The Effect of Content Specific Music on Learning in the High School

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Abstract

Previous research on content-specific lyrical music played in class says music can be helpful by making it more enjoyable and easier to remember. The purpose of this project was to see if this was true that content-specific music could make learning easier in high school History and Spanish. Seventeen Spanish students and twenty-one History students got either a song or no song as part of a normal class and each group had a series of assignments that were graded by the teacher. It was found that there were no significant differences in the scores between the music and no music group for either class, despite students remembering the song weeks later. This suggests that although content-specific music may be enjoyable or memorable, it may not be the best way to study or recall information.

Introduction

Music is usually used to help people get their work done, but the music often has nothing to do with the work they are actually doing. But what if the actual lyrics could help them learn?
A survey by Common Sense Media states that 76% of teenagers often listen to music when doing homework (1). Even though students from the study were not asked about the music they were listening to, it is obvious they were not listening to content-specific lyrics on their favorite streaming platform. Content-specific lyrics are lyrics that communicate details about a learning objective, such as the Civil Rights Movement in American History (2), or the parts of a cell (3). These lyrics can already be from existing songs or can be written by teachers or students. This is important because if such music can make learning easier, then students and teachers should know about it and consider using it. In our study, we gave some students content-specific songs in History and Spanish classes to see if it helped compared to students who did not get the songs.

Multiple Intelligences

Many students have different ways that they like to learn. This is referred to as the multiple intelligence theory (4). There are eight different types of intelligences, one of which is musical. Listening to music connects to and helps these different intelligences in their way depending on which intelligence it is. For example, musical intelligence is when someone is good with rhythms. Music can help with that, because if a person is already good with rhythms then the music just makes things easier. Visual-spatial intelligence is the type of intelligence when someone is good at visualizing things. Music can help because using lyric videos and just watching the lyrics can help people remember and retain info. Another common intelligence would be linguistic-verbal intelligence, which is when someone is able to use words to help them retain things. Music can help because they can read and write lyrics to retain information. This connects to our topic because music has the ability to help people of many different intelligences in different ways, and could therefore reach all learners.

Music and Memory

Maximizing studying effectiveness is something students and the entire academic community alike would greatly benefit from. DeBolt et al. conducted a study where they showed 15 words to students while they were listening to music with or without lyrics (5). Then they distracted the students by conversing with them to see if the students would remember the words later. The participants in the study consisted of 24 students total. There were 19 females and 5 males. It was soon discovered that their hypothesis was not supported. They predicted that exposure to music with lyrics will result in fewer

words recalled as compared to non-lyrical music during a verbal memory task. They ended up discovering that exposure to music with lyrics did not result in fewer words recalled. This is important to know because this demonstrates that music with lyrics doesn't affect the memory in a harmful way. Therefore, in our study, we expected music with lyrics would not harm the memory of our participants.

History and Foreign Language Lyrics

When learning both history and foreign languages, research says students are often more engaged in class, but there was nothing to show that music actually helped them learn better. Marceae played historical pop songs in an American History course for Japanese students, who were also learning English (2). He found that 98% of the students agreed they liked the mix of music and history and 92% said it helped them understand history, while only 25% did not want the music at all. The combination of music and history helped students retain important information about history and practice their English. Other researchers have also looked at music and learning foreign languages. Perez et al. surveyed students learning Spanish to see what type of content made learning easier. They found that songs and song lyrics were often the most difficult to understand, but we were the most commonly used. It was shown in both studies that many students thought music helped them learn better, but there is no real information that this is true.

Science Lyrics

Music can be used in lectures to help with memory. Students can benefit from melodic and textual information in order to memorize the content information given in class. McLachlin studied the effect of a science song played in class and several weeks after the song was played there was a survey given (6). There were 599 students and only 50.3% of the surveys were returned. The students were asked a series of questions, such as if they clapped or sang along. Sixty-nine percent of students sang, 81% clapped, and 95% said they enjoyed it very much or quite a bit. Fifty-five percent sang in their head or out loud at least once after the lecture and 44% thought it would be very helpful. The results showed that the second-year university students found “The Histone Song” to be an enjoyable part of the lecture as well as a useful study aid. While the study did not show if music helped with learning better, it did show that a majority of students enjoyed the music and were likely more engaged.

Crowther argues science songs might help enhance learning through five different methods (7). First, music might enhance recall due to the use of organizational mnemonic devices, which help people remember things by using rhythm. Music can also reduce stress as it makes people relaxed in the classroom. If they are more relaxed, the class is more fun and it is easier to learn when students are not disengaged. Music can appeal to different learning styles by presenting a video for visual learners,

auditory people can listen, and kinesthetic learners can sing and clap along. Last, hearing information in a different way besides from a teacher might make it easier to remember and comprehend.

Singing science music may be helpful when memorizing information. Smolinski wanted to know if singing music could help high school students learn and remember information for a test (3). Some students were split into two groups that consisted of 93 students each. One of the groups consisted of students who were in the chorus, the other group of students was not. What Smolinski did was he had the choral group learn a song that had to do with what they were learning. The choral group had to practice that song three times a week for four weeks. He also gave a pre-test which showed that there was no difference in the scores between the groups. Once they took the final test, the scores showed that the choral group scored higher by ten points. Knowing this information is important because music can be somewhat helpful when it comes to learning and if it is helpful then people should know about it.

Grossman and Watson concluded that music could be useful as part of a science class, to make it more fun and help students study, but they don't argue it improves scores (8). The teachers exposed the students to 5 different songs in class throughout the term and posted them on the Internet and students were able to watch as they wanted. At the end of class, the teachers gave out a survey to ask how it went. In 2012, 120 students were surveyed, and in 2013, 98 students were surveyed. Depending on the song in 2012, 67% of students thought the song was helpful, and 92% thought the song was fun. In 2013, 49% of people planned to watch the songs again before the final, 36% thought it helped them learn, 44% thought it helped with a positive atmosphere, and 64% thought the lecture with the song really helped. The only issue with this source is that they did not have more than one group so they could be compared to students who did not listen to the songs. Our study built on this by having a control group to allow us to compare scores.

Study Hypotheses and Design

Many of the sources that we read decided to do something similar to what we planned on doing. A majority of the studies used music in order to make their class more interesting. The takeaway that we got from most of these studies was that they surveyed students to see if they learned better when using music, but there were also limitations. For example, after giving a test in class the teachers did not display the test scores to compare between groups. This study is going to be different. In order to demonstrate whether or not music actually makes a difference when learning, we took 10A and 10B for Spanish, and 11A and 11B for History. 10A had access to a Spanish related song depending on what they learned, and 10B did not get the song. After hearing the song in class, the students from both classes had several assessments. Then we displayed the results to show which group did better on the test. For 11th grade, the experiment was similar to the 10th-grade experiment.

The hypothesis for each subject would be that content-specific music can help students learn better and also make learning easier for Spanish or History. First, we hypothesized that content-specific music will help students learn better in Spanish, based on a graded exit ticket and the verbal question from an exam. Next, we hypothesized that content-specific music will help make learning better in History based on a graded warm-up and a longer writing assignment. Also, we expected that\ music will make learning more enjoyable, as measured by a survey given after the assessment.

Results

We investigated to see if using content-specific music can help high schoolers learn better and we also wanted to see if the students would find the music enjoyable. This was done by a total of 38 students altogether all mixed between grades 10 and 11. This was also done by the high school Spanish teacher and the 11th and 12th grade History teacher. 10th grade is split into two groups, 10A, and 10B and 11th grade are also split into two groups, 11A and 11B. We expected to find that the group that got the music would do better than the group that did not. Instead, we found that the groups did similarly.

First, we hypothesized that the content-specific music will make learning in Spanish class better based on the graded in-class assignment immediately after the song was played and the test three weeks later. There were two students absent in the experimental group and one student absent in the control group. Students in the experimental group listened to a Spanish song ("¿QUÉ COMIDA / BEBIDA TE GUSTA?," which translates to "What food/drink do you like?) during a lesson on eating and drinking food and drinks. The control group got the same lesson without the song and did the same assignments.

An independent t-test showed a significant difference in the average assignment scores ($t(15) = -2.96$, $p = 0.004$). The control group ($M=12.1$, $SD=1.7$, 81% grade) scored significantly higher than the experimental group ($M=9.8$, $SD=1.6$, 65% grade). We also looked at the test scores a few weeks later, one additional student was removed from the experimental group because they were absent the day of the test. An independent t-test did not find a significant difference between the scores ($t(14)=1.06$, $p=0.15$). The experimental group ($M=104.9$, $SD=12.2$, 85%) scored higher than the control group ($M=98.5$, $SD=11.4$, 79%).

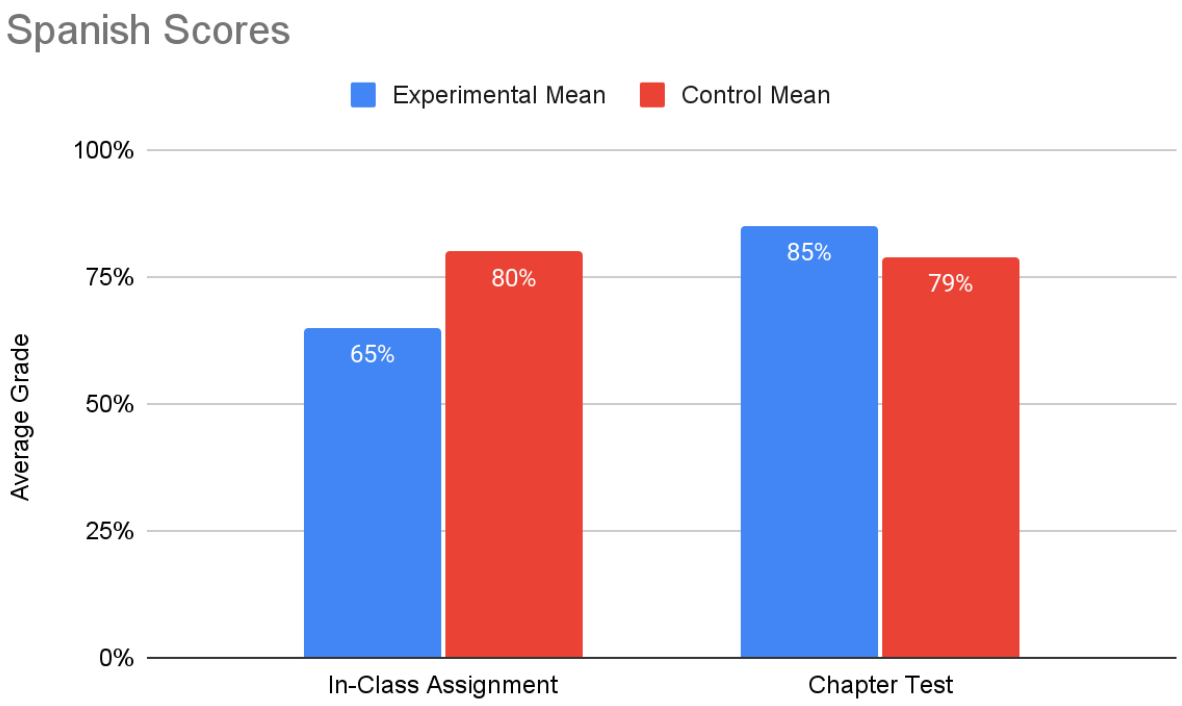

Figure 1. Spanish Scores. *For the in-class assignment, the graph shows the experimental group (who had the song) did significantly worse than the control group but did about the same as the control group on the test. However, this difference was not significant.*

Second, we hypothesized that the content-specific music will make learning better in History based on the graded warm-up and the longer writing assignments. Students in the experimental group listened to a historical song ("John Brown's Body") while learning about abolitionists. An independent t-test found no difference between the control group and the experimental group on their quick write warm-up ($t(18)= 0.66$, $p = 0.26$). The group that had the song scored slightly higher ($M= 8.9$, $SD=0.8$) than the group that did not get the song ($M= 8.6$, $SD= 0.9$).

The follow-up writing assignment titled "Ranking Abolitionists", which asked students to reflect on the abolitionists and their tactics showed no difference between the experimental and control group. Every student scored 100 percent. After talking to the teacher she suggested that we use the quiz instead because the writing assignment was generously graded. An independent t-test found no difference between the control group and the experimental group on their "Causes of the Civil War" quiz ($t(19)= 0.47$, $p = 0.32$). The experiment group did slightly better ($M=13.5$, $SD=3.2$) compared to the control group ($M=12.7$, $SD=3.7$) Overall, the experimental group did better on two out of the three assignments.

This could show that the music played a small part in that somehow, but the results are so small that we can not really say for sure.

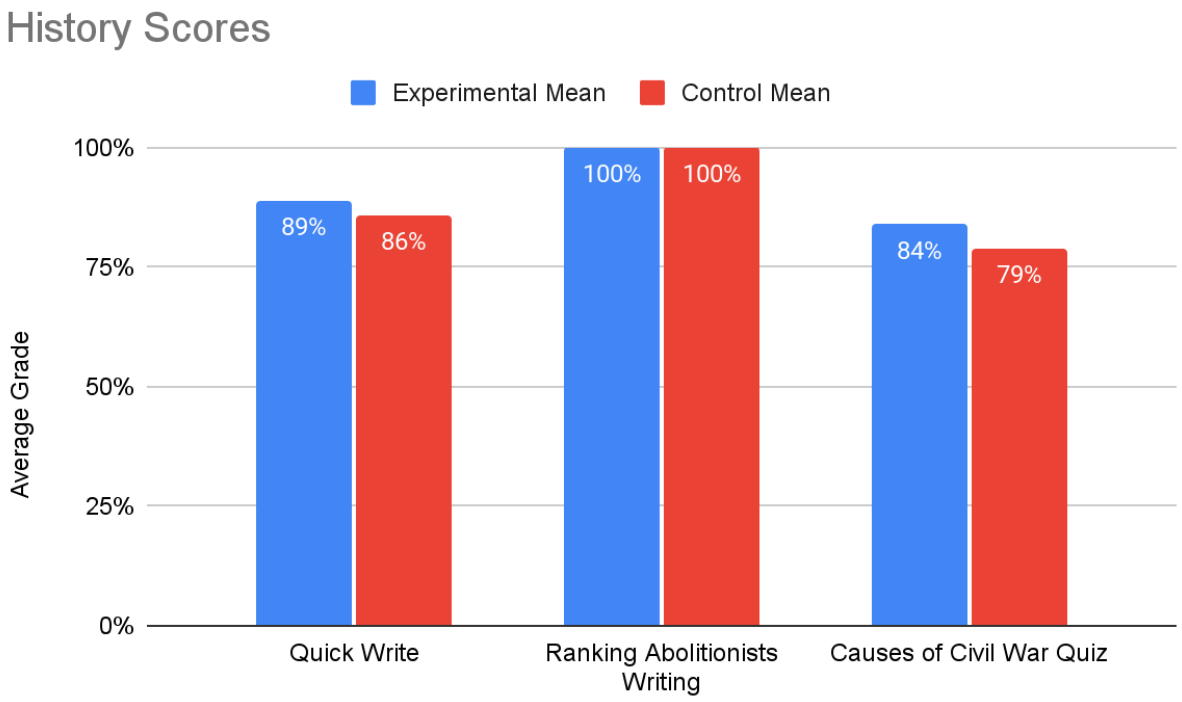

Figure 2. History Scores*. For the quick write, the experimental group, who had the song, did slightly better than the control group. Both groups scored a 100% on the Ranking Abolitionists assignment. An experimental group also did better on the quiz, but there were no significant differences across all three.*

After we collected the scores from the assignments, we gave a follow-up survey to determine if the students enjoyed and remembered the songs that were played in class. Both surveys were given to each experimental group three weeks after the song was played. Of the eight Spanish students who participated, only three of them said they remembered the song. The average enjoyment score was 6.3/10, and the average score for helping them learn was 6.7/10. In history, six students were available to take the survey, and all six remembered the song. The average enjoyment score was a 3.8/10, and the average score for helping them learn was a 5.3/10. Overall, the students in both classes did not seem to enjoy or remember the songs.

Discussion

In this study, we sought to find if content-specific music can be helpful when it comes to learning Spanish and history. Our first hypothesis was that playing a Spanish video about eating and drinking foods would help them do better on their in-class assignment and then on the test that came later. This was not supported by our data (Figure 1), on the in-class assignment the control group did significantly better, and there was no significant difference in the scores on the test given a few weeks later. Our second hypothesis was that playing a song about John Brown would help them do better on two writing assignments and a quiz. This was not supported by our data (Figure 2), on the writing assignments and the quiz, there were no significant differences. However, there was a small benefit for the experimental group's scores. However, because so few people enjoyed the song, we can't say for sure that the music played a part in that.

In prior research by Perez et al (9), they found that even though Spanish music was the most difficult method of learning according to students, it was also the most commonly used media. We found that scores did not improve after the Spanish song, so it must have been difficult for them. Also, our average enjoyment score was only a 6.3/10. Therefore, this suggests that using Spanish music to learn Spanish may not be as helpful as people think it is. Because Perez did not measure scores, we thought it would be helpful to compare with someone else, such as Smolinski's study about using science lyrics (3).

In a prior study by Smolinski (3), he found that content-specific music helped on a science quiz. We found that the music did not help on the Spanish test. The amount of times that they interacted with the song may have played a part in them doing well on the test. In our study, students only listened once, while it was three times a week for four weeks in his study. We found that there were also a few more factors that may have been beneficial to their test scores, such as the interactivity level. In their study, students sang the songs, while in ours they listened and watched. Smolinski's students also had a musical interest because they were a choral group. Therefore, we argue that music may or may not be helpful, and it depends on other factors like the amount of times one interacts and if one likes music. However, teachers should not expect a one-time video to drastically change scores.

In a prior experiment by Marceau (2), he found that even though History music was not what you would think it is, it was somewhat helpful when it came to learning, and it made learning more fun. We found that the students in our study did not enjoy the music as much as the students did in Marceau's. The enjoyment score was 3.8/10, while 98% of Marceau's students enjoyed the songs. We believe that it had something to do with the kind of music we played. So, Marceau's choices were pop songs from the time period, which were modern and enjoyable. While in our study, the song was rather dull and dated. Therefore, this suggests that using historical music to learn History may not be as helpful nor enjoyable as people think it is, and depends a lot on the type of music played.

One limitation of this project is that the groups were very small. In order to have an actual significant difference, it may have helped to have a bigger group of people. If the music were only to help a small amount, we probably missed it because the groups were so small. In the future, we suggest that researchers use groups with more students. Second, we were limited by problems with grading. For one of the assignments in History, the assignments were graded generously, as everyone got a 100%, so it was not possible to find a difference when everyone got a good grade. We can't prove music helped with that. In the future, we suggest asking the teacher if we could write our own assignment instead.

Additionally, we would have preferred that students had more interaction with the music. However, we were compromising with teachers because we did not want to interfere with the plans the teacher already had. If we did this project again, it might be nice to ask teachers if they could play the song more. Finally, we thought it might be a good idea to find out which type of intelligence students have, in order to see if musical intelligence changes results and if students with musical intelligence do better. Because research (4) says people with musical intelligence interact with music better, it might be in our study that no one had strong musical intelligence, or if they did, they were in the control group.

The major takeaway that we found in this study was that music was not really a big help when it came to learning. In the other studies and experiments that were done, there were more students to have more data to prove the points of the teachers who were doing these studies. If we were the teachers, we may have been able to do some things differently. For example, we could have played the song in class as many times as we wanted, or we could have assigned the song as homework and had them listen to it. We could have also given them more assignments about the song. In conclusion, music can be useful in order to make a learning experience more enjoyable, but it may not be the best way to study or help students to retain information.

Method

Participants

The students who participated in this study were 10th and 11th graders from The Neighborhood Academy which is a private school in Pittsburgh. On the day of the History experiment, there were 10 students in the experiment group (with one absent) and 11 students in the other group (with one absent). An independent t-test found no significant difference in semester grades before the experiment ($t(19) = -0.77$, $p= 0.45$). The experiment group ($M=89.6$ $SD =7.3$) had similar grades to the control group ($M=91.7$ $SD = 5.2$). On the day of the Spanish experiment one group had 8 students and 2 people absent and the other group had 9 students with one absent. An independent t-test found no significant difference in semester grades before the experiment ($t(15) = -1.11$, $p= 0.28$). The experiment group ($M=78.9$, $SD =10.5$) had similar grades to the control group ($M=83.9$ $SD = 8.8$).

Materials

The materials were a Spanish song called "¿QUÉ COMIDA / BEBIDA TE GUSTA?," which translates to "What food/drink do you like?" (10). This song was written and produced by Señor Soto on Youtube. The song talks about the vocabulary words for food in Spanish. It also talks about *comer* and *beber,* which translates to *to eat* and *to drink*. There were also assignments that went along with this song such as a timed in-class exit ticket that was graded after the song and lesson were given. The control group just got the lesson without having access to the song. Two weeks later a chapter test was given and the teacher gave the students verbal questions and graded them based on how well they remembered the words from the song and the lesson.

The materials that were used for History were the song "John Brown's Body" from a 1901 recording that was sung by J.W. Myers, and originally written by William Steffe in 1861 (11). There were also some lyrics that were given to the experimental group to go along with the song (12). The teacher also gave a warm-up which was a quick writing assessment the day after the experimental group heard the song. Then later on the teacher gave both groups a longer writing assignment where the students had to rank and justify the methods of the different abolitionists. In both classes, the teacher graded the assignments. In Spanish it was scored as incorrect or correct and in History, it was scored using a rubric based on how detailed the answer was.

Procedure

For our study, first, we had to find teachers who were willing to participate and take time from their class to help us. The 10th grade Spanish teacher and the 11th grade History teacher both agreed to help us. Next, we had to give teachers our plans and what we were going to do, and how the study was going to go. The next step was to find songs for both Spanish and History that would work for the lesson that the teachers gave.

Next, we had to have meetings with each teacher to discuss the lesson plans and show them the songs. In Spanish, the teacher suggested that we find songs that had to do with food, and the verbs *comer* and *beber*. The song that we showed the teacher was a good choice because it was catchy and it covered everything that the teacher wanted to cover. It also showed pictures, Spanish words, and English words on the screen so the students could study the words to know what means what. We thought that using this song and video would be a great way to connect back to the Multiple Intelligence Theory and be able to appeal to all intelligences.

In History, the teacher said that they were studying abolitionism leading up to the Civil War. The song we chose was a good choice because it was from the time period that they were studying. It also had

to do with John Brown, who was very relevant in the lesson. In both classes, the teachers were excited to play the songs in their classes, and they said they looked forward to playing them in class.

Then, after our meetings, we sent a follow-up email to reiterate what we discussed in our meetings. Later on, we had to check in with the teachers again in order to make sure there were no questions. Then, we had to wait for the teachers to do the lessons and give out the assignments in order to get the class's grade averages and do the t-tests. Our final step was to do a follow-up survey to determine whether or not the students enjoyed the song or even remembered it.

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