

## **Special Needs Students Test Scores: Impact of Classical Music**

Teachers are constantly seeking methods to enhance learning experiences. This is particularly true in the case of students with special needs. Depending on the type of challenge the student faces, be it physical, behavioral, learning, or a combination, one method of enhancing perception and memory abilities is through the use of aesthetic and sensory source input (Riddoch, 2006; Waugh & Riddoch, 2007; Desrochers, et al, 2014). As one expert notes, artistic media such as music “doesn’t discriminate,” so neither should teachers in employing it to enhance learning (Embleton, 2014). According to studies done by these researchers and academics, such sources may be used independently or in concert with other types of learning to facilitate student achievement, for mainstream students and particularly in the case of special needs students.

### **Need for this Study and Related Information**

In particular, music has been widely accepted as a tool that can assist students to focus and retain material presented (Francis, 2011) or be used as content itself to promote academic achievement, particularly in a peer-relevant context (Lebler, 2006). There are various ways in which music can be used to therapeutically or instructively assist classroom teachers of special needs students. This paper will examine the effects of music used in a self-contained, elementary classroom of students with mixed needs through an ABA designed testing regime to ascertain whether or not the use of classical music as a background feature enhances test performance.

Use of teaching music as a separate area is a recognized form of pedagogy that has inherent benefits (Schneider 2005; Lebler, 2006). There is no doubt that music affects humans

differently that intellectual input, as it appeals to emotional and artistic responses. Thus music instruction is a valuable tool for teachers of mainstream and special needs students. As vocal and instrumental programs in public schools have been cut nationwide due to reallocation of scarce funds, the losers have been the students who benefit from this type of instruction. Some students learning patterns are more consistent with sensory rather than intellectual stimulation, and lessening the amount of music instruction available has a detrimental impact on those students. Indeed, Lazar reports several strategies that can be employed specifically with learning disabled students using as a tool in memory or in combination with imagery for associative memory enhancement (2014). This current study, however, is not focused on the instruction of music as a subject, but rather on its use as a tool to increase learning among special needs students in academic areas such as reading and arithmetic. Therefore, music will be utilized as a companion to other learning, as opposed to the topic of instruction.

According to the adage, music has a soothing effect on animals prone to violent tendencies. The use of music in relaxation therapy has been well-established, and correlates to use as in relieving stress or anxiety on students during testing (Desrochers et al. 2014; Korhan, 2011). While some people rely on background noise or “white” noise to enable them to relax and fall asleep more readily, the same principle applies to the use of music as a background device during classwork, including academic or non-academic (Waugh & Riddoch, 2007; Riddoch, 2006) or academic subject-matter testing.

Classical music is ideal for such background purposes, especially specific instrumental pieces. Orchestral works do not include lyrics that may be thought-provoking or distracting.

Young students and adolescents are particularly susceptible to lyrics that evoke strong emotional responses or calls to action. This has been demonstrated through exposing youth to rap music which often contains what some may term “inflammatory” lyrics (Travos & Bowman, 2012). These lyrics may incite “violence, risky sexual behaviors, and substance use” and other unhealthy behaviors, or they may also empower marginalized youth, especially ethnic minorities who identify with the artists and relate to their message positively (Ibid). The fact that music can have such a powerful impact on young people, special needs or not, is a testament to the power of sensory and aesthetic forms of expression such as art or music. This corroborates the idea that valid testing of the effects of music on learning that requires focus, concentration and retention would be best served through use of instrumental pieces that do not contain overly-stimulating content or musical schema.

In addition, instrumental pieces may not be well suited for a background testing environment. Particular dramatic pieces that rely on heavy use of percussion or that otherwise build to a crescendo (the 1812 overture; Flight of the Valkyries) would be inappropriate for this study. Calming, pastoral classical pieces that could serve as a backdrop to enhance concentration without distraction are preferable (such as “Spring” from the Peer Gynt suite).

### **Research Questions**

In order to assess the efficacy of utilizing music as a learning tool, three specific questions are posed which will allow interpretation of differing application. They are:

1. Does the use of classical music in a background setting *during* testing improve students’ performance on simple reading comprehension tests and simple arithmetic tests?

2. Does a one-time exposure to classical music in a background *setting immediately* to prior to testing improve students' performance on simple reading comprehension tests and simple arithmetic tests?

3. Does *extended exposure* to classical music in a background setting improve students' performance on simple reading comprehension tests and simple arithmetic tests?

The theory tested through each of these questions is the same, i.e. does classical music in a background setting enhance learning for special needs students as measure through test performance. The likely impact, if any, would be increased receptivity to learning or focus due to reduction in anxiety, enhanced feeling of security or calm, or enhanced relaxation similar to that achieved by use of music or white noise as a sleep aid. The major differences between the three questions deals with the proximity of the music with test administration. In the first case, the music would be played during the test administration, to ascertain if it has an immediate effect that reduces anxiety or stimulates concentration, retention, and focus. The second question would involve setting this mood immediately prior to the administration of the test. The third would be a brief but longitudinal styled study to determine if there is any impact of extended exposure to classical music that might result in increased test performance.

### **Methodology**

This study will be participatory rather than observatory, and will yield quantifiable results. A self-contained class of students in an elementary school setting of approximately the same grade level (although some may include students from more than one grade) will be tested on five different occasions using the same simple reading comprehension test with ten questions

each true or false responses (Appendix A) and then five more times using simple math tests of ten questions each (Appendix B). The first administration will be with no music involved. The questions will define the method to the extent that in during the next three administrations, classical music will be present as a background setting. First it will be in the background during administration. Next, classical music will be used as a background to instruction immediately prior to administration. In the final instance involving music, classical music will be played during a week prior to administration of the test as a background to various educational instruction. Then a concluding administration without music will be given. The results of each administration will be tallied (number of correct responses) and then compared to ascertain if there was any statistical variation or improvement on scores depending upon the use of music. Both reading comprehension and arithmetic tests are used to account for variation of learning strengths (some children are more language oriented and others more logic-reasoning oriented, similar to Gardner's theories of intelligences) (Gardner, 2014).

### **Participants**

For this study the test subjects are elementary school students (around third grade level in skill level) with a variety of special needs. Most of them will be diagnosed with learning disabilities of some sort (autism, developmental delay) or behavioral issues (ADD, ADHD), although IEPs for these students often contain multiple diagnoses that may overlap. In addition, some IEPs may require that tests be read to students, so this is a factor that must be considered when analyzing the results. The testing will be administered on two occasions without music per subject and three occasions with music per subject, and will contain simple reading exercises or

arithmetic problems that have been designed to be accessible to these students. Likewise the questions have been designed to be of conforming difficulty and within the learning range of these students. The only caveat, mentioned earlier in this regard, is that some students may be required to have tests read to them, in which case the influence of the reader may be a factor.

### **Independent Variable**

The constant in all ten administrations (first “A” administration without music for each of the two subjects, three “B” administrations for each subject with different use of music in each, and final “A” administration without music as a follow-up for comparison based on the ABA design) for reading comprehension, three for arithmetic) is the interventional use of classical music as a background device in one of the three ways addressed in each question: during, immediately before, or for an extended period before test administration.

### **Dependent Variables**

The actual tests will be constant in subject matter though variable in introduction as well as per subject but results will vary from administration to administration, although steps are in place to assure reliability by attempting to correlate the difficulty factor between the language and arithmetic tests to prevent skewed results. The same test will be administered five times per subject, and the students will not be given the correct answers in between administration, so that the validity of impact of the music on responses can be more accurately determined. Factors such as time of day of administration (morning is preferable for enhanced concentration although consistency is more important), previous activities (before or after snack, etc.) will be monitored as well to insure consistency.

### **Design and Data Analysis**

This study will utilize the ABA design system. Specifically, tests will be administered three times. First as a control without introduction of the variable (the music in accordance to the specific question) = A. Next the test will be administered with the use of music, either as background during, immediately prior to, or for a prolonged period before, testing = B. Then the tests will be administered a third time following a lapse of time from the use of music to assess if the impact had any duration of impact. The same tests for reading comprehension and for arithmetic will be administered to insure validity of results, without the students being given access to correct answers in between administrations. An alternative would be to design three tests, one for each question, but to try to make them of comparable difficulty. In this case, so long as the students do not have access to the correct answers that might affect subsequent outcomes, such precautions do not appear to be necessary.

Because the tests administered will be objective, with correct deducible answers, they can be scored and the data entered in graphic representation. This will allow for immediate comparison, as each question will either be correctly answered or not, with the only factor changed the use of music. Thus it should be relatively easy to assess the impact of the music on each administration. Correct responses will be charted next to each other for the different administrations, to allow immediate comparison (see answer comparison chart, appendix C).

### **Procedures**

The same procedures will be followed for the two different testing cycles, the reading comprehension test and the arithmetic test:

1. A component #1- first administration: administer the test without music used in any capacity and enter results on scoring comparison graph (number of correct answers). Answers will not be revealed to students.

2. B component # 1- administration of test with classical music played in background during testing. Then tests graded and scores entered on graph.

3. B component #2 – administration of test with classical music played immediately before testing. Then tests graded and scores entered on graph.

4. B component # 3 – administration of test with classical music having been played as background during other instruction for a week prior to this testing. Then tests graded and scores entered on graph.

5. A component # 2 – second administration without music, tests graded and scores entered.

These procedures will be following in their entirety for one cycle of reading comprehension tests and another for the arithmetic tests. Following these administrations, the comparison chart can be used to determine whether any change occurred with music, and if the use of music made a difference.

Limitations to this method exist in that some students may require tests to be read, thus the reader may influence outcome. Also the use of the same tests repeatedly may be either a factor insuring consistency, or producing limitations if they children become too familiar with the material and repeat their answers automatically.



### **Conclusion**

If the literature is correct that music may influence test-taking positively, particularly for special needs students, one would expect to see an improvement in correct responses from the first administration of both types of test through subsequent testing. Whether or not immediate use of music or use prior to testing, either in one application or repeatedly, will influence outcome will be determined upon completion of the research. Likewise, whether or not there is a lasting impact can be assessed through the second non-music administration per the ABA design. Also, it will be of note whether results vary between reading comprehension and arithmetic tests, although this may be influenced more by learning strengths of students tested than music use. Overall, music has benefits that may be tapped in numerous ways for educational purposes. Use as a background feature to reduce anxiety and promote focus and retention is but one aspect of this field of study, and leaves open the possibility of further testing involving use of music in numerous applications.



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**Appendix A: Reading Comprehension Test and Key****Dog and Bell Fable (based on Aesop's Fables)**

A dog is quietly sneaking up being people who come near him and his owner and biting their ankles. His owner attached a bell to the dog so that people will know where the dog is near by the noise. Sometimes, the owner also attached a chain to the dog's leg to also slow him down.

The dog became proud of the chain and the bell, and went with them everywhere. An older dog said to him: "Why do you show yourself like this? The chain and bell are not rewards. They are warnings to all people that they should stay away from you because of your bad behavior of biting them.

- Do not be proud of your behaving poorly; do better next time.

<i>Questions: Evaluation</i>	<b>True</b>	<b>False</b>
1. The dog is biting a ball.		
2. The dog is wears a chain around his neck.		
3. The biting dog is old.		
4. The biting dog is angry about the bell.		
5. The owner is biting the dog.		
6. The second dog has a bell.		
7. The dog is biting his owner.		
8. The bell is a reward.		
9. The chain is attached to the bell.		
10. The dog dies from the heavy bell.		

<i>Questions: Reference</i>	<b>True</b>	<b>False</b>
1. The dog is biting a ball.		<b>X</b>
2. The dog is wearing a chain around his neck.		<b>X</b>
3. The biting dog is old.	<b>X</b>	
4. The dog is angry about the bell.		<b>X</b>

5. The owner is biting the dog.		<b>X</b>
6. The second dog has a bell.		<b>X</b>
7. The dog is biting his owner.	<b>X</b>	
8. The bell is a reward.		<b>X</b>
9. The chain is attached to the bell.		<b>X</b>
10. The dog dies from the heavy bell.		<b>X</b>

<b>Correct Answers:</b>	
<b>Incorrect Answers:</b>	

### Appendix B: Arithmetic Test and Key

1.  $1 + 3 = \underline{\quad}$ .

2.  $2 + 5 = \underline{\quad}$ .

3.  $4 + 0 = \underline{\quad}$ .

4.  $2 + 2 = \underline{\quad}$ .

5.  $6 + 2 = \underline{\quad}$ .

6.  $10 - 3 = \underline{\quad}$ .

7.  $5 - 2 = \underline{\quad}$ .

8.  $7 - 4 = \underline{\quad}$ .

9.  $6 - 0 = \underline{\quad}$ .

10.  $1 - 1 = \underline{\hspace{2cm}}$ .

Key: 1. 4    2. 7    3. 4    4. 4    5. 8  
 6. 7    7. 3    8. 3    9. 6    10. 0

<b>Correct Answers:</b>	
<b>Incorrect Answers:</b>	

**Appendix C: Results (Correct answers per test) Comparison Graph**

**Reading Comprehension Test:**

TRACKING TOOL	Test 1	Test 2	Test 3	Test 4	Test 5
Correct answers					
Variation from T1					
Variation from previous					

**Arithmetic Test:**

TRACKING TOOL	Test 1	Test 2	Test 3	Test 4	Test 5
Correct answers					
Variation from T1					
Variation from previous					