

INFRASONIC—SUMMARY OF RESULTS

31 May 2003
Purcell Room, London

This paper outlines the results of a highly unusual experiment that was staged during two contemporary music concerts. Although the concerts consisted of audible sound, two pieces in each event were laced with infrasound—extreme bass sound, below 20Hz in frequency. Infrasound is of considerable interest to psychologists, acousticians and musical scholars as it is used in sacred organ music and has been implicated in the strange feelings experienced at ostensibly haunted sites (Tandy and Lawrence, 1998).

Our experiment took place at the Purcell Room, London. It was based around a concert for live piano and electronics. Some of the music in the concert was laced with infrasound, produced by an infrasound generator, designed and built for the experiment. The infrasound had a fundamental frequency of 17Hz.

Procedure

Questionnaires were handed out to the audience at the beginning of the concert. These were designed to collect demographic data (e.g. information on age and gender) and background information on individuals' musical experience, music qualifications and paranormal belief.

Before each concert, audience members were asked to indicate their present emotion on four scales (*Happy–Sad*, *Aroused–Sleepy*, *Excited–Bored*, *Angry–Calm*). At four points in the concert, labelled A, B, C and D, they were asked to assess their emotional response to the piece they had just heard, using these four scales. In addition, they were asked to report any unusual experiences, rate their intensity and state whether they thought the infrasound was present or absent during the piece.

In each concert, infrasound was present during two of the four pieces under test. In Concert 1 (3pm) it was present in pieces B & D. It was counterbalanced in Concert 2 (5pm), appearing in pieces A & C. A different audience was present at each concert.

Results

Demographic Data

In total, around 700 people attended these concerts. Of these, 522 people completed a questionnaire and left it in the auditorium, enabling us to count their responses in our analysis. We were able to collect 278 questionnaires in Concert 1 and 244 in Concert 2.

The 522 respondents consisted of 298 males and 224 females. Their ages ranged from under 15 to over 40. Here's a summary of their demographic details:

Demographic details of audience members

	Concert 1	Concert 2
Number	278	244
Age ranges (#)	<i>Under 15 (8)</i>	<i>Under 15 (5)</i>
	<i>16-20 (14)</i>	<i>16-20 (8)</i>
	<i>21-30 (100)</i>	<i>21-30 (56)</i>
	<i>31-40 (69)</i>	<i>31-40 (102)</i>
	<i>over 40 (87)</i>	<i>Over 40 (73)</i>
Gender	117 F	107 F
	161 M	137 M

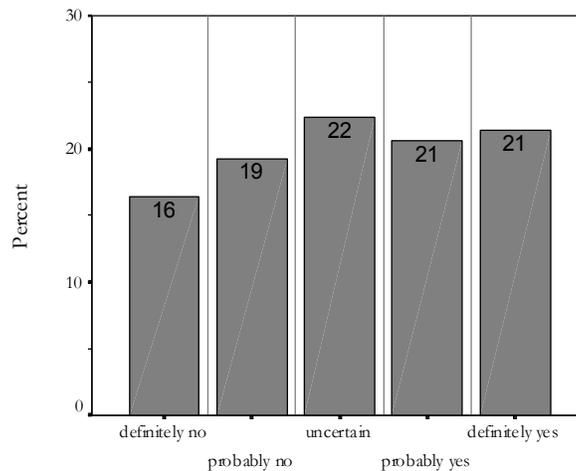
Musical background

72% of all audience members considered themselves musical although only 21% had a music qualification above Grade 1.

Paranormal belief

The graph below shows the spread of answers to the question ‘Do you believe in the existence of paranormal phenomena? *i.e. phenomena that appear to be beyond normal explanation, such as telepathy or fortune telling?*’. This reveals 42% of the sample population probably or definitely believe in the paranormal, whilst 22% are uncertain. This concurs with a recent poll which puts the figure at over 50% (Daily Mail, Feb. 2, 1998).

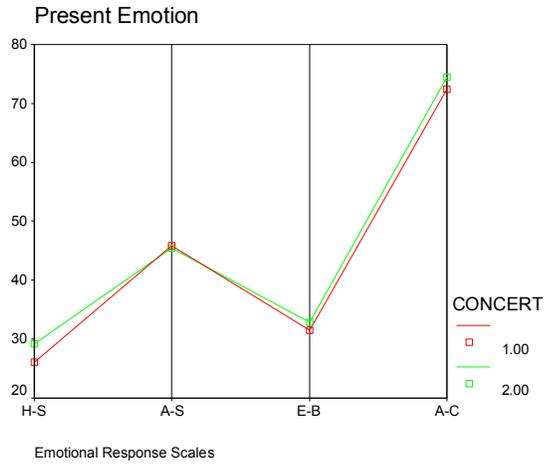
Do you believe in the existence of paranormal phenomena?



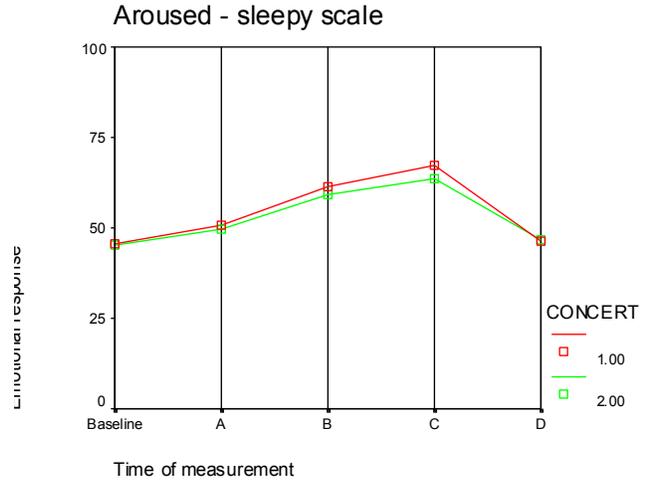
Emotional response

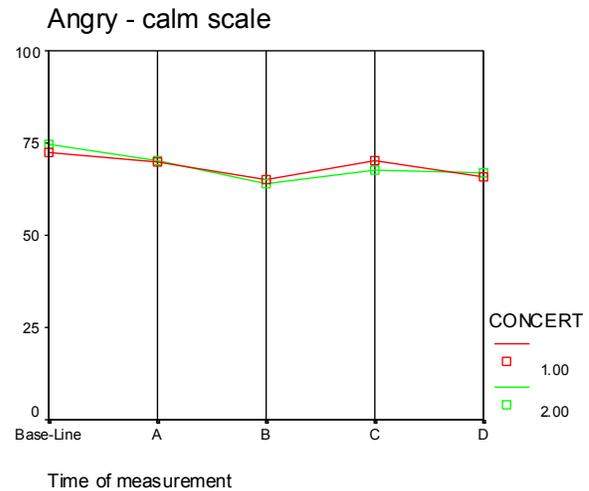
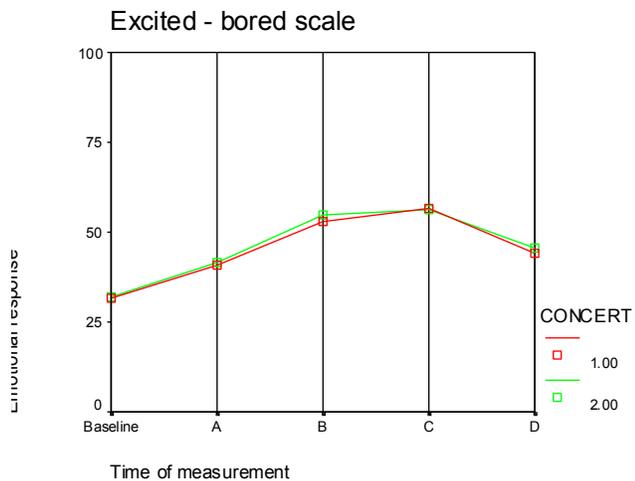
This graph below shows the audience’s emotion prior to the start of the concert, using each of the four emotion scales *Happy-Sad*: H-S; *Aroused-Sleepy* A-S; *Excited-Bored* E-B and *Angry-Calm* A-C. The red line shows the emotions during Concert 1. The green lines show the emotions during Concert 2.

Generally speaking, audience members were *happy* (mean of 26 and 29 respectively), *slightly aroused* (46 & 45), *excited* (31 & 33), and *calm* (72 & 74), during the concerts. There is no significant difference between the audiences’ emotional states in the two concerts. This counters the explanation that any variation in response to the pieces could be due to a difference between the audiences.



The four graphs below indicate the baseline (i.e. present emotion) for each emotion scale and the mean response following each piece (A, B, C and D). Although there are expected differences between the pieces (e.g. between piece C and D on the *aroused-sleepy* scale) and increases or decreases compared to the baseline, there are no significant differences between the two concerts. This suggests there is no change in emotional response due to the presence of infrasound.





Unusual experiences

Many unusual experiences were reported during the concerts, ranging from the emotional (e.g. 'sense of sorrow', 'brief moment of anxiety', 'excited') to the physiological (e.g. 'increased heart-rate', 'headache', 'tingling in neck and shoulders', 'nausea', 'sense of coldness'). The majority of reported experiences were physiological.

The number of experiences after each piece varied: the total number of experiences reported after Piece A was 376; Piece B: 488; Piece C: 498 and Piece D: 234. The percentage of the audience (total from both concerts) who reported these experiences varied from 34% after Piece D up to 62% after Piece C. 56% and 61% of people reported experiences after Piece A and B respectively.

Where infrasound was used

Concert 1	Concert 2
<p>PIECE B <i>She goes back under water</i> (electronics) Sarah Angliss</p>	<p>PIECE A <i>Lo but Hi</i> (piano and electronics) Hayden Parsey</p>
<p>PIECE D <i>Techno Etude No 3</i> (solo piano) Karen Tanaka</p>	<p>PIECE C <i>Toccare</i> (piano and electronics) Ton Bruynel</p>

Piece A

In Concert 1, 19% of people that thought it was present in piece A (infrasound absent) compared to 31% in Concert 2 (infrasound present). 51% of people in Concert 1 reported one or more unusual experiences after listening to piece A (infrasound absent), compared to 60% in Concert 2 (infrasound present).

Piece B

In Concert 1, 37% of people that thought it was present in piece B (infrasound present) compared to 32% in Concert 2 (infrasound absent). 60% of people in Concert 1 reported one or more unusual experiences after listening to piece B (infrasound present), compared to 62% in Concert 2 (infrasound absent).

Piece C

In Concert 1, 32% of people that thought it was present in piece C (infrasound absent) compared to 39% in Concert 2 (infrasound present). 60% of people in Concert 1 reported one or more unusual experiences after listening to piece C (infrasound absent), compared to 65% in Concert 2 (infrasound present).

Piece D

In Concert 1, 27% of people that thought it was present in piece D (infrasound present) compared to 9% in Concert 2 (infrasound absent). 39% of people in Concert 1 reported one or more unusual experiences after listening to piece D (infrasound present), compared to just 28% in Concert 2 (infrasound absent).

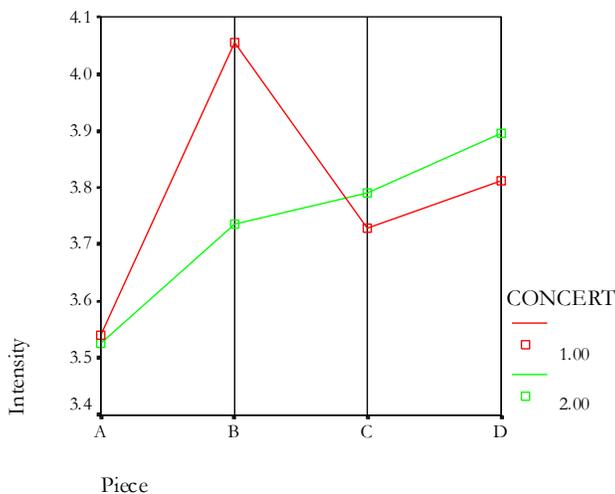
Comparing the pieces

With the exception of Piece B, there is a significant correlation (at the 0.05 level) between number of experiences reported and the presence of infrasound. This can be interpreted in several ways:

In pieces A & D, for example (where the biggest difference in the percentage detecting infrasound occurred), it is possible that people were conscious of the infrasound and this caused them to think that they were having an unusual experience (i.e. via some form of suggestion). Alternatively, they may have genuinely experienced something unusual and then attributed this to the presence of the infrasound. One method of testing this is to conduct a partial (first-order) correlation, using the same variables, whilst controlling for the audience members' recorded detection of infrasound. The results from this particular analysis show a significant correlation (for Pieces A & D), meaning infrasound actually evoked a response. This is supported, given the reported intensity of the audience's experiences.

Intensity of experience

The graph below shows the mean intensity (on a 7-point likert scale, where 1=*mild intensity* and 7=*extreme intensity*) for the primary unusual experience reported after each of the four pieces. Despite there being a steady increase in average intensity for the audience in Concert 2, the interesting values are the mean intensity ratings for audience members in Piece B (it is significantly different than Concert 1) and Piece D. These intensity ratings increase at the appropriate point in the concert, i.e. the mean intensity is higher when infrasound is present (B&D).



Credits

This project was funded conducted by a multi-disciplinary team, headed by engineer and composer Sarah Angliss. Team members included psychologists Ciarán O’Keeffe (Liverpool Hope University) and Professor Richard Wiseman; acoustic consultants Dr Richard Lord and Dan Simmons (the National Physical Laboratory), pianist GÉNIA and film artist Ravi Deepres. Professor Richard Wiseman; acoustic consultants Dr Richard Lord and Dan Simmons (the National Physical Laboratory), pianist GÉNIA and film artist Ravi Deepres. This report was compiled by Ciarán O’Keeffe, on behalf of the Soundless Music team. Copyright the Soundless Music (Infrasonic) project.

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Bibliography

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