The Influence of Social Situations on Music Listening

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The aim of this study was to investigate whether listening to music in a group setting influenced the emotion felt by the listeners. We hypothesized that individuals hearing music in a group would experience more intense emotions than the same individuals hearing the same music on their own. The emotional reactions to 10 musical excerpts (previously shown to contain chill-inducing psychoacoustic parameters) were measured in a within-subjects design. We found, contrary to our hypothesis, that the participants (all musicians) did not experience more chills when listening to music in a group than when listening alone. These findings may be explained by a lesser degree of concentration on the music in the group condition.

Key words: **music; emotion; chills; social influence; group listening**

Introduction

Studies have shown that music can arouse strong pleasurable emotional responses, such as ecstatic "chill" experiences.[1,2] These reactions are often accompanied by measurable physiological reactions, such as changes in the level of skin conductance response (SCR), and in heart and breathing rate.[3] Such experiences also are fairly common; 50–90% of people surveyed by Goldstein[4] experienced strong bodily reactions to music (e.g., goose bumps, increased heart rate, or a lump in the throat). The chill (goose bumps) response is of particularly interest, as it reliably occurs in approximately 15% of people and is also independent of musical genre.[5]

People are motivated to listen to music by their own emotional experience—the felt rather than perceived emotion.[6] One of the most pleasurable strong musical experiences is the experience of a chill.[7] Sloboda[1] concentrated his research on this phenomenon, using questionnaires to collect reports of participants' strongest emotional reactions to music over the past 5 years. The questionnaire included items inquiring about physiological reactions (such as chills, tears, and laughter) and examined the relationship between the occurrence of such experiences and musical parameters. His analyses showed that there do seem to be musical events related to these experiences; for example, chills appear to coincide with new and/or unprepared harmonies as well as with sudden dynamic or textural

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changes. Yet if those pleasurable chills experienced when listening to music are only a physiological reaction to certain abrupt changes in the acoustic stimulus, then everyone should experience chills at the same moments: when the musical events necessary to stimulate chills occur. However, this is not the case—music preference is highly individual.[8] Thus, there must be factors that influence an individual's ability to experience chills when listening to music.

A growing body of evidence indicates that people have an inclination for behavioral mimicry; such shared activity increases feelings of affiliation.[9] This result is in line with studies of emotional contagion, such as one by Provine and Fischer,[10] who showed that people tended to laugh more with others than when alone. Yet to our knowledge, the question of whether emotional contagion is present when people listen to music together has not been investigated. This question is particularly relevant as it has been hypothesized that the adaptive value of music lies in its promotion of group cohesion.[11] We hypothesized that people who were used to experiencing music in a group would be likely to experience more chills when listening to music in a social setting than when alone. In particular, we were interested in the influence of the group setting on the experience of chills, as they are often accompanied by measurable physiological changes.

Material and Methods

Participants

Fourteen amateur musicians (mean age 29; mean years of musical training 16.6) who played together in the same orchestra participated in this experiment. Participants were matched for gender (seven males and seven females), and all except two were right-handed.

Procedure

Participants came for two testing sessions: once alone, and once in a group. The order of these testing sessions was counterbalanced. During the group listening, participants were seated in a circle in comfortable armchairs. The alone condition was the same, except that participants were seated alone. The music was presented using a Sony STR-DB 795 receiver (Sony Deutschland GmbH, Berlin, Germany) through a Teufel multi-channel loudspeaker system (Lautsprecher Teufel GmbH, Berlin, Germany).

Participants also appeared to exhibit above-average cooperative traits, as assessed by the Cooperation subsection of the Temperament and Character Inventory (TCI).[12,13]

Measurements

The participants' emotional reactions to the excerpts were measured both psychologically

Table 1. Musical Stimuli

Presentation No.	Composer	Excerpt	Style
1.	Bedřich Smetana	"The Moldau"	Classical music
2.	Ludwig van Beethoven	Piano Concerto No. 5, Op. 73 (3. movement)	Classical music
3.	Jean Sibelius	"Finlandia", Op. 26	Classical music
4.	Alan Silvestri	"Forrest Gump Suite"	Film music
5.	Wolfgang A. Mozart	Requiem d-minor, K. 626: "Lacrimosa"	Classical music
6.	Felix Mendelssohn	"Hebrides Overture", Op. 26	Classical music
7.	Edward Elgar	"Nimrod" from the "Enigma Variations", Op. 36	Classical music
8.	Klaus Badelt	"The Medallion Calls"	Film music
9.	Richard Wagner	"Lohengrin" Overture	Classical music
10.	Rolf Lovland	"Serenade to Spring"	New Age

(questionnaires) and physiologically (SCR). The questionnaires were administered between the excerpts and were designed to evaluate the feelings via self-report (including chills and other physiological reactions to the music) of the participant. For each excerpt, participants were asked to rate how intensely they experienced 11 possible emotional adjectives (on a 7-point scale). SCR was measured from electrodes on the middle segments of the index and middle fingers of the nonactive hand by means of a 16-channel measuring device developed at our institute. The data were recorded at a 67-Hz sample rate using DT Measure Foundry soft- and hardware from data translation. Additionally, we asked participants to press a button they held in their hand (masked by a blanket) when they experienced a chill. This signal went through the Group Online Response Digital Interface (GORDI)[14] to a computer which recorded the button presses via MIDI in the software Cubase.

Stimuli

The participants listened to ten preselected musical excerpts (Table 1), shown in pilot tests to reliably evoke strong emotional responses. Participants' familiarity with the excerpts ranged from 2.04 to 6.36 with a mean of 3.85 (as measured on the 7-point scale, where 1 stood for "never heard this before" and 7 for "extremely familiar with this excerpt").

Results

This paper will only address the results from the questionnaires and the self-reported chills. The physiological data will be addressed in an upcoming paper by Egermann *et al.* (manuscript submitted for publication). Contrary to our hypothesis, we found that people do not tend to experience more chills when in a group than alone. There were 152 chills experienced over all 10 excerpts in the alone condition, and only 106 in the group condition (Fig. 1A). However, a paired-samples *t*-test showed that this difference was not significant ($P = 0.3$, ns).

There was also no significant difference between the self-report ratings of felt emotion for any of the 11 adjectives listed in the questionnaire (Wilcoxon test with a Bonferroni correction for 11 ratings, $P \leq 0.0045$).

A Mann–Whitney U-test showed that there was a difference between the emotional responses (such as body movement, $P = 0.007$; shivers, $P = 0.01$; contempt, $P = 0.04$; restless, $P = 0.04$; amusing, $P < 0.001$) reported by males and females. However, this difference did not occur in the number of chills reported (Mann–Whitney U-test, $P = 0.88$, ns).

Conclusions

The results of our study suggest that people do not experience emotions more strongly when they listen to music in a group setting. Also, while there was a gender difference in many of the psychological variables describing the emotion felt in response to the musical excerpts, there was no difference with regard to the number of chills experienced. These results could be due to a lack of concentration: people may not be as attentive to the music when they are in a group, especially when it is a group of friends.[15] This hypothesis is supported by the tendency for participants with a higher score on the social/cooperative section of the TCI to have fewer chills than people who scored lower. Unfortunately, we were not able to test this hypothesis using our data because only two of the participants obtained scores under 30 (out of 40).

These findings suggest that musical emotions are not always subject to emotional contagion, especially in unfamiliar situations. However, this study was limited by a small sample size. Also, it could be that the seating arrangement in the group condition (a circle) was distracting or uncomfortable to the participants, who

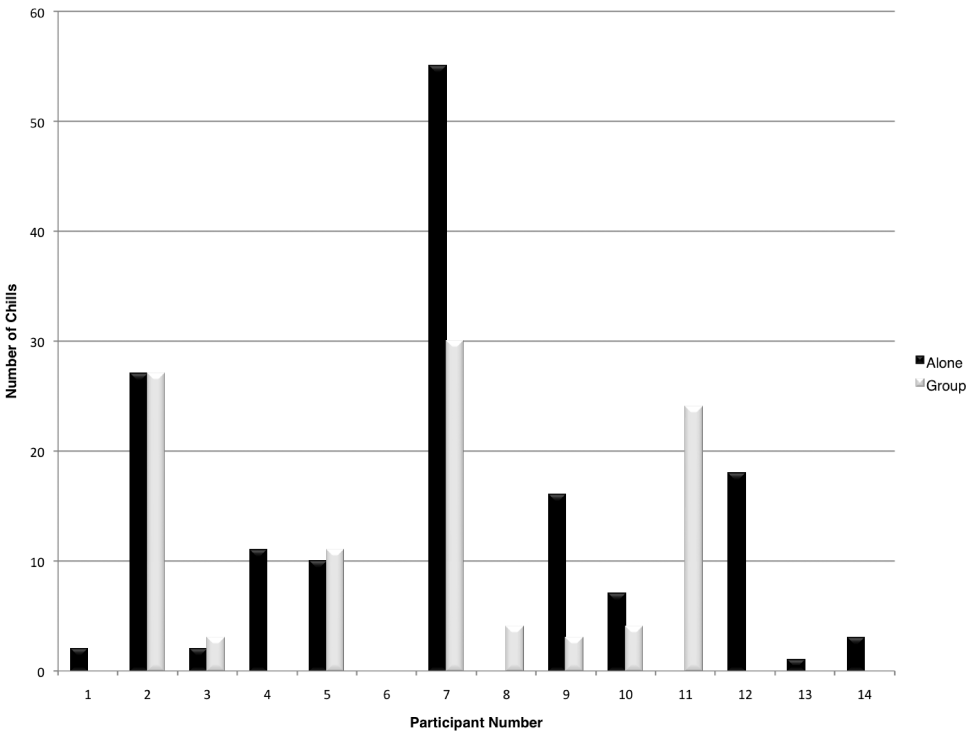

Figure 1. Number of chills experienced by each participant in both the group and alone conditions.

would be used to interacting with each other in an orchestra set-up. We felt that a circle was the best way to encourage social influence, as it allowed each participant to see the others as well as ensuring that each participant had the same social experience (i.e., was seated next to two peers). It would be interesting to see whether the arrangement of the group setting and a modification of the instructions (e.g., encouraging talking and interaction) would make it more likely for participants to experience emotional contagion when listening to music. Further studies would have to be conducted to determine whether other groups (e.g., strangers or a sports team) would show the same lack of difference in a group versus alone in showing strong emotional responses to music.

Conflicts of Interest

The authors declare no conflicts of interest.

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