among the general population. In these cases, normal, healthy individuals repeatedly experience seemingly uncontrollable repetition of musical memories, with a clear insight to the self-generated nature of the experience. These 'earworms' are a harmless everyday phenomenon and not a cause for concern.</p> <p>Musical hallucinations are the most common symptom in clinical conditions of involuntary music<sup>1, 5</sup>. Females, people over sixty years old, and socially isolated individuals may have an elevated risk of developing these symptoms<sup>5</sup>. Musical hallucinations can be associated with peripheral hearing loss<sup>5</sup>, but also with mental disorders<sup>6</sup>. One study reported prevalence of under 0.2% in general hospital population<sup>7</sup>, while another study reported a lifetime prevalence of 26.8% in psychiatric outpatients<sup>8</sup>. In the latter, musical hallucinations were associated with obsessive-compulsive disorder (OCD) and were most frequent (&gt; 50%) in OCD patients with comorbid psychiatric conditions (e.g. schizophrenia). Obsessive symptoms are more common in schizophrenia than in the general population<sup>9</sup>. Such obsessions of the schizophrenia patients can be either similar to those of OCD patients or be psychotic, obsessive hallucinations.</p> <p>There is no standard pharmacological or psychotherapeutic treatment for the obsessive symptoms in schizophrenia patients. Because they can be both hallucinatory and obsessive<sup>9</sup>, they would be expected to respond to either antipsychotics alone or in combination with antidepressants. Musical obsessions in patients without schizophrenia have been treated successfully with clomipramine<sup>5, 10</sup>. However, de-novo OCD symptoms in schizophrenia patients have been triggered by atypical antipsychotics, especially clozapine<sup>11</sup>, and also by lamotrigine<sup>12</sup>. In the latter case, musical hallucinations become controlled by switching lamotrigine to valproate. This solution is not always available. Switching from clozapine is not an option for patients resistant to other antipsychotics, who have clozapine-induced obsessive symptoms. As an alternative, the evidence supporting therapeutic care is unfortunately also scarce<sup>13</sup>. This paper reports a case study of clozapine-triggered musical obsessions in a schizophrenia patient. The anxiety caused by these obsessions was considerably reduced with a novel cognitive behavioural therapy (CBT) tool introduced here while continuing the clozapine treatment.</p>

## CASE PRESENTATION

The person, Mrs. B, is a 36-year old Caucasian female diagnosed with paranoid schizophrenia. She has a college degree and no family history of mental or neurological disorders, but suffers from slight bilateral hypacusis and lopsided tinnitus. Before the onset of her condition, she was pursuing a doctorate degree and working as a researcher. In November 2004, at the age of 27, she was treated first time for a psychotic episode with delusions and various psychosomatic symptoms, apparently triggered by a trauma. She was admitted to a hospital and was first treated with risperidone with increasing dosage up to 4 mg without any improvement of her condition and with the introduction of extrapyramidal adverse effects. Switching to olanzapine at 10 mg resolved her delusional fears over night without apparent side effects. She was also treated with 20 mg fluoxetine to control depression and anxiety. She was released after five weeks in December 2004.

Four months after her release from the unit, B discontinued olanzapine as it interfered with her everyday life and the desire to continue working. Since February 2004, she was taking fluoxetine antidepressant, which was later switched to fluvoxamine 50 mg due to side effects. After two months and doubling of the dose of fluvoxamine it was deemed effective for controlling neither anxiety nor depression and was replaced by escitalopram 10 mg. However, B also discontinued this medication after 6 weeks due to perceived lack of efficacy.

In December 2005, B again experienced somatic symptoms and increased level of anxiety. She was again prescribed olanzapine from 5 mg up to 10 mg, but this time without efficacy for her symptoms. In the following month, she continued to experience dizziness, tachycardia, and other somatic symptoms. After the onset of paranoid thoughts and insomnia, she was admitted to the psychiatric ward in January 2006 and remained in care until mid April 2006. She was examined for an early psychosis, with a consideration for a schizo-affective disorder, although the eventual diagnosis was paranoid schizophrenia. After several unsuccessful trials with different antipsychotics (risperidone, olanzapine, aripiprazole, quetiapine, perphenazine), her psychotic and affective symptoms were successfully controlled in early April 2006 with clozapine only 75 mg per day. By this time B had been examined a full head MRI scan following the first psychosis, and an EEG examination after the second, but these examinations did not suggest any functional or structural abnormality.

During the time of the second episode of hospital care, involving experiments with different drug treatments, she noticed that she was often singing aloud and felt a strong craving for music. She was the most disturbed by the repetition of musical fragments inside her head. Mrs. B was accustomed to INMI experiences, but perceived her apparently drug-induced condition as obsessive and intrusive. Although she does not recall being much bothered with music after being going out of hospital in 2006, she believes the disruptive musical thoughts surfaced again in spring 2007. She recalls an episode from May in which music experiences were obsessive. She joined a choir in late 2007, which she thought improved her moods but further exaggerated musical symptoms. The symptoms neither varied in response to small (25mg) changes in clozapine dosage nor along her hormonal cycle. She believed that increased work-related stress did exaggerate the symptoms.

## TREATMENT

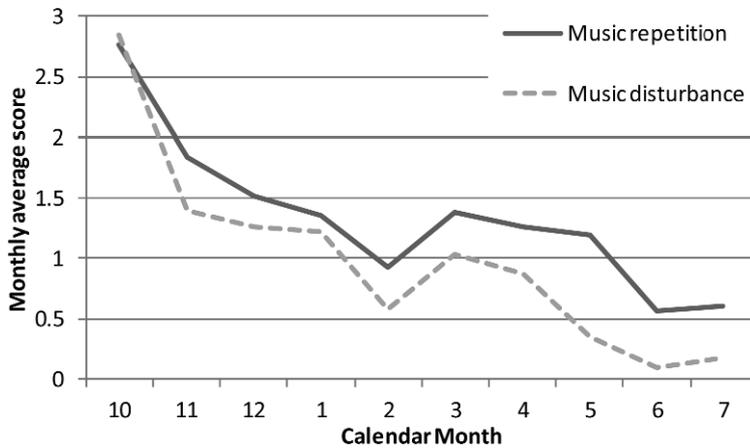
Having suffered from musical obsessions for over three years, B contacted the author A in 2009. She agreed to participate in a trial with a novel CBT inspired instrument Music and Moods Inventory (MMI) and document her musical symptoms daily<sup>14</sup>. This longitudinal study concentrated on her daily moods and involuntary music experiences. An adaptation of an instrument illustrated in Figure 1 was developed for the general population<sup>2</sup> was used, now focused on the disruptiveness and repetitiveness of music in everyday life. Emotional state was reported with a modified 10-item The Positive And Negative Affect Schedule (PANAS) scale<sup>15</sup>. B used a printed survey to make numerical estimates of her feelings and experiences with the help of scoring guidelines provided by A. Clozapine and regular outpatient visits continued during the trial as usual and the communications between A and B happened solely via email approximately once a month.

#	Date	time	T/P/O 0-5			PANAS 1-5											Music experiences		
			Day orientation	Concentration	Daily medication	Anxious	Serious	Normal	Delighted	Upset	Happy	Excited	Interested	Fearful	Attentive	Awful	Repetitiveness (0-5)	Disturbance(0-5)	Storable songs
1					75 Lep														
2					75 Lep														
3					75 Lep														
4					75 Lep														
5					75 Lep														

**Figure 1.** A sample of MMI form as it was printed and provided for Mrs. B for self reporting.

**OUTCOME AND FOLLOW-UP**

Patient B kept the diary for 278 consecutive days, approximately nine months. During this time, the frequency and disturbance of her symptoms decreased, as measured by the instrument (see Fig. 2). The positive outcomes of the trial were confirmed by B's outpatient care psychiatrist. The content of her musical obsessions reflected her choir repertoire, for instance including numerous Abba songs. She discontinued the reporting at a time when the music repetition and disturbance scores had reached a floor level and she found the documenting meaningless. The analysis of MMI scores found that B largely equated the disturbance of involuntary music by its frequency of repetition over the day. Across the 278 data points, the two scores were linearly correlated ( $r=.818$ ). There was no correlation between negative and positive mood scores or between them and music repetition or disturbance.



**Figure 2.** Line chart showing major trends in the daily states reported by Mrs. B. Xaxis shows the calendar month since the reporting started in October 2009. Values on Y-axis represent monthly averages and are not comparable across the plotted variables.

In a three year follow-up after the therapy, she continues on clozapine, but has remained less anxious and less disturbed by the musical symptoms.

**DISCUSSION**

This paper has described a woman with drug-resistant “musical obsessions” comorbid with schizophrenia. Her musical symptoms increased after otherwise successful clozapine treatment began. However, because her psychotic and affective symptoms responded well to clozapine but were resistant to several other antipsychotics and antidepressants benefits of clozapine were considered to outweigh the increase in musical obsessions. Therefore, instead of discontinuing clozapine a CBT tool was tested here for the treatment of musical

obsessions.

The improvement of the patient seemed to occur through increased introspective insights to her condition. Having means to quantify the extent of her symptoms reduced the worries that the symptoms were uncontrollable and not understandable, and seemed to empower the patient. This is in line with an earlier case study of applying therapy to musical obsessions<sup>13</sup>.

The type of CBT treatment tried here placed considerable requirements for the compliance of the patient. Mrs. B was very motivated, persistent, and co-operative in the face of minimal contact hours with the therapist. This was deemed very important for the success of the trial. Experiences with this patient suggest that cognitive therapy can be an effective treatment for certain conditions of involuntary. Based on the current insights, it is valuable to consider therapy treatment in occasions where involuntary music experience is a comorbid symptom.

What does the case of Mrs. B reveal about the nature of involuntary music? It is consistent with the idea that involuntary music involves a continuum of phenomena from casual involuntary musical imagery to more troublesome and debilitating musical obsessions and hallucinations<sup>16</sup>. This means that only a slight, gradual change in the pervasiveness of the involuntary music might be required to turn the normally manageable condition into a debilitating one.

Currently, we do not know enough of the neural underpinnings of regular INMI to pinpoint any cortical area, connection, or neurotransmitter system as a cause of this shift. This is also a remaining challenge for diagnosis, as no clear-cut criteria exist for distinguishing different types of music conditions from each other. Especially the discussion about the existence of musical pseudohallucinations<sup>16, 17</sup> should take into consideration the recent findings of involuntary music outside the clinical sphere<sup>2, 18</sup>. Taking new knowledge from psychology to bear on psychiatric can be useful in the long term.

For future research, it would be beneficial to use MMI to other cases of musical obsession to assess its validity. Given the rare morbidity of musical obsessions, discovering and helping these patients will require international collaboration. Although some norms about the frequency and characteristics INMI exists<sup>2</sup> additional research to standardizing these measures is needed. If objective measures to quantify the characteristics of involuntary music were found, then we could considerably improve the diagnosis and care of this condition.

#### Disclosure of Interest

The study and reporting by Author A were supported by a research grant (#129477) from the Academy of Finland. Authors state no other conflicts of interests.

### LEARNING POINTS

- Involuntary music is a wide ranging phenomenon with few extreme cases
- Musical obsessions are debilitating but a rare and poorly understood condition
- Musical obsessions can be drug-resistant or even drug-induced
- This case shows promise for treating drug-resistant music with cognitive therapy

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