in both reading and spontaneous speech samples at follow-up than at original baseline conditions.

We are encouraged to explore further the use of calcium channel blocking agents in stuttering. The present study used a fixed dosage schedule (80 mg 3 times daily). As this was well tolerated with virtually no side effects, larger doses are worth exploring. We also plan to investigate other drugs of this class. The use of calcium channel blockers may prove to be a useful component of a broad program of speech retraining for severe adult stutters (Burns and Brady 1980).

References

Auditory Hallucinations in Schizophrenia: Does Humming Help?

Michael Foster Green and Marcel Kinsbourne

Introduction
A simple and effective behavioral method to control auditory hallucinations has so far eluded researchers. Such a method would be useful because neuroleptics are sometimes ineffective for controlling auditory hallucinations and often result in troublesome side effects. Falloon and Talbot (1981) reported coping strategies (including working, lying down, walking) employed by 40 schizophrenic patients to control persistent hallucinations. However, no particular method seemed to be especially effective.

Bick and Kinsbourne (1987) tested the view that auditory hallucinations result from disinhibited subvocal activity. They used an experimental procedure (holding the mouth wide open which presumably interferes with subvocalization) and control conditions. Following each condition, the subjects reported whether the manipulation increased, decreased, or did not change their hallucinations. There were fewer halluci-
nations when schizophrenics held their mouths open, but not when they closed their eyes tightly or made a fist. Consistent with this finding, Erikson and Gustafson (1968) suggested (based on two case studies) that humming or gargling can help patients control voices.

The goal of the present study was to systemically and quantitatively investigate the effects of several behavioral conditions on hallucinations. This preliminary report is part of a larger project on the role of subvocal processes in auditory hallucinations.

Methods

Subjects for this study (n = 17) were state hospital inpatients who experienced frequent auditory hallucinations. All subjects met DSM-III criteria for schizophrenia based on an expanded version of the Present State Exam. Average neuroleptic medication (in chlorpromazine equivalents) was 1208 (SD 831), and length of present episode (in months) was 17.4 (15.3). Interviewers were trained to reliability by the Clinical Research Center for the Study of Schizophrenia at UCLA. No patient had mental retardation, a neurological disorder, or was over 55 years of age.

Five experimental conditions were selected based on predictions about their effects on subvocalizations: opening the mouth, biting the tip of the tongue, softly humming a single note, raising the eyebrows, and making a fist. The first three conditions were predicted to reduce hallucinations by interfering with subvocalization. The last two were control conditions.

Testing was conducted in a sound-proof room. Electromyogram (EMG) electrodes were attached to the oral and laryngeal regions (to index subvocal activity), and subjects were instructed to depress a response button for as long as they heard voices. The duration of the button press was recorded by a polygraph in an adjacent room.

Conditions lasted for 90 sec and were counterbalanced across subjects. Baseline levels were recorded after instructing the subject to relax. The only dependent variable for the current report was the length of time the subject pressed the button.

Results

A repeated measures Analysis of Variance on the scores for baseline and the five experimental conditions revealed a strong effect for the type of condition (F = 5.59, p < 0.0002). Each experimental condition was then contrasted with baseline. Humming was the only condition to significantly reduce the self-report of hallucinations (p = 0.002). A nonparametric procedure (Wilcoxon sign-rank) yielded similar results (p < 0.003). This effect was not simply due to outliers: 15 of the 17 subjects showed a reduction with humming. Table 1 shows the mean score (in seconds) for each condition.

Discussion

The data show that humming reduced the amount of time that subjects reported hallucinations. Although the mechanism is unknown, there are several possible explanations.

Humming might provide an auditory distraction that interferes with hallucinations. However, the subjects were instructed to hum a single note as quietly as possible, so auditory interference was relatively small. Also, several of our patients reported that auditory stimuli seem to increase their hallucinations (e.g., listening to the radio). In fact, Alpert (1985) found that patients reported more hallucinations at moderate levels of white noise.

Perhaps humming required more effort than the other conditions. However, subjects mentioned that it was difficult for them to raise their eyebrows and hold their mouth open for the required time intervals. They did not complain about the humming condition.

In terms of the subvocalization theory, humming might have successfully overridden the subvocal speech (by engaging its output mechanism) and hence reduced hallucinations. However, we did not confirm Bick and Kinsbourne's (1987) finding that opening the mouth reduced hallucinations. Unlike the Bick and Kinsbourne
study, subjects in the present study had EMG electrodes attached to their mouth that might have precluded the subjects from opening their mouths wide enough to suppress subvocalization.

With respect to the view that auditory hallucinations result from verbal activity in the non-dominant hemisphere (P. Green et al. 1979; Birchwood, 1987), could humming have interfered with the generation of hallucinations? Humming a melody is considered a right hemisphere task, but our subjects simply hummed a single note, which was probably mediated by the left hemisphere (Gordon and Bogen 1974).

Though Falloon and Talbot (1981) did not list humming as a spontaneously used coping strategy, we found that it reduced reported hallucinations in our subjects. The present study demonstrates the value of using behavioral techniques (with a hypothesis-driven approach) to control auditory hallucinations.

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Table 1. Mean Time Spent Hallucinating

<table>
<thead>
<tr>
<th></th>
<th>Baseline open (sec)</th>
<th>Bite tongue single note (sec)</th>
<th>Hum a fist (sec)</th>
<th>Clench eyebrows (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>33.35</td>
<td>28.21</td>
<td>17.97</td>
<td>36.81</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>29.28</td>
<td>27.14</td>
<td>26.46</td>
<td>30.97</td>
</tr>
</tbody>
</table>

References


