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School of Rock: The Relationship Music Training on Academic Achievement

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Abstract

Music education has been a key part of human culture for thousands of years (Cartwright, 2013). As children often begin to receive musical education during grade school, many researchers have begun to investigate whether musical training may benefit other areas of academics. This literature review evaluates the overall effectiveness of musical training on academic performance for three different age groups: pre- and elementary school children under 12 years old; middle and high school-age adolescents between 12 and 18 years old; and college and university students over 18 years old. Musical training here includes instrumental and vocal training, as well as instruction in musical theory. Various studies indicated that children and adolescents who received music training had higher academic achievement (Wetter, Koerner, & Schwaninger, 2009). In addition, college-age adults who had received music training in college exhibited better memory, which in turn can bring about better academic achievement (George & Koch, 2011). This review provides evidence for the support of music education programs in schools and in the private setting in order to help children reach higher levels of academic success.

Keywords: music training, academic achievement, music education

School of Rock: The Relationship of Music Training on Academic Achievement

Human beings have always had a fascination with music. Early peoples, such as the ancient Greeks, studied music and its effects. Pythagoras, an ancient Greek philosopher and mathematician, hypothesized that music was a representation of cosmic order. Other Greeks believed music had positive effects on the body and could remedy physical and mental illness (Cartwright, 2013). In the present day, beliefs concerning the benefits of music may bring people to try learning music themselves. In 2010, about 18.08 million people in the US reported that they were able to play a musical instrument (Americans for the Arts, 2013), demonstrating that musical training is quite widespread. Since music plays a large role in human society, it is of value to study its effects on individuals.

Children are often exposed to music from very early ages. Since many children begin to receive musical education during grade school, many researchers have investigated whether musical training may have other benefits in the area of academics (Schellenburg, 2006; Wetter, Koerner, & Schwaninger, 2009). It is important to evaluate the benefits and effectiveness of musical training in schools and in the private sector given that emphasis in schools is gradually shifting from music and the arts to mathematics and science (Dillon, 2006). Being able to show that musical training does in fact correlate with an increase in academic performance would be useful for governments in deciding how much emphasis to place on music programs. In addition, parents would be able to better evaluate the benefits of enrolling their children in private music lessons.

Although much research has been conducted about musical training and academic performance, these studies have tended to focus on specific age groups and their performance in specific subjects (e.g. how piano lessons affect math scores of second-graders). This paper will

address the effects of musical training on a broader scale by analyzing how musical training affects academic achievement for different age groups. Studying how musical training relates to the academic performance of different age groups sheds light on the timing and magnitude of these effects. This literature review will evaluate the overall effectiveness of musical training on academic performance for three different groups of people: young and elementary school-age children, middle and high school-age adolescents, and college and university students.

Literature Review

For the purposes of this literature review, young and elementary school-age children will be anyone under the age of 12, middle and high school-age children will be anyone between the ages of 12 to 18, and adults will be anyone 18 years of age or older. The studies referenced in this review examine groups from different countries around the world.

Elementary School-Age Children

Children often have their first encounters with music training in a formal private setting or in elementary school. As most children in the United States are capable of receiving some form of formal music training by age five formal, private lessons are often initiated by parents who desire that their children learn to play an instrument from a young age (Cutietta, 2016). Many parents believe that placing children in music lessons may help them develop positive characteristics, one of which is academic performance (Dai & Schader, 2001). If a child can begin receiving music training at such a young age, then the academic benefits of such training may be present early in the child's life as well.

Multiple studies have found that when controlling for differences in intelligence, parents' income and educational level, there was an increase in overall academic performance in musically trained elementary school-age children (Schellenberg, 2006; Wetter et al, 2009).

Comparatively, other nonmusical out-of-class activities, such as sports and clubs, did not have similar associations with academic performance (Schellenberg, 2006). These studies demonstrate that there is something special about musical training that is more beneficial than other extracurricular activities. When this training is continuous, the child's levels of academic achievement tend to remain high over time (Wetter et al., 2009). It is therefore advantageous to place one's child in music education programs early on.

Although music training clearly has general benefits to children's academic success, music training may also advantageously affect specific subjects. For example, whether music training leads to better math scores in young children has been widely debated. Costa-Giomi (2004) found that piano instruction in fourth-graders did not affect academic achievement in math, but a course in non-instrumental music training (NIMT)—including vocal training and music theory—was shown to help children improve their math scores (Ribeiro & Santos, 2017).

What might account for this difference is that Costa-Giomi (2006) studied low-income children with no piano at home. Although the study was for an extended period of time (three years), the fact that these children did not have a means to practice and develop their abilities outside of a classroom setting could have inhibited their musical development. This lack of musical development could have, in turn, prevented them from experiencing the academic benefits of continuous musical training (Wetter et al., 2009). The children in this case may have been taught memorization instead of musical principles. In contrast, the study conducted by Ribeiro & Santos (2017) had more immediate effects. The children studied were divided into groups: those with low achievement in math (Group 1) and those with normal math scores (Group 2). By the end of the NMIT, the number of students in Group 1 decreased drastically. The researchers hypothesized that this difference resulted from students having to become

conscious of musical principles and not just memorize movements (Ribeiro & Santos, 2017). This study provides an interesting comparison with the study performed by Costa-Giomi (2006). The piano instruction in Costa-Giomi's study may not have been as effective at teaching musical principles, whereas the NMIT training emphasizes only those principles and not how to play an instrument. The study did not require a physical musical instrument and was therefore independent of familial socioeconomic status. At least in mathematics, musical training (though not necessarily instrumental training) can provide a child with the skills to succeed.

Music lessons in childhood may be a significant predictor of academic ability in high school (Schellenberg, 2006), demonstrating that the classroom skills the children learn from being engaged in their music classes may transfer to other classes in the future. In other words, children who come to school with musical experience and training before entering grade school may do better at school. Students who continue musical learning beyond their pre-K-12 schooling will continue to grow and succeed academically. Schellenberg (2006) affirms that concurrent student engagement in various academic and musical courses during the school day may help students gain the tools to succeed in other areas, such as verbal comprehension, perceptual organization, and processing speed.

Middle and High School-Age Adolescents

As previously established, it is possible that the skills developed in music classes may be evident and even increase as a child learns and grows. Adolescents who are musically active have significantly higher grades than their counterparts (Hille & Schupp, 2015). In addition, adolescents who also study music tend to maintain higher and more consistent levels of academic achievement (dos Santos-Luiz, Mónico, Almeida, & Coimbra, 2016). This study demonstrates

that the correlation between music training and better academic performance may persist even as children get older.

It is important to consider that as children enter middle and high school, they are permitted to choose from a variety of classes instead of having schedules assigned to them. One study found that students who elected to take music courses performed better in most school subjects than those who did not take music courses (Cabanac, Perlovsky, Bonniot-Cabanac, & Cabanac, 2013). Although the relationship between choosing music courses and earning better grades is not necessarily a causal one, it can indicate an important connection between musical students and high academic achievement. Additionally, music classes provide a group atmosphere where social networks can be created, giving the students a more positive school experience.

Besides scholastic K-12 school music education, many adolescents are involved in private music lessons. Private lessons may have an even greater effect on adolescents because of their more individual and specialized nature. A study by Cheek and Smith (1999) indicated that eighth-grade students who took private lessons performed better in math than eighth-graders who had music instruction in school. Because one-on-one instruction can be more focused than group instruction, students who take private lessons could advance further in their music education. Deg, Wehrum, Stark, and Scharzer (2014) observed that private lessons may allow adolescents to become more confident in their newfound musical knowledge, and in turn, an improved academic self-concept. Given that a positive academic self-concept may be a predictor to academic success (Ghazvini, 2011), private music lessons may help students perform better academically.

College and University Students

A continuing examination of music training of college students and their previous musical experiences may give further insight into how extensive long-term music training can facilitate academic success. Very little has been done, however, to study the direct relationship between music training and academic success for this population. Despite the lack of research in this aspect of academic performance, much has been written about how cognitive abilities affect academic achievement in college students. Since better cognitive abilities are associated with increased academic performance (Rohde & Thompson, 2007), measuring the cognitive abilities of musicians versus non-musicians can help in the analysis of the relationship between music training and academic success.

Cognitive abilities can be measured in many ways, but one of the most common forms is by examining memory. Brandler and Rammsayer (2003) found that musicians (all of whom had academic degrees in music and had been studying music for 14 years or more) scored higher on verbal memory tests than their counterparts who did not have musical experience. In an academic setting, verbal memory would be useful to a college student trying to recall historical facts from a textbook or something that a professor said in a lecture. Increased verbal memory resulting from long-term musical training could potentially lead to greater ability to recall learned information, which in turn can lead to higher academic performance (Rhode & Thompson, 2007).

Music training may be associated not only with verbal memory, but also working memory. Since a greater working memory capacity can help people stay focused for longer periods of time (De Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012), a strong working memory could prove to be especially useful in an academic setting. One study by George and Coch (2011) of undergraduate students at a college in the Northeast United States researched working

memory in musicians and non-musicians. In the study, “musicians” were considered people who had played an instrument since they were 10 years of age or younger, and had continued playing the instrument consistently until the time of the experiment. The researchers found that musicians had better auditory and visual working memory than non-musicians. Musical training over the course of a student’s life can positively affect the student’s cognitive abilities, and these cognitive abilities contribute to the academic success of college students in the forms of memory recall and attention span.

Conclusion

This literature review analyzed the relationship between music training and academic performance. The analysis of the literature was presented in three groups: elementary school-age children, middle and high school-age adolescents, and college-age adults. In younger children, music training contributed to an increase in academic performance (Schellenburg, 2006). Music lessons place children in an academic setting that is familiar, enjoyable, and entertaining early in their lives, which could increase their desire to learn other subjects in school. In addition, the skills acquired in music training programs may transfer over to other school subjects. When children grow into adolescents, the relationship between music training and important aspects of academic performance (such as memory and comprehension) is also present (Cabanac et. al, 2013). Private music lessons may also magnify this effect in adolescents. Finally, as students reach the college and university stage of their lives, music lessons were correlated with an increase in memory, which is related to higher academic achievement (Brandler & Rammsayer, 2003).

Since there seems to be a positive relationship between music training and academic performance, research on more specific aspects of this idea would be useful to the academic

community. Studies that examine which instruments or types of music training have the greatest effect on academic performance would be especially impactful. In addition, how long one must receive musical training in order for the training to influence academic performance would contribute to the knowledge of this field.

This literature review provides support for the argument that music training does strengthen students in nonmusical subjects. It is important for parents, teachers, and government officials to be aware of this association. If music education programs are sacrificed to elevate other subjects, there may be a negative effect on the child's performance in those other subjects. Encouraging children to study music, both inside and outside of a school setting, is an important part of education at all levels of schooling.

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