The Effects of Live and Recorded Music on Preschool Students' On-task Behavior

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Abstract

The purpose of this study was to determine the effects of live and recorded music on preschool students' on-task behavior. Previous studies suggest background music can improve students' on-task behaviors. The sample for this study consisted of eight children in a three-year old Sunday school classroom from a large church in East Tennessee. Data were collected using no background music, recorded background music, and live background music played by the researcher on the violin while the students were working. The students were first observed for off-task behaviors during two weekly class meetings with no music. The next two meetings, the students were observed for off-task behaviors while classical violin music was played in the background. For the last two meetings of observation, the researcher played Classical music on the violin. A list had been made with each student's name. When a student was observed to be off-task, a tally-mark was placed by his/her name. Data were analyzed using a paired-samples t-test as well as a Pearson Product Moment correlation. Results indicated there were no significant differences in on-task behaviors while working with no music, recorded music, and live music. The results did indicate a negative correlation between no background music and recorded background music. The increase in the variable of recorded background music decreases the variable of no background music. The results suggest the implementation of recorded Classical background music in the preschool classroom could have a positive effect on the on-task behaviors of preschool students.

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IRB form has been removed due to privacy of information and has been archived separately.

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Chapter 1

Introduction

Music is used in many aspects of our daily lives. We hear it on television, in movies, at the grocery store, and shopping centers. The music in a movie can enhance our suspense for what is about to happen. Stores supposedly use certain types of music to entice us to make certain purchases. Music has a powerful effect on our moods. Music has long held an important place in worship services. However, we do not always hear music in learning situations. Classrooms and Sunday school rooms are often expected to be quiet areas in order for learning to occur. Children can be affected by music as well as adults. Parents sing lullabies to infants to get them to sleep and young children are taught the alphabet through song. One study has shown that infants as young as five months respond to music by moving to the rhythm. They also seem to find music more interesting than speech (Dean, 2013). Music has been known to show improvements in verbal intelligence and according to Dean (2013), children become thirty times more helpful after making music compared with listening to a story. Music is also good for building social emotional bonds among children. Preschoolers have been known to laugh and hug each other after singing or performing songs (Morehouse, 2013).

Since music is played in the background in so many areas of life, music could also be played in classrooms. One study played classical music during different times of the day to see the effects on learning behaviors. The music did have a positive effect (Dolev & Ziv, 2013). Dolev and Ziv (2013) conducted a study to find the effects of background music on bullying. The findings from this study were promising. They found that music could be beneficial to create a calm and positive atmosphere (Dolev & Ziv, 2013). One place that is expected to have a calm

and positive atmosphere is the Sunday school classroom. Preschool students are not always calm for the time that they are in Sunday school. For many of them, Sunday school is their first classroom experience. The teachers are usually volunteers who have probably never had any training for classroom management. The use of background music may be a way to help these teachers and students have a more cohesive and structured lesson. A study in a London junior high school used calming, background music to find its effects on the ability of students to finish math questions. The students did not perform the math questions with more accuracy but they were able to finish more problems within a shorter amount of time (Hallam, Katsarou & Price, 2002). Hallam, Katsarou, and Price (2002) also studied the differences between calming music and exciting, aggressive music for performing tasks. They found the calming music to have positive effects while the aggressive music had a negative effect. Students were able to complete memory tasks better after listening to calming music than they were with aggressive music (Hallam, Katsarou & Price, 2002).

Another study was performed by two teachers who wanted to see if background music could help their students remain on-task during independent work times. Their students were found to stay on-task with a 32.63% increase (Knobloch & Silverman, 2012). Knobloch and Silverman (2012) also said that the children in their classes requested the music when it was not being played and the principal could see a difference in the atmosphere of the classroom with the music.

Many churches have transitioned to the use of contemporary music which is considered more exciting than traditional church music by some. This change has also affected the curriculum in many Sunday schools. Students are expected to be excited about church but this could pose behavior problems with preschool children. Young children may not have developed

the ability to transition from jumping and singing to sitting still to listen to their Bible story. Preschoolers learn through playing games. Music can be learned through games without diminishing the value or benefits (Morehouse, 2013). Music games or songs, as well as background music could be used to signal transition times for young children in the Sunday school classroom. Background music that is calming or relaxing could help young students make transitions more quickly.

Statement of the problem

The effects of music on students' academic performance have been researched for years. Davidson and Powell studied the effects of music on fifth grade students (1986). Hallam, Katsarou, and Price also used background music to find the effects on task performance of elementary school students (2002). Each of these studies used classical music with no lyrics. However, there have not been as many studies conducted using live classical music. The Bolton Project was a long term study that involved a resident group of classical musicians that played classical music as well as taught lessons that incorporated the classroom curriculum (Fox & Perret, 2004). The researcher of this study wanted to find the effects of live background music in the preschool classroom. Therefore, the problem for this study was to determine the effects of both live and recorded music on preschool students' on-task behavior.

Purpose of the study

The purpose of this study was to examine the effects of live and recorded music on preschool students' on-task behavior.

Significance of the study

The significance of this study was to help preschool Sunday school teachers keep their students on-task during different activities. Sunday school teachers are not always trained teachers and they had some difficulty keeping their students on-task. Taking the time to calm students took time away from instruction time. Sunday school teachers needed to teach their young students rather than merely "babysitting" while their parents were in worship service. It is important for preschool students to learn how to remain on-task. It could help them when they begin Kindergarten. This study could also be beneficial to other preschool and elementary school teachers.

Limitations of study

The following limitations were imposed on this study.

1. The sample for this study came from one Sunday school class and therefore the results cannot be generalized.
2. The instrument used to measure on-task behaviors was designed by the researcher and was not tested for validity or reliability.

Operational definitions

Background music- Music that is played quietly and does not interfere while students and teachers are performing various activities.

On-task behaviors- When students remain occupied with the activity in which they are currently participating.

Preschool students- The children in this study were three years old.

Sunday school- The class that children and/or adults attend at church to learn about the Bible.

Recorded music- Music that is played from CDs or computer files by different professional artists.

Live music- Music that was performed on the violin by the experimenter in this study.

Overview of study

This study consists of five chapters. Chapter 1 consists of statement of the problem, purpose of study, the significance of the study, limitations of the study, operational definitions, and overview. Chapter 2 is a review of literature. Chapter 3 covers the methods and procedures that were used to conduct the study. Chapter 4 includes collection of data. Chapter 5 comprises of the findings, conclusions, recommendations, and implications.

Chapter 2

Review of Literature

There have been many studies performed in the past involving music and its effects on humans. Musicians and their listeners are both affected by the power of music. Music is everywhere. Besides hearing it on television, in movies, and as part of worship services, music is often playing in the background. Many work places have radios playing throughout the workday. People also listen to music while doing housework or homework. Some people claim listening to music makes them more productive while others may complain of its distractions. The classroom is generally an environment that remains quiet and does not include much or any background music. There is potential for music to enhance learning and on-task behaviors in the classroom (Davidson & Powell, 1986).

Effects of Music on the Brain

One topic of study that has been performed quite often is the effect of playing or listening to music, on the brain. The act of playing music uses different areas of the brain simultaneously. Music stimulates both hemispheres of the brain at the same time. This "boosts learning and information intake" (Magilone, pg. 2), which can increase cognitive skills (Magilone, 2006). Evidence has also shown that the corpus callosum, the bundle of nerves that connects the two hemispheres of the brain, to be larger in trained musicians (Fox & Perret, 2004). Fox and Perret (2004) also state that music may improve cognitive agility. This means that the ability to manage different types of information, and being able to apply them appropriately, may be improved (Fox & Perret, 2004).

Participating in music lessons has been shown to increase cognitive skills in children (Magilone, 2006). Cognitive neuroscientists have found even small exposure to music lessons

during childhood creates neural circuits for the processing of music that are less enhanced in those with no training (Levitin, 2006). According to Magilone (2006), music can enhance spatial IQ by increasing short and long term memory. Another notable benefit is that trained musicians perform better on word memory tests than untrained adults. This may be a result of the way classical music affects the brain's organization and abilities through melody and rhythm (Magilone, 2006). Morehouse (2013) states that most preschool age children recognize, understand, and respond to the structure of music. When children participate in music lessons they learn to listen better which allows the ability to discern the structure and form of music (Levitin, 2006).When listening to music from the Baroque and Classical periods, the brain releases more serotonin, which lets the body and mind perform better (Magilone, 2006). The production of serotonin helps ease tension. If the listener is more at ease, it could help the listener remain relaxed and more on task. According to Magilone (2006), the rhythms and beat patterns of music from the Baroque period affect breathing rates and electrical resistance of the skin which influences the hormone system. All of these effects on the body can help the brain work more efficiently. Albert Einstein, one of the most well-known geniuses, was a violinist. He claimed that one of the reasons he was so smart was because he played the violin (Magilone, 2006). Simply listening to music will not produce a new generation of Einstiens, but the benefits for cognitive abilities should not be ignored.

Background Music and Concentration

Background music has benefits for cognitive abilities, breathing, and relaxation but some adults claim that music can be distracting. Some teenage students like to listen to music while studying. They claim it helps with their studies. Many workplaces have music playing in the background too. Some workplaces think that it boosts morale and productivity. However, it is a

concern as to whether or not it has an effect on concentration. It is known that background music can alter human behavior and the tempo of music may influence the heartbeat of its listeners (Huang & Shih, 2011). Lyrics in music can be distracting to listeners but instrumental music can actually improve reading comprehension (Huang & Shih, 2011). More intense music, of higher volume and tempo, is more distracting (Chou & Tze, 2010). Chou and Tze (2010) conducted a study with college students to determine whether hip hop or classical music in the background would be the most distracting. The music used for the classical music group was a CD of music by Mozart. The second group was exposed to a collection of popular hip hop songs that were of fast tempo and popular at the time of the study. There was also a control group that did not listen to any background music. The study found that the performance of cognitive tasks can be affected by the type of background music that is played (Chou & Tze, 2010). Chou and Tze found that hip hop music can have a greater detrimental effect on a reading concentration task than classical music. Chiang, Huang, and Shih (2012) also found that background music with lyrics affects attention performance more than that without lyrics. They found that if background music is going to be played in the work environment, it should not have lyrics.

Another aspect of using music in the workplace is the matter of personal taste in music. If a listener does not like the background music it can have a greater negative effect on performance. Huang and Shih (2011) found that when they had listeners take a test, a strong like or dislike for the background music had a "negative and statistically significant effect on attention test scores" (p. 386). It is important for workplaces to avoid music that workers strongly like or dislike when choosing background music in order to have the best impact on work performance (Huang & Shih, 2011). It is also important to take into account the effect background music can have on any trained musicians within the workplace. They have been

trained to listen carefully and may not be able to block it out. There may be no such thing as background music for the trained musician because they have been taught to listen attentively (Fox & Perret, 2004). Background music could affect trained musicians in the workplace differently than other workers.

Children can also be distracted by background music. If they are musicians they are also at further risk of distraction. Bloor (2009) found that a student who could be classified as a musician struggled to work with background music. It was difficult for this child to sit still. He was "unable to do anything but move to and listen to the music" (Bloor 2009, p. 261). Bloor's study was done to determine the effects of background music on children while taking a test. He chose students who could be classified as musicians. Some took music lessons while others sang in the church choir. Some children were found to tap a pen or make bodily movements in time with the music (Bloor, 2009). Bloor (2009) also observed children mock conducting the music or pretending to play a musical instrument once they were finished taking the test. His findings show that regardless of whether or not the music is distracting, it does have an effect on the behavior of children (Bloor, 2009).

Background Music for Students with Emotional and Behavioral Problems

Another way to use the effects of background music on behavior is in children with emotional or behavioral problems. Children who have emotional problems may have difficulty remaining on-task with independent class work. Aylesworth, Deutsch, and Parks (1976) performed a study with an emotionally disturbed seven year old boy who would isolate himself and become self-destructive when he was frustrated. This caused him to have difficulty with his schoolwork. After performing a baseline, they implemented the use of a tape recorder and

headphones for the boy. He was told that if he wanted to listen to music he would have to do his schoolwork. While he was working, the music played but when he stopped the music also stopped (Aylesworth, Deutsch & Parks, 1976). The findings from this project were that music can be used as positive reinforcement. The self-destructive behavior of the boy stopped completely while he was allowed to listen to the music. This treatment indicated that with the use of music, a child could be slightly more motivated to work on school work (Ayelsworth, Deutsch & Parks, 1976).

Hallam and Price (1998) also found that music can be beneficial for children with emotional and behavioral problems. The children they observed displayed behaviors with tantrums, crying, verbal aggression, and general over-activity. Background music was played while the students were working on math problems. All of the students performed better on the math problems while background music was present. A decrease in hostility among the students was also noted with the presence of background music (Hallam & Price, 1998). When calming background music was played in the classroom, there was an increase in performance and the greatest effect was observed on the children who were considered hyperactive (Hallam & Price, 1998).

The Effects of Music on Tourette's and Parkinson's

Music can also have effects on other involuntary and neurological problems. People with Tourette's syndrome can be affected in both negative and positive ways. Their tics may become worse or less common by listening to music. Some may actually become absorbed in the music they are listening to and forget about their tics while other music can cause stronger tics that are more difficult to try to control (Sacks, 2007). Sacks (2007) found that people with

phantasmagoric form of Tourette's may show more complex reactions to music. Their ticcing becomes a representation of the music they are hearing (Sacks, 2007). The energy from Tourette's can be redirected by the physical act of playing music such as drumming (Sacks, 2007).

Music can be a form of therapy for those with Parkinson's disease. The Parkinsonian stutter, which is the starts and stops of movement by those with Parkinson's can respond to the rhythm and flow of the right kind of music (Sacks, 2007). Sacks (2007) found that playing music for a patient could lessen the automatisms of her disease and the movements became replaced with ease and flow of movement. She was even able to conduct the music and dance to it. It is important that the right kind of music be played though. It has been found that this music must be legato and have a well-defined rhythm (Sacks, 2007). This kind of music could have a calming effect.

There are other situations where the calming effects of music can be beneficial. Music can alter moods and create a positive atmosphere that influences behaviors and emotional cognitive processes (Dolev & Ziv, 2013). Dolev and Ziv's (2013) study on the effects of background music had promising results. It was suggested that music could be a tool for creating a calm atmosphere that could influence the behavior of children. By calming aggressive behaviors, Dolev and Ziv found bullying to decrease.

Music for the Learning Disabled

It has been hypothesized that background music could increase student performance in writing fluency and quality of writing by Legutko and Trissler (2012). Their study involved observations of children age eleven to twelve who had specific learning disabilities in reading

and writing or both. Compositions by Mozart were chosen due to the upbeat tempo and because they were from the classical period. Throughout the experiment, all of the students improved their writing efficiency (Legutko & Trissler, 2012). In the beginning of the study, some students complained that the music was distracting but when the music was removed those same students were disappointed that it was gone. Overall, it was found that background music could improve the writing ability of students with learning disabilities compared to writing in silence (Legutko & Trissler, 2012).

Erskine (2002) played Pachelbel *Canon* during class for a group of ten to twelve year olds that had been diagnosed as learning disabled and had been taken out of a regular classroom. When listening to the music they were able to relax and concentrate on their work (Erskine, 2002). Erskine (2002) believes that the students were able to concentrate and achieve more because of the effects of the music. They made improvements in math as well as built their self-esteem. Erskine (2002) states that classical music could be used in the classroom to "enhance learning" (para. 13), reduce stress, and introduce children to beautiful music.

Another learning disability that can be affected by music is dyslexia. Dyslexia is understood to be of neurological origin and is a deficiency in language processing (Fox & Perret, 2004). Studies have shown that those with dyslexia have symmetrical brains. One thought is that during the developmental process of neural pruning, there is an overproduction of synapses. As a result there are too many nerve cells and this leads to a difference in the way function develops (Roehmann & Wilson, 1990). Those with dyslexia have trouble processing phonemes, or the sounds that make up words. Music is made up of rhythms and changes listening skills. Music can improve phonemic awareness which could be beneficial for children with mild to moderate dyslexia (Fox & Perret, 2004).

The Use of Music in the Classroom

Music is being used more often in the classroom due to more and more information being found about its benefits for learning and on-task behaviors. One important experiment on the use of music in the classroom was the Bolton Project. The Bolton Project was performed by members of the Winston-Salem Symphony at an at-risk elementary school during the mid-1990s. The symphony musicians developed lessons that were integrated into the classroom curriculum for students in a first grade class. The students were taught about different aspects of music and how they were related to other subjects they were learning. There were also times that the musicians simply held an open rehearsal while in the classroom. The project continued for several years. After the first two weeks teachers claimed that the students had improved on listening and had longer attention spans (Fox & Perret, 2004). The greatest achievement was three years later when the end-of-grade test results were in. The results showed that some children had scored fifty percentage points higher than the children from the previous year (Fox & Perret, 2004). It is speculated by Fox and Perret (2004) that the exposure to music improved listening skills of the students which resulted in higher achievement.

In the London area there were three schools that were used to study the effects of background music on task performance by Hallam, Katsarou, and Price (2002). The first study that was performed involved math work. The second study involved a memory task. Two types of music were played for the different groups used in these studies. One group listened to pleasant and calming music while another group listened to arousing and aggressive music. There was also a control group. The students in these studies were age eleven to twelve. Hallam, Katsarou, and Price (2002) found that the type of background music played can have distinctive effects on task performance. Music that was arousing and aggressive had a negative effect on

performance in the memory task group while the pleasant and calming music had a positive effect on the number of mathematics problems completed (Hallam, Katsarou & Price, 2002). Hallam, Katsarou, and Price (2002) state the importance of choosing calming background music for classrooms in order to create the "optimum environment" (p. 120), for students to complete individual work. Music could also be used outside the classroom to promote good behavior while students go from different places throughout the school, wait for assemblies to begin, or even while eating lunch (Hallam, Katsorou & Price, 2002).

Davidson and Powell (1986) found that easy-listening background music could be beneficial for increasing on-task performance in an elementary science class. Music that was considered to be easy-listening was an orchestration of strings and woodwinds that had a "melodic melody line over non-dissonant chordal structures and is non-percussive in beat" (Davidson & Powell 1986, p. 30). Their study showed that the benefits were greater for boys than girls. It was believed that the lack of increase for the girls was due to the ceiling effect. The girls were already ninety-nine percent on-task during the first 15 days of the study (Davidson & Powell, 1986).

Another aspect of remaining on-task is the consideration of whether students can remain still during classwork. Students who have problems with hyperactivity often need interventions to help them remain on task. A study by Wolfe (1982) examined the use of continuous music on bodily movement and task performance. The study was conducted on two groups of children. One group was considered hyperactive while the other was not. Wolfe (1982) sought to find effects of music on motor behavior. The students in his study had not been diagnosed as hyperactive but had been evaluated as such by their teacher (Wolfe, 1982). His methods involved seeing each child individually for three separate tests and were completed over three

months. The method he used involved a tape recorder that had a foot pedal attached in order for the assistant to turn the music on and off without the student being able to see it. He also used a video recorder to document the subjects. The pieces of music that were used were four different marches by John Philip Sousa. While the background music was being played the students were given the task of marking through a specific letter in a printed story. In one of the three different tests, the music would be stopped whenever the student made "extraneous" bodily movements (Wolfe, 1982, p.77). It was found that there was no difference in the number of extraneous movements made by the students while the music was being played or not played. The music did not affect the bodily movements of the children that had been classified as hyperactive by their teachers. At the time of this study, students were expected to remain still in their seats a little more than they may be by some teachers today. While music may not help hyperactive students remain stationary, the ultimate goal is that they remain on-task.

Teachers are often looking for new classroom management strategies, ways to keep their students on-task, and to not lose precious instructional time. Two teachers decided to conduct their own experiment on the use of background music in the classroom and on-task behavior. They were also interested to see if playing music would affect transition times in the classroom. These two teachers played music with and without lyrics. It was found that the music with lyrics could be distracting while the classical music without lyrics seemed to relax and focus the students (Knobloch & Silverman, 2012). Their students even began to ask for the music to be played during writing time. The students also did not talk to each other while the music was played unless it was to ask each other for something they needed. Before the use of background music, Knobloch and Silverman (2012) had noticed that many of their students were talking more than remaining on-task and completing assignments. After introducing background music,

the students seemed to be more focused and talked to each other less. The main focus of this study was to find a way to enable students to work more efficiently and save instructional time (Knobloch & Silverman, 2012). The study ended up being beneficial for keeping students on-task.

Conclusion

There have been many studies conducted over the years to find the benefits of background music. Teachers will always be searching for ways to keep students on-task. Music has many positive effects in the classroom. The benefits of music for cognitive development cannot be ignored either. Music has a place in the classroom whether it is by learning music as its own subject or using it as a classroom management tool. Music is valuable. This literature review showed the effects of background music on school-age children and adults. Therefore, further study needs to be conducted to see if background music can affect the on-task behaviors of preschool students.

Chapter 3

Methodology and Procedures

The purpose of this study was to determine the effects of live and recorded music on preschool students' on-task behavior. In the past, studies have been conducted to find the effects of background music on performance and behaviors of school-age children. There have also been studies conducted to find whether or not background music can be a distraction for adults in the workplace (Chiang, Huang, & Shih, 2012). Sunday school teachers are volunteers whose services could benefit from a positive effect of music in the classroom. Therefore, this study is important in order to find the effects of background music in a Sunday school classroom.

Population

The population for this study was from a large church in Gray, Tennessee. Gray is an East Tennessee community that is situated between the cities of Kingsport and Johnson City, Tennessee. The church is active within the community. Members of the church often help with local events and within the local schools. The church has 740 members. There are 200 children on the roster with an average of 90-100 in attendance each week. There are two elementary schools and a high school in the town of Gray. Most of the congregation of the church lives within the community but there are several others who commute from within the Tri-Cities area. The median household income for the area was $37,047 as of 2010.

Sample

This study was conducted with children from the Wee Worship Sunday school class at the church. The Wee Worship class was for 3 year old preschool children. There were 8 total children that were part of this study. The majority of the children were Caucasian and from

middle class families. Wee Worship met during two different worship hours. The first class was from 9:30 -10:45 a.m. The second class met from 10:55 a.m.- 12:00 p.m. During the second class, the Wee Worship class was combined with the 4 year old class beginning at 11:30 a.m. Research was conducted during the second hour of worship until these classes were combined at 11:30. There were 2 volunteer teachers for each class.

Data Collection

Data for this study were collected using tallies for the number of times each student was off-task. The students were first observed for off-task behaviors during two weekly meetings with no music. The class was then observed for two weekly meetings on the number of times the students were off-task when participating in class activities with recorded background being played. After the two weeks of recorded music were completed, the class was observed for two weekly meetings for the number of times students were off-task while live background music was played by the researcher. The number of times students were off-task were tallied. During the three phases that the students were observed, they were working on equivalent tasks that were similar in comprehension and difficulty. Data were compared for the three phases.

Procedure

The researcher began this study by asking permission from the youth minister at a local church. The youth minister suggested classes that would be appropriate for the study. The youth minister spoke with the Sunday school teachers about the possibility of study in their class. The regular teacher of the 3 year old class agreed to let her class be the sample for the study. A consent letter for the parents of the preschool children was written and approved by the staff at the church. The consent letter was distributed to the parents. Once the letters were signed and returned to the researcher, the study began. The researcher began the study by observing the 3

year olds during a regular class for two weeks with no background music present. The researcher took note of the number of times each student was off-task throughout the class by placing a tally mark next to the name of each of those students. The following two weeks, recorded background music was played during class. The recording was classical violin. While the music was being played, the class was observed for off-task behaviors. A list with the names of each of the students was made and when a student was off-task a tally mark was placed by his/her name. The idea of using a list to mark which students were off-task was taken from Knobloch and Silverman (2012). The following two weeks the researcher played live, classical music on the violin during class and observed the off-task behaviors of the students. A list was used again to mark which students were off-task. The data collected for both sessions were collected and analyzed.

Research Questions and Hypotheses

Research Question 1:

Is there a difference between preschool students' off-task behaviors when working with live background music and recorded background music?

Research Hypothesis 1:

There is a difference between preschool students' off-task behaviors when working with live background music and recorded background music.

Null Hypothesis 1:

There is no difference between preschool students' off-task behaviors when working with live background music and recorded background music.

Research Question 2:

Is there a difference between preschool students' off-task behavior when working with no background music and when working with recorded background music?

Research Hypothesis 2:

There is a difference between preschool students' off-task behavior when working with no background music and when working with recorded background music.

Null Hypothesis 2:

There is no difference between preschool students' off-task behavior when working with no background music and when working with recorded background music.

Research Question 3:

Is there a difference between preschool students' off-task behaviors when working with no background music and live background music?

Research Hypothesis 3:

There is a difference between preschool students' off-task behaviors when working with no background music and live background music.

Null Hypothesis 3:

There is no difference between preschool students' off-task behaviors when working with no background music and live background music.

Research Question 4:

Is there a relationship between preschool students' off-task behaviors when working with no background music and recorded background music?

Research Hypothesis 4:

There is a relationship between preschool students' off-task behaviors when working with no background music and recorded background music.

Null Hypothesis 4:

There is no relationship between preschool students' off-task behaviors when working with no background music and recorded background music.

Research Question 5:

Is there a relationship between preschool students' off-task behaviors when working with no background music and live background music?

Research Hypothesis 5:

There is a relationship between preschool students' off-task behaviors when working with no background music and live background music.

Null Hypothesis 5:

There is no relationship between preschool students' off-task behaviors when working with no background music and live background music.

Chapter 4

Data Analysis

The purpose of this research was to determine the effects of recorded and live music on preschool students' on-task behavior. The research was conducted in a three-year old Sunday school classroom in a large church in East Tennessee. Data for this study were collected using a tally mark system. The students were observed for off-task behaviors while recorded and live music were played in the background.

Collection of Data

Data for this study were collected from a sample of eight, three-year old children in a Sunday school classroom. The demographic for this class was primarily Caucasian with seven girls and one boy. The demographics of this sample are displayed in Table 1. The participants for this research were used for collection of data with no music as well as recorded and live music. The recorded music was a CD of classical violin music. The live music was classical music played by the researcher on the violin. The data were collected using a tally mark system to document off-task behaviors through observations made by the researcher. The researcher placed a tally mark by the name of students who were observed to be off-task during class time instruction while the researcher played either recorded or live background music.

Table 1

Demographic Profile of Participants

Group	Frequency (f)	Percentage (%)
Gender		
Male	1	12.5
Female	7	87.5
Total	8	100
Age		
3	8	100
Total	8	100
Race		
Caucasian	8	100
Total	8	100

Research Questions and Related Hypotheses

Six research questions were used to guide this research. Each research question was followed by a research hypothesis and a null hypothesis. The data were analyzed using a significance of $p < 0.05$.

Research Question 1:

Is there a difference between preschool students' off-task behaviors when working with live background music and recorded background music?

Research Hypothesis 1:

There is a difference between preschool students' off-task behaviors when working with live background music and recorded background music.

Null Hypothesis 1:

There is no difference between preschool students' off-task behaviors when working with live background music and recorded background music.

To answer the research question, data were collected from the participants while being observed for off-task behaviors. The participants were first observed while playing a CD of classical violin music in the background. The participants were then observed while the researcher played the violin. A paired samples t-test was conducted to determine if the difference in off-task behaviors while playing recorded or live background music was significant. The mean score for recorded background music was 1.875 and the mean score for live background music was 2.75. The results indicate no significant difference, ($t(7)= -0.813$, $p= 0.443$). The mean for recorded background music ($M= 1.875$, $SD= 1.88$) was no different than the mean for live music ($M= 2.75$, $SD= 1.58$). Therefore, the null hypothesis must be retained. The results are displayed in Table 2.

Table 2

Dependent t-test for Recorded Background Music and Live Background Music

Variable	M	SD	df	t	Sig.(2-tailed)
Recorded Music	1.875	1.885	7	-0.813	0.443
Live Music	2.75	1.580	-	-	-

Note: $p<0.05$

Research Question 2:

Is there a difference between preschool students' off-task behaviors when working with no background music and recorded background music?

Research Hypothesis 2:

There is a difference between preschool students' off-task behaviors when working with no background music and recorded background music.

Null Hypothesis 2:

There is no difference between preschool students' off-task behaviors when working with no background music and recorded background music.

To answer the research question the students were first observed for off-task behaviors with no background music for two weeks then for two weeks with recorded background music. A paired samples t-test was conducted to determine if the difference in students' off-task behaviors with no background music and recorded background music were significant. The mean for no music was 6.25 and the mean for recorded music was 1.875. No significant difference was realized ($t(7)= -1.745$, $p=0.124$). Therefore the null hypothesis was retained. The results are displayed in Table 3.

Table 3

Dependent t-test for No Background Music and Recorded Background Music

Variable	M	SD	df	t	Sig.(2-tailed)
No Music	6.25	5.59	7	-1.745	0.124
Recorded Music	1.875	1.88	-	-	-

Note: $p<0.05$

Research Question 3:

Is there a difference between preschool students' off-task behaviors when working with no background music and live background music?

Research Hypothesis 3:

There is a difference between preschool students' off-task behaviors when working with no background music and live background music.

Null Hypothesis 3:

There is no difference between preschool students' off-task behaviors when working with no background music and live background music.

To answer the research question, a paired samples t-test was conducted to determine the differences in off-task behaviors with no background music and live background music. The mean for no music was 6.25 and the mean for live music was 2.75. No significant difference was realized ($t(7) = -1.782$, $p= 0.118$). Therefore the null hypothesis was retained. The results are displayed in Table 4.

Table 4

Dependent t-test for No Background Music and Live Background Music

Variable	M	SD	df	t	Sig.(2-tailed)
No Music	6.25	5.59	7	-1.78	0.118
Live Music	2.75	1.58	-	-	-

Note: $p<0.05$

Research Question 4:

Is there a relationship between preschool students' off-task behaviors when working with no background music and recorded background music?

Research Hypothesis 4:

There is a relationship between preschool student's off-task behaviors when working with no background music and recorded background music.

Null Hypothesis 4:

There is no relationship between preschool students' off-task behaviors when working with no background music and recorded background music.

To test the research hypothesis, a Pearson Product Moment of Correlation was conducted to determine if the relationship between off-task behaviors with no background music and recorded background music was significant. The mean for off-task behaviors with no background music was higher ($M= 6.25$, $SD= 5.59$) than the mean for off-task behaviors with recorded background music ($M=1.875$, $SD=1.88$). A significant negative correlation was found ($r= -0.727$, $p< .05$) between the off-task behaviors. The coefficient of determination, r^2, was 0.53.

This indicates that 53% of the variance in off-task behaviors may be attributed to the presence of recorded background music and 47% of the variance may be attributed to other factors. Therefore, the null hypothesis can be rejected. The results are displayed in Table 5.

Table 5

Correlation for Off-task Behaviors with Recorded Background Music and No Background Music

Variable	M	SD	r	r^2	Sig. (1-tailed)
Recorded Music	1.875	1.88	-0.727	0.53	0.020
No Music	6.25	5.59	-	-	-

Note: $p < 0.05$

Research Question 5:

Is there a relationship between preschool students' off-task behaviors when working with no background music and live background music?

Research Hypothesis 5:

There is a relationship between preschool students' off-task behaviors when working with no background music and live background music.

Null Hypothesis 5:

There is no relationship between preschool students' off-task behaviors when working with no background music and live background music.

To determine a relationship between students' off-task behaviors with no background music and live background music a Pearson Product Moment of Correlation was conducted. The mean for no background music (M= 6.25, SD= 5.59) was higher than the mean for live

background music (M= 2.75, SD= 1.58). A significance was not found (r= 0.169, p= 0.344) between the two. The results showed a lack of significance (p= 0.344). The coefficient of determination, r^2 revealed a negligible correlation of 3%. 97% of the variance can be explained by other factors. Therefore, the null hypothesis was retained. The results are displayed in Table 6.

Table 6

Correlation for Off-task Behaviors with Live Background Music and No Background Music

Variable	M	SD	r	r^2	Sig.(1-tailed)
Live Music	2.75	1.58	0.160	0.0256	0.344
No Music	6.25	5.59	-	-	-

Note: $p < 0.05$

Chapter 5

Findings, Conclusions, Recommendations, and Implications

This chapter includes a summary of the findings, conclusions, recommendations for future study, and implications for research of the effects of live and recorded background music on the on-task behaviors of preschool students.

Summary of Findings

There were five research questions used in this study to find the differences or relationships between no, recorded, and live background music. All data were analyzed at a 0.05 level of significance.

The first research question for this study stated: Is there a difference between preschool students' off-task behaviors when working with live background music and recorded background music? A paired-samples t-test was conducted to analyze the data. This study showed no significant difference between off-task behaviors when working with live and recorded background music.

One possible reason for the insignificance was the small sample size that was used for this study. A larger sample of participants may have shown a stronger difference between the different types of music. Another possibility was the presence of the researcher. Many of the children were interested in watching the researcher during class time, especially during the presence of live music. The students were interested when the researcher played the violin during class. There were tendencies of the students to stop to watch and listen. Some also were moved to dance or twirl to the recorded background music. This tendency was similar to prior research

conducted by Bloor (2009). Bloor (2009) found that some children were found to tap a pen or move in time to background music that was being played during a test.

The second research question stated: Is there a difference between preschool students' off-task behaviors when working with no background music and recorded background music? A paired samples t-test was conducted to answer the research question. The analyzed data showed no significant difference when working with no background music and recorded background music.

One possibility for the lack of significance was the small sample size. Another possibility could be the presence of the researcher. The participants were aware of the researcher's presence during observations. The young age of the participants caused them to be curious about the presence of the researcher. Acknowledgement of the music by the classroom teacher could also have been a factor. The students were aware that music was being played and at times would stop to listen or move to the music.

The results are not consistent with prior research. Davidson and Powell (1986) found easy-listening background music to be a plausible technique for increasing students' on-task behaviors. Although significance was not realized, the overall atmosphere of the classroom was very calm with the presence of background music. The classroom teacher even made comments about the difference in the children with the music. After this study, the teacher implemented the use of background music during class because she could see a marked difference in the children with the music. The researcher believes a longitudinal study could make a difference in this study. It would give the participants time to be used to the presence of background music as well as the researcher.

To answer the third research question which states: Is there a difference between preschool students' off-task behaviors when working with no background music and live background music, a paired samples t-test was conducted to analyze the data. The data revealed no significant difference when working with no background music and live background music.

The lack of significance is reminiscent of the findings of Huang and Shih (2011). Huang and Shih (2011) found that background music with lyrics could be distracting to adults in the workplace. Other research has found that the type of background music being played can have an effect on the performance of cognitive tasks (Chou & Tze, 2010).

The researcher believes one reason the participants were off-task was due to the novelty of the situation. The young participants may have never witnessed someone playing the violin before. Many of them stopped to watch throughout the class time. Another reason for the insignificance was the change of class room teachers on the days when the researcher introduced live music. The previous classes had different volunteer teachers. The small sample size was still another possible factor. If there had been a bigger group, the presence of a violinist in the classroom may have been less noticeable.

The fourth research question stated: Is there a relationship between preschool students' off-task behaviors when working with no background music and recorded background music? A Pearson Product Moment of Correlation was conducted to answer this question. A significant negative correlation was found. This finding was consistent with a study conducted by Knobloch and Silverman (2012). Their study found students were more focused and stayed on-task while listening to background music during individual work time (Knobloch & Silverman, 2012).

The results of this study suggest that recorded background music can have a positive effect on the on-task behaviors of preschool students. The music was already playing as the children came into the classroom. This set a serene tone which may have helped the students relax and be more receptive to class activities. Another study found that students who had been diagnosed as learning disabled were able to relax and concentrate on their tasks when listening to classical music (Erskine, 2002). The researcher also believes the music had a positive effect on the class teachers. They claimed to enjoy the music and feel relaxed. When teachers are relaxed young students are possibly more relaxed also. Listening to Classical or Baroque period music has been linked to the release of serotonin by the brain which helps ease tension (Magilone, 2006). The research for this study suggests there is a relationship between preschool students' off-task behaviors when working with no background music and recorded background music. The more the students listened to recorded music, the more they were on task. Lack of recorded music increased the number of off-task behaviors.

The fifth research question stated: Is there a relationship between preschool students' off-task behaviors when working with no background music and live background music? To determine this relationship a Pearson Product Moment of Correlation was conducted. There was no significance found.

The possibilities for the lack of significance are similar to the previous research questions. The researcher believes the sample of participants was too small. The students were possibly being exposed to a live musician for the first time. Another reason was also the change of classroom teachers. The size of the classroom itself could be a fourth possibility. The room was not exceptionally large therefore the researcher was within close proximity of the class's activities. Some students were even compelled to stand in front of the researcher to watch the

violin being played. This is consistent with research by Morehouse (2013) where he states that most preschool children recognize, understand, and respond to music.

Conclusion

The purpose of this study was to determine the effects of live music and recorded music on preschool students' on-task behavior. The results of this study suggest that recorded background music may increase the on-task behaviors of preschool students. The insignificance that was also found between no background music and recorded background music suggest that future research needs to be conducted.

Similarly, the results indicate that live background music does not increase the on-task behaviors of preschool students. The lack of increase in on-task behaviors may have been inhibited by the novelty of a live violinist being in the classroom.

Recommendations

For future research the researcher has the following recommendations:

1. This study should be conducted with a larger sample of participants.
2. Research should be conducted with various age groups to find who could benefit the most from the use of background music.
3. A longitudinal study may yield different results due to an adjustment period to the presence of background music.
4. A different population and setting should be considered for this study. A Sunday school classroom has inconsistencies that may have affected this study.

Implications

Based on the findings of this study the following implications are suggested:

1. Teachers can play recorded background music to create a relaxing atmosphere that may increase on-task behaviors.
2. Parents can play recorded classical background music at home to keep children on-task while completing homework.
3. Schools can play classical background music in the hallways before school or between classes to create a relaxed atmosphere that may be more conducive to learning.

References

Ayelsworth, J., Deutsch, H., & Parks, A.L. (1976). The use of contingent music to increase on-task academic behavior in children with emotional problems. *Behavioral Engineering, 3*(3), 77-79.

Bloor, A. (2009). The rhythm's gonna get ya'-background music in primary classrooms and its effect on behavior and attainment. *Emotional and Behavioural Difficulties, 14*(4), 261-274. doi: 10.1080/13632750903303070

Chiang, H., Huang, R., & Shih, Y. (2012). Background music: Effects on attention performance. *IOS Press, 42*(2012), 573-577. doi: 10.3233/WOR-2012-1410

Chou, M., & Tze, P. (2010). Attention drainage effect: How background music effects concentration in Taiwanese college students. *Journal of the Scholarship of Teaching and Learning, 10*(1), 36-46. Retrieved from http://www.iupui.edu/~josotl

Davidson, C.W., & Powell, L.A. (1986). The effects of easy-listening background music on the on-task-performance of fifth-grade children. *Journal of Educational Research, 80*(1), 29-32. Retrieved from http://www.jstor.org.milligan.idm.oclc.org/stable/27540238

Dolev, E., & Ziv, N. (2013). The effect of background music on bullying: a pilot study. *Children & Schools. 35*(2) 83-88. doi: 10.1093/cs/cdt006

Erskine, R. (2002). The power of music in the classroom. *ATA Magazine. 82*(3). Retrieved from https://www.teachers.ab.ca

Fox, J., & Perret, P. (2004). A well-tempered mind. New York, New York: Dana Press.

Hallam, S., Katsarou, G., & Price, J. (2002). The effects of background music on primary school pupils' task performance. *Educational Studies, 2*(28), 111-112. doi: 10.1080/03055690220124551

Hallam, S., & Price, J. (1998). Can the use of background music improve the behavior and academic performance of children with emotional and behavioral difficulties? *British Journal of Special Education, 25*(2), 88-90.

Huang, R., & Shih, Y. (2011). Effects of background music on concentration of workers. *IOS Press, 42*(2011), 573-577. doi: 10.3233/WOR-2011-1141

Knobloch, K., & Silverman, N. (2012). *La, ti, does music affect students' on-task behavior?* Paper presented at Inquiry Conference, Pennsylvania State University. Retrieved from https://www.ed.psu.edu

Legutko, R.S., & Trissler, T.T. (2012). The effects of background music on learning disabled elementary school students' performance in writing. *Current Issues in Education, 15*(1), 1-8. Retrieved from http://cie.as.edu/ojs/index.php/cieatasu/article/view/568

Levitin, J. (2006). *This is your brain on music: The science of human obsession.* New York, New York: Penguin Group.

Magilone, S. F. (2006). Effects of classical music on the brain. *Classical Forums.* Retrieved from http://www.classicalforums.com/articles/Music_Brain.html

Morehouse, P. (2013). The importance of music making in child development. *YC: Young Children 68*(4), 82-87.

Roehmann, F.L., & Wilson, F.R. (1990). *Music and child development.* St. Louis, Missouri: MMB Music, Inc.

Sacks, O. (2007). *Musicophilia: Tales of music and the brain.* New York, New York: Alfred A. Knopf, Inc.

Wolfe, D. (1982). The effect of interrupted and continuous music on bodily movement and task performance of third grade students. *Journal of Music Therapy, XIX*(2), 74-85.