The Effects of Music on Language Acquisition

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Introduction

Connections between music and language have long been of interest to scholars across academic fields (Bjørkvold, 1990; Garfias, 1990; Borchgrevink, 1982; and Pribram, 1982), and TESOL (Teaching English to Speakers of Other Languages) professionals have long made use of music in their classrooms (Richard-Amato, 2003; Lems, 2002; and Guiglielmino, 1986). Yet what basis is there for the inclusion of music in EFL curricula? Does music actually promote language acquisition? Though there has been some research that specifically investigates the use of music in language classrooms, there is a wider variety of research that investigates relationships between music and language. A basis for the inclusion of music in EFL classrooms can be created by comparing research regarding music and language in the areas of structural parallels, affective impacts, and cognitive processing.

This article examines research regarding structural parallels between music and language, ways in which music impacts the affective state, and the cognitive processing of music and language.

Review of Research

Structural Parallels

There are structural parallels between music and language, and these can influence the ways in which music is best utilized in a language classroom. While some of these structures can be generally applied to music and language, others appear to be culturally specific.

Jackendoff and Lerdahl (1982) were two of the earlier theorists regarding general structural parallels, as they compared the syntax and prosody of music and language. Sloboda (1990) continued to examine this subject, drawing comparisons between the phonology, syntax, and semantics of music and language. Sloboda noticed that both music and language consist of phonological building blocks, or small, individual sounds. In a language, these sounds are phonemes; in music, they are notes. In either situation the syntax orders and structures these sounds, creating recognizable and meaningful patters of sound. According to Sloboda, semantics, or the meaning of language, may be extended to music through the emotional experiences people have in response to music, as well as listeners' abilities to identify general characters of music (happy or sad, restful or agitated).

In addition to examining general structural similarities between language and music, other scholars have wondered if a comparison of music and language would reflect culturally specific qualities. In other words, will a certain culture's music reflect

similarities in rhythm, tempo, and fluidity to that culture's language? Patel and Daniele (2003) set out to find an empirical basis for this idea. The authors compared British and French music and language, for British English and French represent "stress-timed" and "syllable-timed" languages, respectively.[1]

In order to empirically compare music and language, Patel and Daniele (2003) applied the normalized Pairwise Variability Index (nPVI) to both music and speech samples from each country. To obtain their speech samples, the authors used a previous study done by Ramus (2002). Ramus had already used the nPVI to compare British and French speakers. Ramus's speech samples were based on twenty utterances of each language. These utterances were performed by four individuals from each language, speaking five sentences each in declarative tones. Using the Mann-Whitney *U*-test, the authors found that nPVI ratings for British English were significantly greater than for French (U=66, P<0.001).

The authors then applied the nPVI to their own music samples. All music samples were chosen based on strict criteria to account for as many variables as possible, and all were instrumental pieces from 19th century British and French classical composers. The nPVI measures were taken from the written scores of musical pieces rather than performed pieces so as to adhere to the composers' original choice for rhythm. As with the speech samples, British pieces scored significantly higher than French pieces (U=9993.5, P<0.01).

Patel and Daniele (2003) summarized these findings by noting that the average rhythmic differences emerging between cultures' musical traditions paralleled the prosodic, or rhythmic, differences between those cultures' native languages. They also observed striking similarities between French language and French music, and British English language and British music. Thus, there appears to be some empirical evidence for language having a culturally specific connection with music.

Affective Impacts

Learners' affective states can influence their language learning, and music has been shown to have positive effects in this area. Richard-Amato (2003) defines the affective state as a learner's attitudes, motivation, anxiety levels, acculturation, personality, and feelings of community. Lowering the affective filter, or the emotional and motivational blocks to language learning, is commonly accepted as an important aspect of language instruction. Music seems to be very beneficial in this area, as it can increase joy and confidence while lowering anxiety. Research into the affective impacts of music examines the ways in which different types of music can lyrics affect listeners' emotional states.

[1] Phonetic research has demonstrated qualitative rhythmic differences between stress- and syllable-timed languages (Grabe & Low, 2002; Low, Grabe, & Nolan, 2000; and Ramus, Nespor, & Mehler, 1999; cited in Patel & Daniele, 2003).

In Western musical cultures, major musical modes are typically associated with feelings of happiness, whereas minor modes are associated with feelings of sadness. Gregory, Worrall, and Sarge (1996) set out to discover whether these associations are learned or innate, and if they are learned, to determine at what age these emotional and musical associations begin to form. Participants in the experiment included forty children aged three to four years old, twenty-eight children aged seven to eight years old, and twenty-eight young adults.

The music samples used in this experiment consisted of eight uncommon tunes from the Oxford Nursery Song Book (Buck, 1934). Four of the original songs were in major mode and four were in minor mode. Each of these eight tunes was then recorded in four different musical conditions: 1) original piece, 2) transposition into opposite mode, 3) original with harmony, and 4) transposition with harmony. From these music samples, four tapes were created. Each tape contained all eight tunes presented with the same order but different conditions (two tunes from each condition per tape). Within each age group, participants were asked to give their affective responses to the musical stimuli. The youngest participants, the three and four year olds, were first shown two faces, one "happy" and one "sad." Once the children correctly identified the emotion portrayed on each face, they were asked to point to the face that went with each tune. The older children and adults were given the same stimuli as the younger children, but marked the appropriate face on a sheet of paper.

Gregory et al. (1996) analyzed the results of this experiment using a three-way analysis of variance: age was a between-subjects factor, mode was a within-subjects factor, and harmony was also a within-subjects factor. They found that the effect of age was significant, with three and four year olds giving far more "happy" responses overall ($F(2, 93) = 4.31$, $p < .02$). The authors also found that mode (major or minor) was significant ($F(1, 93) = 34.84$, $p < .001$), with more "happy" responses given to major modes across groups. The age and mode interaction was also significant ($F(2, 93) = 8.66$, $p < .001$). Though there was almost no difference in responses to major and minor modes for the three and four year olds, there was a large difference for seven and eight year olds, and an even larger difference for the young adults. The condition of an added harmony elicited significantly more "happy" responses across groups ($F(1, 93) = 8.55$, $p < .05$). Gregory et al. concluded that emotional associations with major and minor modes of music are learned, and that they tend to develop between the ages of four and seven years.

While Gregory et al. (1996) investigated the affective impacts of major and minor modes of music, Stratton and Zalanowski (1994) wanted to determine whether music or lyrics have a greater affective impacts. They hypothesized that lyrics would convey a clear affective message, while music would intensify the effect of the lyrics. In order to test this hypothesis, the authors conducted a series of three experiments.

The first experiment tested the mood changes resulting from listening to three versions of the same song, "Why Was I Born?" by Oscar Hammerstein and Jerome Kern. This song was selected because of its slow, melancholy melody and depressing lyrics. Three versions of this song were recorded to create three testing conditions: 1) melody and

lyrics, 2) melody only, and 3) spoken lyrics only. Subjects consisted of thirty-two undergraduates, who were divided into three groups (of fifteen, thirteen, and fourteen) and assigned to one of the three conditions. The Multiple Affect Adjective Check List—Revised (MAACL-R) was used to assess depression and positive affect before and after listening to the assigned condition. Subjects were also asked to rate how pleasant they found the stimuli using a simple ten-point scale, with "1" being very unpleasant and "10" being very pleasant.

Results from this experiment support the first part authors' original hypothesis and clearly illustrate the power of lyrics.[2] While the music alone decreased depression somewhat ($t(14) = 1.34$, *ns*) and increased positive affect significantly ($t(14) = 3.06$, $p < .01$), lyrics alone and with music significantly increased depression ($t(12) = 1.78$, $p < .09$; $t(13) = 2.26$, $p < .05$) and decreased positive affect, though not significantly ($t(12) = 1.15$, *ns*; $t(13) = 1.27$, *ns*). An HSD Q-statistic indicated that both conditions with lyrics were significantly different from the music alone condition, but not significantly different from each other. The ten-point pleasantness ratings demonstrated similar significant differences across groups ($F(2,39) = 14.93$, $p < .001$). Music alone, even if containing traditionally melancholy qualities, may have a positive effect on mood; however, the same music may have the opposite effect of accompanied by depressing lyrics.

Stratton and Zalanowski's (1994) second two experiments expanded on these findings. The second experiment followed the same procedure as the first experiment but with a new group of forty-four subjects and three new conditions of the original song: 1) melody only played in an up-beat, jazzy style, 2) lyrics and melody in the same up-beat style, and 3) the original melody with new, up-beat lyrics. The first two conditions of this experiment produced similar results to the parallel conditions of the first experiment. No significant changes in mood were reported as a result of the third condition.[3] Thus, this experiment also supports the notion that lyrics, more than music, affect mood.

Stratton and Zalanowski's (1994) third experiment was designed to investigate the lasting impact of lyrics on melody. Thirty new undergraduates acted as the subjects for this study. The same song as in the first two experiments was used for the experimental group, while a comparable song, "A Stranger in My Place," by Anne Murray, was used for the control group. Subjects listened to a series of five songs (four test songs plus either "Why Was I Born" or "A Stranger in My Place") with both melody and lyrics during session one. They rated each song with a ten-point scale for pleasantness, liking, and familiarity. One week later, the subjects listened to the same five songs (with the exception that the control group's original song, "A Stranger in My Place" was replaced by "Why Was I Born") without lyrics and performed the same ratings. The experimental group rated the "Why Was I Born" melody as significantly less pleasant than did the control group. The pairing of unpleasant lyrics with a melody led the melody to be rated as less pleasant at a later date; thus, lyrics appear to have a lasting impact on melody.

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[2] The second part of the hypothesis, that music would intensify the lyric's effect, was not supported with statistical significance.

[3] The relatively weak positive affect of the pleasant melody-lyric combination is consistent with a previous Stratton and Zalanowski (1989) study that found it is easier to induce a negative mood than a positive one.

Cognitive Processing

The cognitive processing of music and language may also increase language acquisition. Memory is an important aspect of language learning, and many studies have linked musical support with improved memorization. In his book, *Introduction to the Musical Brain*, Campbell (1992) notes that the more connections that can be made in the brain, the more integrated an experience becomes within memory (as cited in Adkins, 1997). Combining music with language creates many connections, as language is primarily processed in the brain's left hemisphere and music in its right hemisphere.

A deeper understanding of the cognitive processing of music and language can influence the ways in which language instructors utilize music in their classrooms. Bonnel, Faita, Peretz, and Besson (2001) wanted to discover whether there is evidence for independent cerebral processing of music and language. They note that though melodies and words are first heard simultaneously, the question remains as to whether or not the brain continues to process them together. To investigate the brain's internal processing, Bonnel et al. set out to divide participant's attention between melodies and lyrics based on a dual-task paradigm.

In order to create a situation that would test this paradigm, Bonnel et al. (2001) selected two hundred excerpts from French operatic songs. Each of the excerpts ended in a monosyllabic word on a single note. Lyrics and melody remained unchanged throughout the entire excerpt until the last note and last word, which were presented in four different ways: 1) original note, original word; 2) original note, incongruous (semantically unrelated) word; 3) original word, incongruous (out of key) note; 4) incongruous note, incongruous word.

Participants in the study were divided into two groups; one group investigated a single-task condition, while the other investigated a dual-task condition. The single-task group consisted of forty-eight students with a mean age of 27.4 years. All students were native French speakers from Quebec. Half of the single-task participants were asked to perform the linguistic task of identifying whether the last word was semantically incongruous, while ignoring musical differences. The other half of this group was asked to perform the musical task of identifying whether the last note was musically incongruous, regardless of linguistic congruency. The dual-task group consisted of 24 students who met the same criteria as the single-task group. The dual-task participants were asked to identify both incongruous notes and incongruous words.

After the experiment, Bonnel et al. (2001) used standard statistical procedures (z-tests and receiver-operating characteristic curves) to compare data across groups. They found no statistical differences between single-task and dual-task groups. These results suggest independent processing for music and language.

While the cerebral aspects of cognitive processing are important, the overall effects of these processes are especially valuable to language learning. One of the most significant cognitive effects regarding language learning is the way in which music and language

interact with memory. Wallace (1994) performed a series of studies investigating the relationship between music, language, and memory. Her first two studies examined two hypotheses: 1) music can aid the recall of text, and 2) some of this recall can be attributed to music's melody rather than only to a text's rhythmic qualities.

Wallace's (1994) first experiment was designed to demonstrate that music can aid recall. The music and texts used were taken from two ballads, "Sailing" and "Dressed." Both excerpts were three verses long and contained 80-85 words. Subjects consisted of sixty-four undergraduates from an introductory psychology class. Subjects listened one of the two ballads, either spoken or sung, five times and recalled its text after the first, second, and fifth repetitions. They were instructed to write down, as close to verbatim as possible, whatever words they remembered. In a delayed-recall task, subjects were again asked to recall the text twenty minutes after the fifth trial. A repeated measures analysis of variance (ANOVA) found significantly greater verbatim recall for the sung (music) condition than for the spoken (non-music) condition on all trials, including the recall-delay task (F (1, 60) = 19.95, $p < .0001$, $MS_e = 0.05$). Thus, Wallace concluded that music can aid recall.

Wallace's (1994) second experiment was designed to demonstrate that music contributes more than just rhythmic structure to text recall. Subjects for this experiment consisted of twenty-one undergraduates from a different introductory psychology class as the previous subjects. The exact procedure from the first experiment was repeated with these subjects, with one exception. Rather than hearing a spoken version of the ballad, subjects heard a rhythmically spoken version accompanied by a background metronome tapping in synchrony with the verses. As with the first experiment, sung versions resulted in significantly greater recall than spoken versions (ANOVA: F (1, 54) = 5.04, $p < .03$, $MS_e = 0.06$). Thus, it appears that music contributes more than rhythmic information to text recall.

Music and Language Acquisition

The actual use of music to enhance language acquisition was pioneered in the 1970s by Bulgarian psychotherapist Georgi Lozanov. Lozanov developed Suggestopedia, which involves the use of background baroque music to holistically enhance language acquisition. In his doctoral dissertation, Quast (1999) set out to explore the effects of Suggestopedic learning on students with technical giftedness.[4] There were two main aims to his study: 1) to demonstrate the effect of various background conditions on group learning, and 2) to explore the specific background effects in relation to certain student characteristics. Quast (1999) began with the hypothesis that baroque music would be most beneficial to all students' language acquisition.

Participants in the study consisted of forty German students. The material taught to these students was comprised of four lists of twenty-five English idioms. A Latin Square design was used for this study, consisting of four background conditions (instrumental

[4] Quast's original dissertation is entitled "Zum Effect Verschiedener Musikgenres auf Suggestopadisches Lernen" (Quast, 1995).

rap, baroque music, meditative music, and silence) and four groups of subjects organized according to personal characteristics measured by standardized tests (gender, foreign language learning ability, musicality, and average feeling state). The background conditions, personal characteristic groups, and lists were combined so that every characteristic was experienced every condition, yielding a total of sixteen testing groups.

The procedure for each group was exactly the same. First, the psycho-physical state of the subjects was determined using standardized tests. Second, the group was led through relaxation exercises. Third, the idiom list was read by the experimenter (with the assigned background condition) while the students looked at the text. Fourth, the idiom list was read a second time while students had their eyes closed. Once this learning process was completed, the subjects were again tested for their psycho-physical states. Finally, recognition and translation tests for the learned material (developed by the author) were given to the subjects both immediately after the learning process and again after one hour.

Results from the study show a significant effect of music on both affective and cognitive variables (chi sqr = 9.05, $p < .03$). Overall, baroque music and rap came across as the most beneficial musical genres for both cognitive learning and affective states in nearly every personal characteristic group, though baroque music appeared to be more beneficial for longer durations because it caused less fatigue than rap. The one exception to this pattern was the musical group of subjects, which preferred silence or meditative music. Quast (1999) suggested that this may be because the musical subjects had a tendency to analyze music.

While Suggestopedia involves the use of background music to aid language acquisition, many language teachers more actively involve students with music. Fisher (2001) conducted a recent cross-sectional, longitudinal study on this use of music for ESL purposes. The purpose of Fisher's study was to determine if music could effectively be used to increase elementary student language achievement. Fisher's study involved eighty native Spanish-speaking kindergarteners, with limited English skills, assigned to one of four teachers within the same school in Los Angeles. The study was conducted over a two year period, and students kept the same teachers for both kindergarten and first grade. All four teachers were matched in every possible way with one exception: Two of the teachers in the study used abundant amounts of music while teaching, while the other two teachers did not use music in their classrooms. Fisher's (2001) study compared language learning differences between the two music classrooms and two non-music classrooms.

The data used in Fisher's (2001) study was collected through direct observation and standardized tests. Direct observations were done twice monthly for each classroom and were categorized using consistent, comparative methods (taken from Bogdan and Biklen, 1992). The standardized tests used were the SOLOM (Student Oral Language Observation Matrix, by the California Department of Education, 1981); the Yopp-Singer Test of Phoneme Segmentation, 1995; and the DRA (Developmental Reading Assessment, by Beamer, 1997). These tests were given twice: first, prior to the study to

ensure equal language levels across classrooms, and second, after the study to measure differences in language achievement. Standard statistical measures, t-tests and chi-square tests, were used to quantify and compare reading achievement scores at the study's conclusion.

Statistical results from the study demonstrated clear differences between the music and the non-music groups. On both the SOLOM and the Yopp-Singer Test of Phoneme Segmentation, students who had been in music-inclusive classrooms outperformed those students who had been in classrooms without music (SOLOM: $t=5.5$, $p<.001$; Yopp-Singer: ($t=2.1$, $p=<.04$). Similar results were produced with the DRA. According to this test, ten students from the music groups were able to read at grade level for both English and Spanish, while only one student from the non-music groups had this ability ($X^2=6.7$, $p<.03$). Overall, the students that had been assigned to musical classrooms surpassed those students from non-musical classrooms on all tests with regards to their language achievement. Fisher (2001) concluded that the active use of music in elementary classrooms is a viable means of increasing student linguistic performance.

Implications of the Research

When applied to language acquisition, research in the areas of structural parallels, affective impacts, and cognitive processing support the inclusion of music in EFL curricula. Studies that specifically investigate the use of music in language classrooms also provide a basis for using music to teach language.

As Jackendoff and Lerdahl (1982) and Sloboda (1990) have previously asserted, there are many structural parallels between language and music. Patel and Daniel (2003) found that some of these parallels may be culturally specific. If this is true of English, as their study suggested, then using English songs with students might naturally introduce them to speech patterns of English speakers. For example, when speaking English, the prosody of the language requires certain words and syllables to receive accents as part of regular pronunciation. By using rhythmic chants or songs to teach words and phrases, students may learn the proper placement of accents, as well as common pacing of speech.

Just as Patel and Daniel (2003) suggested that there are cultural similarities between the structures of music and language, Gregory et al. (1996) found that culture may affect the ways in which listeners respond to music. Gregory et al. (1996) found that in Western musical cultures, the major mode is associated with feelings of happiness, while the minor mode is associated with feelings of sadness. This information becomes relevant to teaching English when the findings of Stratton et al. (1994) are considered. Stratton et al. (1994) found that the character of a piece of music can affect the mood of a listener, with melancholy songs increasing feelings of depression. Feelings of depression raise learners' affective filters, and this can hinder language acquisition. By selecting songs written in major modes, language teachers may lower affective barriers to learning. When teaching students with non-Western musical backgrounds, language teachers may want to include music that evokes feelings of happiness in those students' native cultures, as well.

Though the character of a melody is important to consider, Stratton et al. (1994) also found that lyrics have a greater effect on listeners' moods than melody alone. They found that depressing lyrics significantly increase feelings of depression, regardless of the type of melody to which the lyrics were paired. This data suggests that language teachers should select songs with positive lyrics in order to lower the affective filter, and Fisher's (2001) study supports this idea. In the Fisher (2001) study, the two classrooms that used music began each day with a group song that had a positive message, such as having good self-esteem. In observation notes, Fisher remarked that students in those classrooms seemed more excited about learning English than did students in the non-music classrooms. Statistical analysis at the end of the study revealed that those students in musical classrooms actually did acquire more English.

The study by Bonnel et al. (2001) demonstrates that music and language are processed independently in the brain. This implies that focusing on both music and language simultaneously should not interfere with the memory of either. That is, using music while teaching students language will not distract them or inhibit their acquisition of linguistic forms. Rather, music will increase language acquisition on cognitive levels, especially with regards to memory. Wallace's (1994) earlier findings support the idea that music can aid memory. Wallace found that when text is set to music, recall of that text is significantly higher than when the text is spoken. Interestingly, Wallace also found that recall of text set to music is significantly better than when the same text is spoken in a rhythmic pattern. Thus, though many EFL professionals effectively use rhythmic recitations to teach English, instructors may further promote language acquisition by adding actual melodies and songs to their curricula.

Fisher (2001) and Quast (1999) specifically investigated the effectiveness of music for language learning, and both researchers found that music positively affects language acquisition. In Fisher's study, besides beginning each day with an opening song, students in musical classrooms learned spelling words taken from songs and read stories that were set to music. The positive results of this study suggest that actively using music to learn language is a useful way for EFL teachers to incorporate music into their curricula.

On the other hand, Quast (1999) found that music positively affects language acquisition even when implemented in a passive fashion, such as with background music. Students in Quast's study exhibited more positive attitudes and less fatigue when music was played in the background. In addition, students who memorized word lists while background music was playing performed significantly better on recall tasks. The methods used in Quast's study were based on the theory of Suggestopedia, which advocates the use of Baroque music above all other genres. Interestingly, different musical genres had different effects on different students (Baroque came across as most beneficial overall, women did better with rap for short durations, and musical students preferred meditative music or silence). This suggests that instructors will want to include a variety of musical genres in their curricula.

Music clearly enhances language acquisition, and there is evidence across disciplines in support of incorporating music in EFL curricula.

Conclusions

Research across disciplines supports the notion that music assists language acquisition, and this writer's own classroom experiences with music have been positive. While creating music activities from scratch can seem daunting to busy professionals, even playing music in the background may assist student learning, and there are several textbooks full of pre-made song lessons (*Bartelen 2007; Kumai & Timson 2002, 2003, 2005, and 2006*). Using music in language classrooms can assist students with language acquisition and contribute to a more positive classroom environment.

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