THE EMOTIONALITY OF MUSIC: DEATH METAL TO AMAZING GRACE

Elysia Iversen[1], and Jane F. MacNeil[2]
[1]University of Calgary at Red Deer College, Red Deer., AB, Canada, T4N 5H5, elysia_iversen@hotmail.com
[2] Dept. of Psychology; University of Calgary, Red Deer College, Red Deer., AB, Canada, T4N 5H5, jane.macneil@rdc.ab.ca

1. INTRODUCTION

Music is a multidimensional medium that influences one's physical, psychological, and emotional levels of consciousness. It is commonly acknowledged that music can express and arouse emotions (see Juslin & Sloboda, 2001, for a recent review). Given the ubiquitousness of music in the Western world, be it through radio, recordings, television or recorded background music played in public places it is important to gain more understanding regarding the effects of music on our behavior and cognitive processing. Though it has been shown that music can affect an individual, the emotional and psychophysiological mechanisms that account for these effects are not well established (e.g., Juslin & Zentner, 2002).

The research so far has been relatively unsystematic and much of it has been inconclusive, in part because music is processed in different ways. The purpose of this study was to evaluate the effects of preferred versus nonpreferred background sound conditions on the cognitive and emotional responses of healthy young adults. In addition the effect of duration was also considered as a contributing factor.

2. METHOD

2.1 Participants

A sample of 171 female (74.35%) and 59 male (26.65%) college students (N = 230) enrolled in introductory psychology courses participated in this study with a total of 95 (25 males and 70 females) in phase one and 135 (34 males and 101 females) in phase two. Table 1 shows the age ranges of participants.

Table 1. Age ranges of participants.

Total	Phase 1	Phase 2	Total
Under 21	57 (60.00%)	99 (73.33%)	156 (67.83%)
21-25	22 (23.16%)	21 (15.56%)	43 (18.70%)
25-30	8 (8.42%)	8 (5.93%)	16 (6.96%)
30-40	5 (5.26%)	5 (3.70%)	10 (4.35%)
Over 40	3 (3.16%)	2 (1.48%)	5 (2.17%)

2.2 Instruments

Cognitive and Emotional Performance Tests (CEPT) consisted of both traditional general knowledge questions and questions assessing emotional responses and was compiled from online IQ tests. Version one of the CEPT was composed of 15 multiple choice questions consisting of ten traditional questions, and five emotional questions. Version two of the CEPT was comprised of 30 multiple choice questions, with 20 traditional questions and ten emotional questions. Three different editions (A,B and C) were created for each version of the CEPT that contained the same proportion of questions.

2.3 Procedure

In phase one, participants completed Version 1 A through C of the CEPT under three different background sound conditions, which were randomly selected. Music selections were determined based upon answers to an Individualized Music Preference Questionnaire. Appealing and irritating selections of music were determined by the most frequently identified genre. Participants completed test A in the silent control condition, test B in an appealing sound condition (rock music), and test C in an irritating sound condition (heavy metal). The appealing sound condition consisted of 5 minutes of rock music (e.g., "Hard to Handle" by the Black Crowes) and the irritating sound condition consisted of 5 minutes of heavy metal music (e.g., "Bound to Violence" by Hatebreed). A randomized visual pattern was projected onto a screen located at the front of the room for all three sound conditions. Music was played through the internal audio systems built into the lecture halls. There would have been some variance in the sound levels from the front of the room compared to the back, but independent listeners reported very little difference in sound level quality or experience.

To determine if the duration of the music was an important factor, in phase two the musical background was 10 minutes in duration and sound levels were comparable to those in phase 1. In phase two participants completed the three editions of Version 2 of the CEPT. The presentation of the three background sound conditions was randomly presented. The appealing sound condition consisted of 10 minutes of rock music and the irritating sound condition consisted of 10 minutes of heavy metal music. As in phase one, a randomized visual pattern was projected on a screen that was located at the front of the room.

3. RESULTS

A repeated measures ANOVA was completed on percentage correct scores for all responses The mean percentage correct scores for the three background sound conditions were compared using paired t-tests with a

Bonferroni correction. Only comparisons significant at the .0167 level will be considered for discussion.. For the traditional question test scores over a 5 minute duration the effect of condition was significant F(2,188)=3.609, p=.029. No significant difference was found between the mean test percentage score during the quiet condition (M=67.37, SD=22.084) and the appealing condition (M=72.95, SD=15.837), t(94)=-2.229, p=0.028). There was also no significant difference between the quiet condition and the irritating condition (M=67.47, SD=17.683), t(94)=-0.042, p=0.966). A significant difference was found between the appealing and irritating condition (t(94)=2.588, p=0.011).

For the traditional question test scores over a 10 minute duration the assumption of sphericity was violated (p=.004), therefore the Greenhouse-Geisser correction was used. The effect of condition was found to be significant F(1.852,248.226)=7.527, p=.001. No significant difference was found between the mean test percentage score during the quiet condition (M=71.07, SD=11.676) and the appealing condition (M=70.15, SD=13.396), t(134)=0.951, p=0.343). There was a significant difference found between the quiet condition and the irritating condition (M=74.33, SD=12.781), t(134)=-2.823, p=0.005). A significant difference was also found between the appealing and irritating condition (t(134)=-3.340, p=0.001).

For the emotional question test scores over a 5 minute duration the assumption of sphericity was violated (p=.016), therefore the Greenhouse-Geisser correction was used. The effect of condition was found to be significant F(1.843,173.245)=70.301, p=.000. A significant difference was found between the mean test percentage score during the quiet condition (M=23.541, SD=24.143) and the appealing condition (M=56.459, SD=19.708), t(94)=-11.652, p=0.000). There was also a significant difference found between the quiet condition and the irritating condition (M=51.053, SD=25.439), t(94)=-8.143, p=0.000). No significant difference was found between the appealing and irritating condition (t(94)=2.015, p=0.047).

For the emotional question test scores over a 10 minute duration the assumption of sphericity was violated (p=.000), therefore the Greenhouse-Geisser correction was used. The effect of condition was found to be significant F(1.791,240.039)=58.616, p=.000. A significant difference was found between the mean test percentage score during the quiet condition (M=34.9630, SD=23.79998) and the appealing condition (M=55.615, SD=24.836), t(134)=-11.096, p=0.000). There was also a significant difference found between the quiet condition and the irritating condition (M=55.467, SD=26.320), t(134)=-8.168, p=0.000). No significant difference was found between the appealing and irritating condition (t(134)=0.068, p=0.946).

4. DISCUSSION

The aim of this study was to determine the effect of preferred versus nonpreferred genres of music on the cognitive and emotional performance of healthy young adults. It was also hypothesized that healthy young adults would show impaired cognitive and emotional performance in the absence of background stimuli. The results of this study lend support to this hypothesis in that healthy young adults performed better cognitively and emotionally in the presence of background music regardless of whether it was preferred or nonpreferred music when compared to the absence of background stimuli. This may be explained in part due to the fact that an increased number of adolescents are studying at home with either music or the television playing at the same time (Patton et al., 1983; Kotsopoulou, 1997).

No support was found for the prediction that healthy young adults would perform better cognitively and emotionally in an appealing background sound condition compared to an irritating background sound condition. For the emotional IQ questions there was no difference found between percentage correct scores for the appealing background sound condition versus the irritating background sound condition in either the 5 or 10 minute duration.

The most important finding of this study is that the mere presence of music, regardless of preferred or nonpreferred, is beneficial to the cognitive and emotional performance of healthy young adults. These findings have important implications for the structure of the classroom environment in terms of background stimuli. More research needs to be completed to determine what affects the volume, meter, tempo, and rhythm of music have on the cognitive and emotional performance of students in a classroom setting.

Indeed, for most people, music expresses emotion, but only recently has the topic begun to attract serious attention from neuroscientists (Zattore, 2005).

REFERENCES

Juslin, P. & Sloboda, J. (2001). Music and Emotion. Theory and Research. Oxford University Press: Oxford.

Juslin, P., & Zentner, M. (2002). Current trends in the study of music and emotion: Overture. *Musicae Sciantiae. Special Issue 2001-2002*, 3-21.

Kotsopoulou, A. (1997). Music in students' lives. Unpublished MA dissertation, Institute of Education, University of London.

Patton, J.E., Stinard, T.A., & Routh, D.K. (1983). Where do children study? *Journal of Educational Research, 76*(5), 280-286.

Zattore, R. (2005). Music. The food of neuroscience? *Nature*, (434), 312-315.