

**Investigation of the Effect of Different types of Background Music on  
Students' Ability to Memorize and Recall from Word Lists**

**Candidate Name and Number: Ramon L. Jackson**

**Type of Study: Music Experiment**

**Subject and Level: Math Studies HL Date of submission: November 18, 2009**

## **Table of Contents**

<b>Abstract.....</b>	<b>pg.1</b>
<b>Introduction.....</b>	<b>pg.2</b>
<b><u>Methods</u>.....</b>	<b>pg.3</b>
<b>Designs.....</b>	<b>pg.4</b>
<b>Participants.....</b>	<b>pg.5</b>
<b>Materials.....</b>	<b>pg.5</b>
<b>Procedures.....</b>	<b>pg.6</b>
<b><u>Results</u>.....</b>	<b>pg.7</b>
<b>Description of Results.....</b>	<b>pg.7</b>
<b>Analysis of Results.....</b>	<b>pg.7</b>
<b>Discussion.....</b>	<b>pg.8</b>

## **Abstract**

**The investigation is to investigate the effect of different types of background music on students' ability to memorize word lists. The music was selected from three genres: classical, rap hip-hop, and gospel, each rated with medium, high and low levels of dissonance respectively. Dissonance is defined as an inharmonious or displeasing sound.**

**For this experiment, I chose 26 participants and there were four different word lists in a repeated measures design. They had two minutes to study each word list, one minute to sit in silence, and one minute to recall and write down as many words as possible. The first test was a control, and no music was played during both the participants studying the words and recalling the words. For the remaining three word lists, the students were exposed to three different types of music during memorization and recollection. The music was played at a normal volume level from a record player. The dependent variable was the number of words a student could memorize from a word list. The independent variable was the genre of music played during memorization and recollection. The order in which the words were written did not affect their scores.**

**All 26 participants were middle school band students aged 12 to 14, attending the Northwest Jackson Middle School. The results show that the null hypothesis must be retained for the tests conducted with the songs "Bad Mamma Jamma" and "Isn't She Lovely" (rap/hip-hop). Although there were slight decreases in the average number of words retained with these two songs, the decreases were not statistically significant.**

## **Introduction**

### **Research Question**

**Does the type of background music played during memorization and recollection have a significant effect on students' ability to memorize and recall word lists? When students study that affect their school success whether good or bad. Children everyday study for major test and find ways such as music to relax and to help them better learn the subject at hand. Many researchers say that music can cause major distractions in the performance of students while others say it only helps them. However, to me it depends upon the student and how much they take the music and relate it to their work. By me investigating the effect of background music on students' ability to memorize word lists may give insight into whether listening to music while studying is effective. Memory is one of the processes studied by the cognitive perspective of psychology.**

### **Review of Literature**

**Students from both Africa and the United States took an exam testing visual, verbal, and mathematical skills while Rock and Roll music was played in the background. The African students performed worse on the test because they were not familiar with the music. Therefore, familiarity with the music impacts on a student's ability to succeed (Peynircioglu, Zehra F. et al. 2002). Jenny Nam Yoon (2000) found that students perform poorly on academic tasks when they are listening to music that they strongly dislike because it causes stress. This goes in on with my experiment when students are not familiar with a piece they would find it hard to concentrate and be successful because of the dissonance in the music found.**

**Susan C. Kagan (2001) says that when children are in an educational setting noise as far as music, cars and truck and ect... can cause major distractions and noise can have a negative effect on students' concentration.**

**The Encoding Specificity Principle of Memory (Thompson & Tulving, 1970), states that the most effective way to recall information is to study the material under the same conditions as when it is to be recalled. In this case, the music should be played during both studying and testing, or not at all, if maximum performance is expected.**

**Researchers at the University of London, Elizabeth Valentine, Ph.D., and Nicholas Foster, investigated which types of music aid memory the most effectively. They studied middle age men and women, and found that they could recall memories more successfully when upbeat background music was played. This experiment's aim is to determine whether students' ability to memorize and recall word lists is effected by the kind of music played in the background during memorization and recollection.**

**Based on the research and experiment of Peynircioglu, et al. and Yoon, if the students in his experiment had completed my experiment they would have responded poorly to “After A Dream” because the music is something that they’ve never have heard before.**

**The students may not perceive “After A Dream” as music, but rather as noise, and in Kagan's research, the piece will impair the students' ability to concentrate.**

### **Hypotheses**

**Null Hypothesis - The dissonance in music does not impair with students' ability to memorize word lists.**

**Research Hypothesis - The more dissonance in music, the more it impairs with students' ability to memorize word lists.**

## **Methods**

### **Design**

In this study, I used an experimental method with a repeated measures design [RMD]. All the students participated in all four phases of the experiment at the same time, in one room. RMD was chosen in an attempt to control subject variables and short-term memory ability. The variables that were controlled were the time allowed for studying, sitting quietly and recalling the word lists (testing). The duration and volume of each musical selection was controlled. Also, participants received the same word lists at the same time. The types of words in each list were also controlled. Commonly used words were selected from the categories of food, animals, colors, objects, and clothing, and were all one to three syllables long. These words are words that I felt that the students in their age group could relate to. Each test used the same basic procedure. The independent variable was the level of background music played, and the dependent variable was the number of words a participant could recall from the list. Dissonance is defined as an inharmonious or displeasing sound, and the three pieces of background music were rated as having low, medium and high levels of dissonance. In order to comply with ethical standards, the participants were given an informed consent and were explained in dept.

### **Participants**

The 26 participants ranged in age from 12 to 14 years old. All were students in the Middle School Band, and were asked to participate during their band class. The Band Director was informed about my procedures and was asked not to take penalty from students after my testing. The participants were had all different types of grade levels of English.

### **Materials**

- The following songs: • "Bad Mamma Jamma and Isnt She Lovely (medium dissonance)
- "After A Dream" by Ramon L. Jackson (high dissonance) • "Call Him Up (low dissonance)
- Stopwatch
- 26 pencils
- 26 copies of 4 separate word lists, each composed of 13 words (see Appendix ii)
- 60 labeled slips of paper to write down memorized words from each list (see Appendix ii)

### **Procedure**

1. Pass out consent forms and overview it in dept.
2. Hand out first word list face down so students cannot study until time is called.
3. Allow students to turn word lists over and start stopwatch.
4. Allow students two minute to memorize word lists in silence.
5. After one minute, tell students to stop studying, and collect word lists.
6. Ask students to sit in silence for one minute. During this time, pass out blank sheets of paper, with the number of the word list to be recalled.
7. Ask students to silently recall as many words as possible in one minute.
8. Collect students' papers.
9. Repeat steps 1 through 8 three more times, but instead of silence during the memorization and recollection periods, play one minute of each kind of background music in the following order:
  - a. "Bad Mamma Jamma and Isnt She Lovely" (medium dissonance)
  - b. "After A Dream (high dissonance)
  - c. "Call Him Up" (low dissonance)

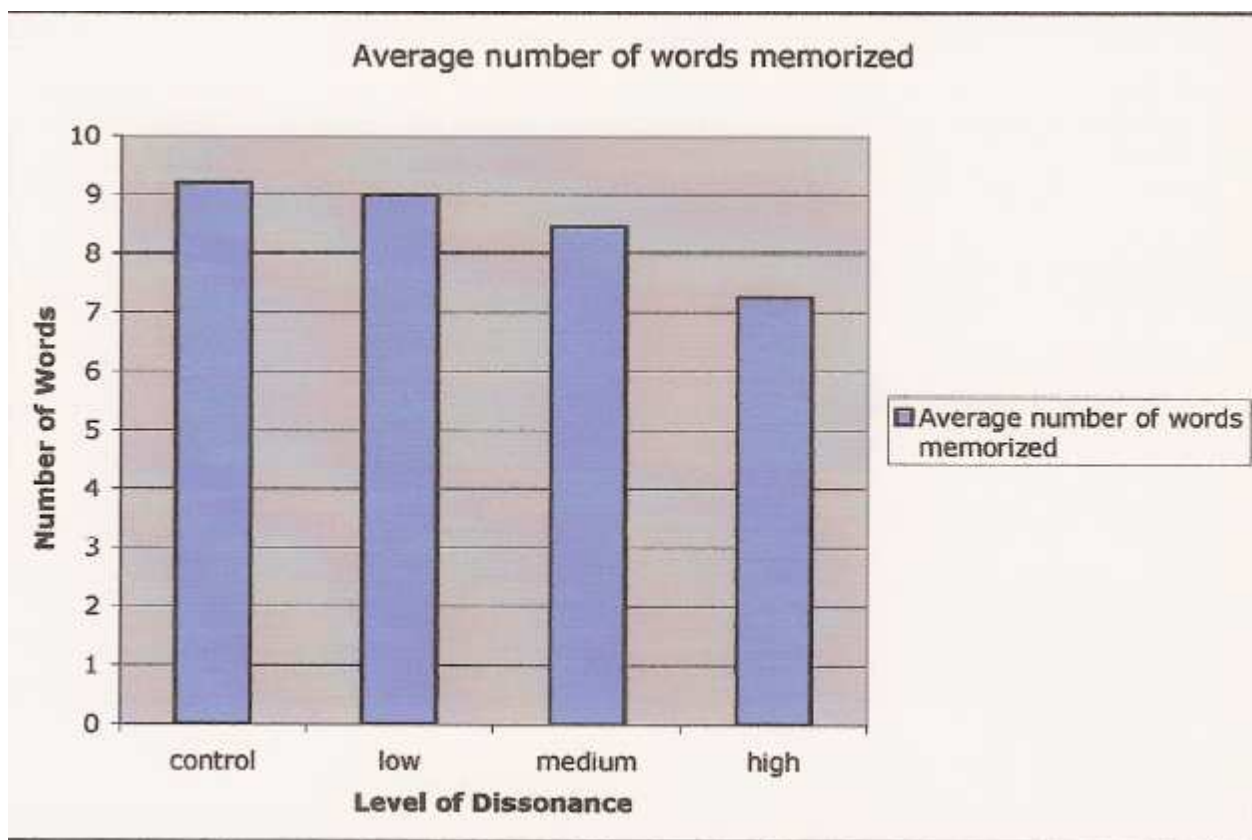
### **Results**

Descriptive statistics applied to the number of words memorized in each list:

**Experimental Group**

Level of Dissonance	Control	Low Dissonance	Medium Dissonance	High Dissonance
Average Number of Words	9.2	9.0	8.46	7.26
Median Number of Words	10	9.0	9.0	7.0
Standard Deviation	1.93	2.49	2.77	2.81

**Level of Dissonance**





## **Analysis of Results**

The average numbers of words memorized for the control, low, medium and high dissonance tests were 9.2, 9.0, 8.46, and 7.26. This means that on average, the students memorized the most words during the control and the lowest number of words while listening to the music was at a high dissonance level. The standard deviation of the words memorized for the control, low, medium and high dissonance was 1.93, 2.49, 2.77, and 2.81 respectively to three significant figures. This means that more participants performed around the same mean during the control than when the music was being played. There was the most variance in the data while highly dissonant music was being played.

## **Discussion**

The results show that the null hypothesis must be retained for the tests conducted with the songs "Bad Mamma Jamma" and "Isn't She Lovely" (medium dissonance) and "Call Him Up" (low dissonance). "Bad Mamma Jamma" and "Isn't She Lovely" did not significantly affect students' ability to memorize and recall the word lists, but "After A Dream" has the highest impairment in the participants' performance. This finding is similar to the research of Peynircioglu, et al., as they found that students perform poorly while listening to unfamiliar music (Rock and Roll). None of the students who were tested in this experiment had heard "After A Dream" or any experimental piece like it because it was a song that I wrote and it was based upon some personal reflections of my life. The results of the test using "After A Dream" therefore support Kagan's theory.

There were several limitations to the methodology of this experiment. First, because the students were asked to memorize the word lists consecutively without any break, they grew tired, and their enthusiasm to learn and try diminished. It would have been better if

students had taken the four tests on separate days. In that case I would have seen higher scores (maybe). Second, because the students grew disinterested and were all tested at the same time in the same room, some participants talked during the periods of silence and played around, though asked to be quiet and to stop playing. This may have caused distractions to others in the room. It would have been better to test each student separately so that they couldn't interact but time wouldn't have allocated that. Thirdly, the parent student consent forms, some were turned in on time and some were turned in later in which I could start on time as I wanted to. Fourthly, my schedule for my classes and time allocated for experimentation had big conflicts, I may have missed out on tons of notes and work to try to complete the experiment and so I had to delay it at one point to catch back up with my work.

### **Conclusion**

The results of this experiment show that the null hypothesis must be retained for the tests conducted with the songs with low and medium levels of dissonance. "Bad Mamma Jamma" and "Isnt She Lovely" did not significantly affect students' ability to memorize and recall the word lists, but "After A Dream" has the highest impairment in the participants performance. So therefore student perform well when they are listening to music that they normally hear everyday.

## **References**

**Kagan, Susan C. *The Effects on Students Engaged in Reader Response Strategies*, Kean University. New Jersey, 2001.**

**Peynircioglu, Zehra F. et al. *Phonological Awareness and Musical Aptitude*. Journal of Research in Reading, Volume 25, Issue 1 (2002), pp 68-80.**

**Yoon, Jenny Nam. *Music in the Classroom: Its Influence on Children's Brain Development, Academic Performance, and Practical Life Skills*, 2000.**

## **Appendices**

**(appendix i)**

**(appendix ii)**

Word List #1	Word List #2	Word List #3	Word List #4
Picture	Pencil	Banana	Apple
Stone	Cup	Plant	Fish
Window	Orange	King	Cat
Carpet	Right	Cloud	Boat
Horse	Game	Glass	Paper
Door	Corner	Ring	Chair
Sun	Lion	West	Red
Ball	Sky	Milk	Face
Hat	Nose	Green	Shirt
Yellow	Feather	Foot	Dish
Food	Airplane	House	Flower
Tree	Square	Computer	Tooth
Book	Coat	Dog	Floor

Word List #1	Word List #2	Word List #3	Word List #4

**Note: This is the memorization test used. The Blank copy is the answer sheet that each participant received and the one with words is the answer key.**

**(appendix iii) Raw Data**

	<b>Control</b>	<b>Medium Dissonance</b>	<b>High Dissonance</b>	<b>Low Dissonance</b>
<b>Participants</b>	<b>Word List #1</b>	<b>Word List #2</b>	<b>Word List #3</b>	<b>Word List #4</b>
<b>1</b>	<b>9</b>	<b>13</b>	<b>7</b>	<b>10</b>
<b>2</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>10</b>
<b>3</b>	<b>12</b>	<b>9</b>	<b>7</b>	<b>13</b>
<b>4</b>	<b>8</b>	<b>12</b>	<b>10</b>	<b>9</b>
<b>5</b>	<b>10</b>	<b>9</b>	<b>6</b>	<b>11</b>
<b>6</b>	<b>10</b>	<b>10</b>	<b>7</b>	<b>12</b>
<b>7</b>	<b>11</b>	<b>12</b>	<b>11</b>	<b>11</b>
<b>8</b>	<b>12</b>	<b>7</b>	<b>12</b>	<b>8</b>
<b>9</b>	<b>8</b>	<b>11</b>	<b>6</b>	<b>8</b>
<b>10</b>	<b>7</b>	<b>7</b>	<b>3</b>	<b>11</b>
<b>11</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>8</b>
<b>12</b>	<b>6</b>	<b>11</b>	<b>3</b>	<b>8</b>
<b>13</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>5</b>
<b>14</b>	<b>11</b>	<b>6</b>	<b>9</b>	<b>6</b>
<b>15</b>	<b>7</b>	<b>6</b>	<b>3</b>	<b>5</b>
<b>16</b>	<b>5</b>	<b>7</b>	<b>5</b>	<b>8</b>
<b>17</b>	<b>7</b>	<b>11</b>	<b>7</b>	<b>7</b>
<b>18</b>	<b>11</b>	<b>7</b>	<b>5</b>	<b>12</b>
<b>19</b>	<b>10</b>	<b>12</b>	<b>7</b>	<b>10</b>
<b>20</b>	<b>8</b>	<b>10</b>	<b>5</b>	<b>7</b>
<b>21</b>	<b>10</b>	<b>9</b>	<b>11</b>	<b>10</b>
<b>22</b>	<b>8</b>	<b>12</b>	<b>7</b>	<b>10</b>
<b>23</b>	<b>11</b>	<b>9</b>	<b>10</b>	<b>7</b>
<b>24</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>10</b>
<b>25</b>	<b>7</b>	<b>13</b>	<b>7</b>	<b>10</b>
<b>26</b>	<b>5</b>	<b>7</b>	<b>12</b>	<b>7</b>