Music and the Cognitive Process – Student Perceptions

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Abstract

Music has been used to aid cognitive processing for decades. Recent advances in medical technology have provided empirical evidence of the effects of music on the structure of the brain as well as on the cognitive, affective and motor components of the brain. Since the 1960's, an increasing number of educators have attempted to maximize the learning process by integrating music in their curricula. This paper focuses on the student as it explores second language learners perceptions of the effects of music on the cognitive process involved

Key terms: neuromusicology, neurolinguistics, music and education, music and cognitive processing, student perceptions on music and learning

"I would teach the children music, physics and philosophy, but the most important is music, for in the patterns of the arts are the keys to all learning." (Plato)

Introduction

Music embodies the spirit of all humanity and provides a powerful way of conveying meaning to the human heart and mind. There is no culture, no people or group that is without some form of musical expression. In fact, music like language is unique to the human species (Blacking, 1973). All genres of music have the power to elicit a multitude of cognitive, affective and motor responses depending on the listener. Even the most stoic among us succumbs to its influence. One may shed a tear in response to a somber melody, unconsciously tap a toe to a lively tune or simply wax nostalgic as some vivid memory of an episode long since passed but somehow connected to a musical experience is recalled. Since music affects the whole human experience, and since we continue to seek out some sort of musical experience, we must be aware of the effects to some degree. This brief report explores the awareness and perceptions of second language learners regarding music as an aid to learning.

As background, recent research in neuromusicology will be introduced. In the next section, the research method used to gather information needed to answer the research questions will be explained and will be followed by the presentation and analysis of the findings in order to determine the degree to which students are aware of music and its effects on the cognitive process related to learning.

Literature Review

"It can be said that the musical brain is modularized. That is, musical experiences are multimodal, involving at the least the auditory, visual, cognitive, affective, memory and motor systems." (Hodges, 2002) Furthermore, Hodges states that motor and other physiological responses such as changes in heart rate, blood pressure and the like have been observed and documented, and that recent advances in medical technology have allowed neuroscientists to take a closer look at specific structural changes in the brain in response to musical stimuli. As a result, incontrovertible evidence that the electrochemical neural wave patterns as well as the general topography of the brain are affected by expressive or receptive musical events has emerged. Hodges lists the following premises derived from neuromusical research:

- The human brain has the ability to respond to and participate in music.
- The musical brain operates at birth and persists throughout life.

- Early and ongoing musical training affects the organization of the musical brain.
- The musical brain consists of extensive neural systems involving widely distributed, but locally specialized regions of the brain:
    - Cognitive components
    - Affective components
    - Motor components.
- The musical brain is highly resilient.

During the past decade, several studies on the human brain and memory recall have shown that exposure to music not only alters brain function but increases it as well. Wallace (1994) documented and validated the use of music to enhance memory performance. Schellenberg (2005) studied the effects of music on general intellectual performance, and Fox, Knight and Zelinski (1998) investigated the relation between music and mood. Peterson and Thaut (2006) used an electroencephalogram (EEG) to evaluate changes in brain wave patterns by using a modified version of Rey's Auditory Verbal Learning Test (AVLT) where subjects heard a word list that was recited or sung. The results of the Peterson-Thaut study suggest that verbal learning with background music improves brainwave activity in the area of the brain involved in verbal encoding. Furthermore, music has been shown to strongly affect the learner's attitude, motivation, anxiety level, acculturation, personality and mood. (Hodges, 2002).

While there is literature that asserts that music is distinct from linguistic and other cognitive processing, research clearly provides evidence that music influences linguistic and cognitive process. In light of this evidence, it is no surprise that educators, in particular language educators constantly in search of techniques that can enhance learning, if not accelerate it, increase retention of material taught, and be easily incorporated into the classroom curriculum, have considered using music to enhance second language learning.

One of the first proponents of the use of music as an aid to language learning was Dr. Georgi Lozanov, an educator and psychiatrist at the University of Sofia, Bulgaria, who in the late 1960's and 70's pioneered the field of accelerated learning by incorporating various psychological techniques such as playing soft music, encouraging relaxation techniques, using positive suggestion and administering biofeedback to improve cognitive processing (as reported in Pattison, 2006). This technique used by Lozanov came to be known as Suggestopedia (more recently referred to as "Desuggestopedia to reflect the importance placed on desuggesting limitations on learning" (as cited in Larsen-Freeman, 2000)) and eventually gained favor among language educators; consequently, it gave rise to the growing fields of neuromusicology as well as neurolinguistics.

Considering the increased use of music as a learning aid and the attention given to such techniques by educators since Lozanov's initial research, the question of whether or not teacher recognition of the benefits has also transferred to the learner can be put forward. Do we, as learners, naturally employ music to enhance learning in general because "…through music we are able to discover, share, express, and know about aspects of the human experience that we cannot know through any other means"? (Hodges, 2002) This brief report investigates the perceptions that English language students at a Japanese university have of music and the cognitive process involved in language learning specifically.

1. Are students somehow aware of the cognitive benefit and the affective impact of listening to music?
2. More specifically, is the average student of English somehow cognizant of the effect of music on the brain such that they actively choose to use music to aid the learning process?
3. What genre(s) of music do students choose to listen to while studying, and are their choices ideal?

Method

A simple voluntary on-line survey conducted in English was made available to intermediate and advanced students of English enrolled in English language courses at a University in Kyushu, Japan. The survey was made available through Blackboard course links for each class level. Blackboard is an online course management tool designed to allow students and teachers to access and use

material that complements face-to-face learning. This was done in order to learn more about students' study habits in relation to music and to gain insight into their perceptions of music and the learning process. A total of thirty-six (36) students responded to the survey. Of the (36) who responded to the survey, two (2) students were from China, one was from Korea, one was from Vietnam, one was from Myanmar, and one was from Taiwan. One student chose not to give information on their country of origin. The remaining twenty-nine students (80.5%) were Japanese. As indicated in figure 1, the respondents were 50% male and 50% female. Figure 2 indicates the class levels of students who took the survey. Twenty-five students (72.2%) were studying English at the intermediate level. Ten students (27.8%) were advanced level students.

Figure 1

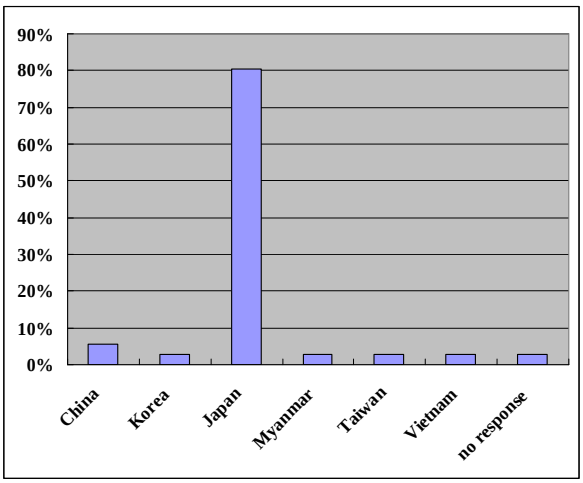


Figure 2

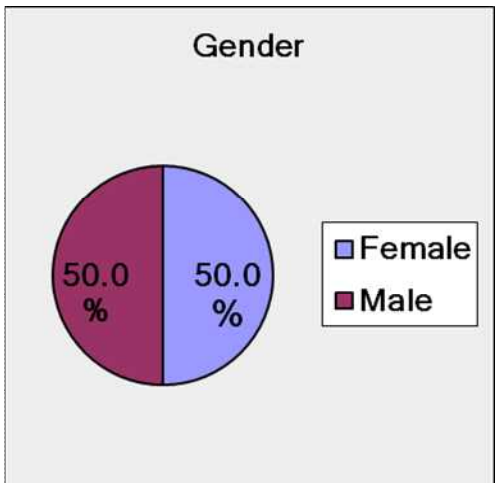
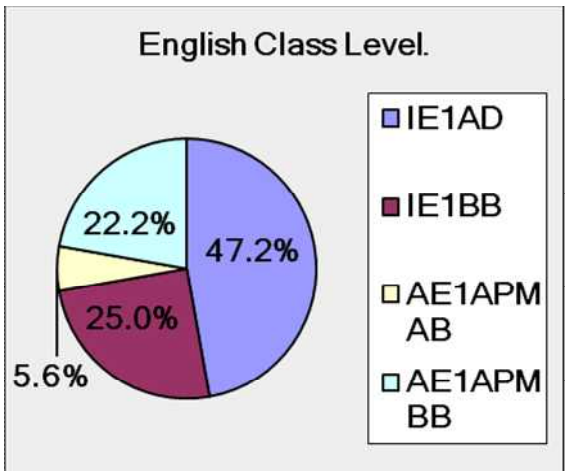


Figure 3



Seven (7) questions pertaining to study habits in relation to music and five (5) demographic questions were employed in the study. The questions requesting information about study habits and music were as follows:

1. Do you like music?
2. If you like music, what kind of music do you like?
3. Do you listen to music when you study by yourself?
4. If you listen to music when you study by yourself, what kind of music do you listen to while studying?
5. If you do listen to music when you study by yourself, why do you?

6. Do you like it when music is used during class time? why or why not (please specify)
7. Please choose one answer for the following statements:

   strongly disagree, disagree, agree, strongly agree

   a. Listening to music helps me study.
   b. I concentrate better when I listen to music while studying.
   c. Listening to music has helped me to improve my language skills.
   d. My mood changes when I listen to music.
   e. Listening to music has helped me to remember more new English vocabulary.

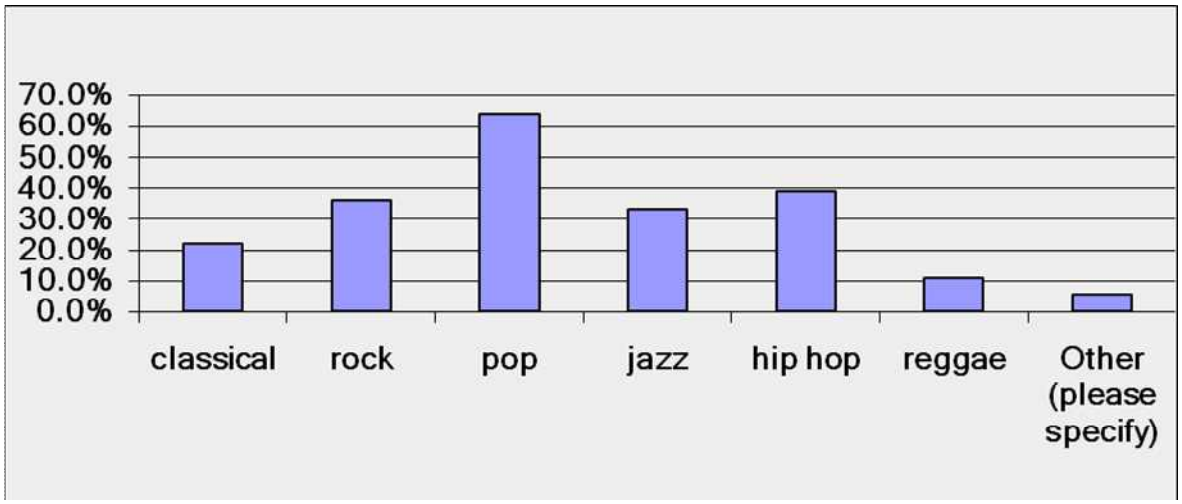
Although the survey was limited to only 36 students, it was hoped that the information gathered would help to determine whether or not students are aware of the impact of music on the cognitive process and to gain a better understanding of how students use music to enhance the language learning process.

Findings

In this section, the results of the survey conducted to find out more about if and how students use music to help them learn will be presented. Following this section, the results will be analyzed in terms of students' perceptions of the effects of listening to music while studying.

It is not surprising that when asked if they liked music, 100% of the respondents indicated that they indeed liked listening to a variety of music in general. Eight students (22%) chose classical music as the type of music they like, thirteen (36.1%) indicated that they like rock, twenty-three (63.9%) like pop music, twelve (33.3%) enjoy listening to jazz, fourteen (38.9%) reported that they found hip hop entertaining, four (11.1%) stated that they listened to reggae, and two students (5.6%) indicated that they listened to other kinds of music.

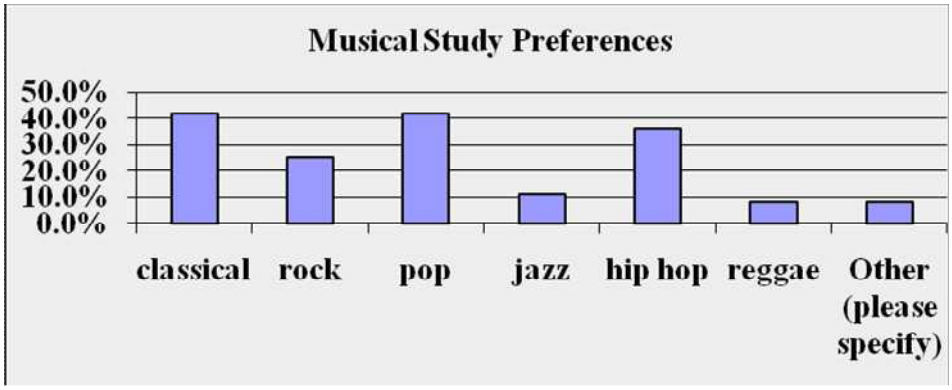
Figure 4



General Music Preferences

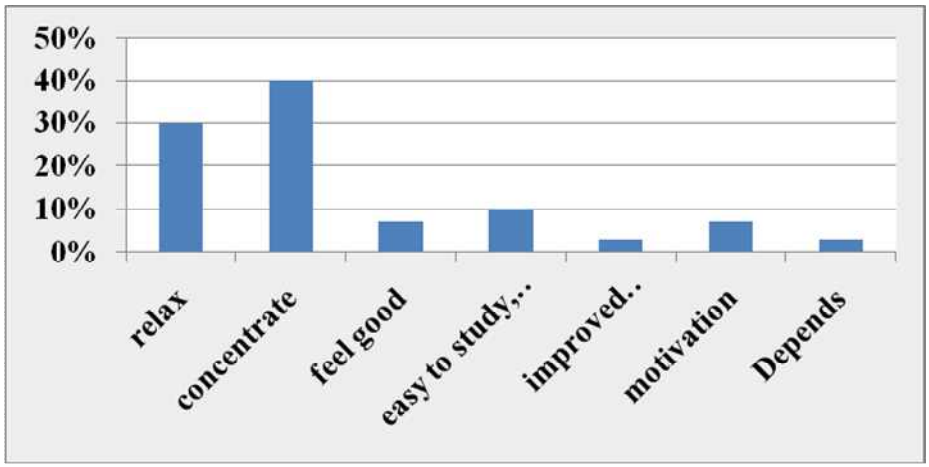
When asked if they listened to music while studying, 27 (75%) of the 36 respondents indicated that they did listen to music while studying while 9 (25%) of the respondents said that they did not listen to music while studying. Figure 4 indicates students' musical preferences while engaged in some kind of self-directed study or review outside the classroom. Fifteen of the 36 respondents (41.7%) reported listening to classical music, 9 (25%) listened to rock music, 15 (41.7%) to pop, 4 (11.1) to jazz, 13 (36.1%) to hip hop, 3 (8.3%) to reggae and 3 (8.3%) to other forms of music.

Figure 5



Thirty-one (86%) of the students surveyed indicated that they listened to music while studying. Six reasons were given in response to this question. Twelve students (40%) said that they listened to music in order to concentrate. Nine students (30%) indicated that listening to music helped them relax while studying. Three students (10%) simply stated that they liked music, wanted to listen to music or that it helped them to study smoothly without giving more specific detail. Two students (7%) indicated that they felt motivated by the music they listened to while studying. Another two students (7%) reported feeling good while listening to music while studying. Six students (14%) said they did not listen to music. One student (3%) reported listening to music but did not give a reason for listening to music.

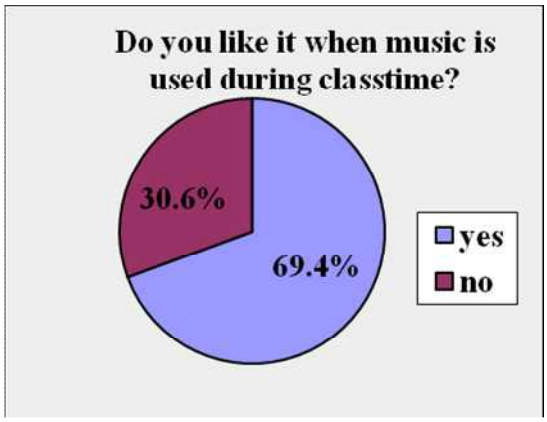
Figure 6



Reasons for Using Music While Studying

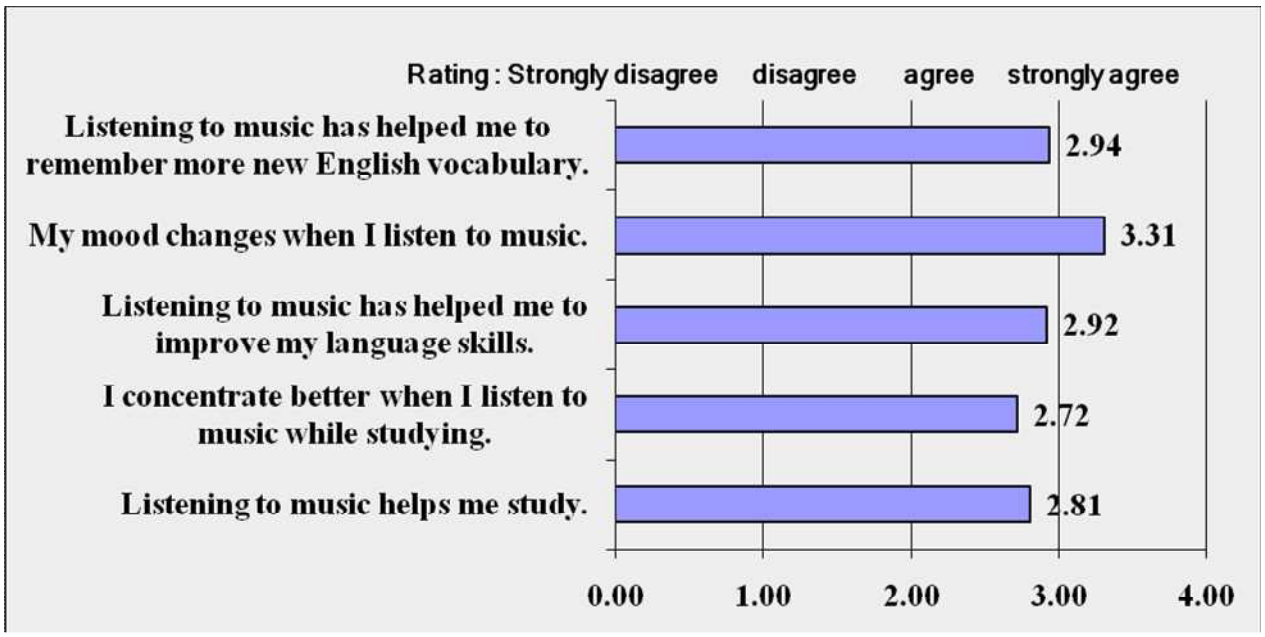
When asked whether or not they enjoyed it when music was used in the class room, an overwhelming majority (69.4%) of the students said they enjoyed listening to music in the classroom. On the other hand, 30.6% indicated a dislike for music in the classroom.

Figure 7



As for students' responses with respect to the influence of music on their learning experience, most students believed that listening to music stimulates an affective response. As seen in figure 8 below, the most frequently chosen response was related to music and its effect on mood while its effect on remembering vocabulary was the second most frequently chosen response, followed closely by improved language skills. The fourth most frequently chosen response was related to music as a study aid. The answer with the least number of responses was directly related to concentration.

Figure 8



Analysis

Students' perceptions on music in relation to studying will be examined critically in this section. To begin, it was not surprising that every student indicated that they were favorably disposed to music. This fact supports the claim that all humans have a natural proclivity to music. (Blacking, 1973) However, when asked if they listened to music while studying, only 86% of the respondents indicated that they did. While a sizeable majority of students enjoy listening to music, a good proportion (25%) of the students reported that they consciously chose not to listen to music. This suggests that students are aware of the fact that music does influence the learning process on some level. If this were not the case, the results for both questions would have been identical. All of the students would have responded favorably or unfavorably with respect to listening to music regardless of the task involved.

In addition to a general affinity for music, individual taste in music could play a part in the total music experience in relation to studying. For example, research by Lozanov (as cited in Schuster, 1985) suggests soft baroque music while research conducted by Mammarella, Fairfield and Cornoldi (2006) suggests Vivaldi as an ideal genre when it comes to enhancing cognitive performance, particularly in older adults. The musical tastes of college age students are ever changing; therefore, a musical preference for baroque music used in 40 year old research (Lozanov as cited in Schuster, 1985) or music used in research on the aging could hardly be expected to appeal to the young adult of the 21st century. With regard to students' general preferences for genres of music, the most popular genre proved to be pop music. The second most popular preference was hip hop, followed closely by rock. Of those who reported listening to music while studying, a number of students indicated that they listened to classical music (approximately 40 %). The result was identical for those who indicated that they listened to pop music while studying. However, when compared to the results for general preferences, it is clear that students changed preference when it came to studying. Students were able to choose multiple genres within general preferences as well as study preferences. The fact that classical music gained in favor over both the jazz and the pop categories as a study preference while the results for those who favored hip hop remained unchanged was unexpected. This result suggests that students are somehow aware of qualitative differences with respect to various genres of music and their effects on students' ability to study.

With regard to the reasons why students chose to use music while studying, most students indicated that music aided their ability to concentrate, again suggesting some awareness on the students' part of the effects of music on the language learning process. How students ascertained this information or developed their opinions is unknown. However, one individual specifically stated that he had heard that listening to music helped to improve brain activity. What is obvious is that students are consciously choosing music to activate the cognitive function. Students chose relaxation as the second reason for listening to music while studying, suggesting some awareness of the affective impact that music has on the human experience. When asked about their feelings on teachers using music in the classroom, an overwhelming majority indicated that they enjoyed it. However, approximately 30% of the students did not like the use of music in the classroom. Nevertheless, when compared to the 25% who did not like to use music to study to, it was clear that 5% of the students who did not like it when music was used in class did indeed use it when they studied on their own. Data gathered in response to the last survey question, which asked students to agree or disagree with varying degrees to five statements regarding their perceptions of the effects of music, illustrated a reverse in the ranking of affective and cognitive effects. Whereas concentration and relaxation were initially chosen as their first and second reasons for listening to music to help them study, students agreed that music helped them to relax more often than it helped them to perform a cognitive function. This may demonstrate the power of the affective component and the need to lower affective filters or barriers that place limitations on learning (Lozanov as cited in Larsen-Freeman, 2000).

Conclusion

In conclusion, it has been shown that students are aware of the impact of music on the both the cognitive and the affective processes as the majority of the students demonstrated a conscious choice to listen to music while they studied. Moreover, a significant number of students changed their music preference to a softer classical style for the purpose of studying because doing so was

perceived as a way to improve concentration or relax. In general, students perceive the act of listening to music as a means of relaxing or changing their mood.

Although the results of this research suggest that students have a general awareness of the power of music on the human experience, the sample size of the survey was considerably small; however, the gender balance of 50% male and 50% female was ideal. A repeat of this survey may produce more interesting results. Also, the online survey itself could be fine-tuned in order to elicit better responses that are more specific and detailed. Perhaps, a translation of the survey allowing students to read and respond in their native language would provide clearer responses from students.

Further research in this area could include an investigation on the use of un-vocalized alpha wave inducing music in the language classroom in order to enhance learning. Music is a significant part of the human experience, and considering the depth and scope of its effect on our lives it should be utilized more often to enhance the human condition. As Plato postulated "...for in the patterns of the arts are the keys to all learning."

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