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The effects of music tuition on academic achievement in Portuguese 8th year students

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The positive association between music lessons and academic achievement is well documented in the literature. Students who learn music show better academic achievements than those who are not involved in musical activities. However, this is a multifaceted association that can only be explained if several dimensions are taken into account, such as socioeconomic status (SES) or general intelligence (*g*). Significant differences in academic achievement were found between 8th year students who studied music (n=60) and those who did not (n=50) in five out of seven subjects analysed: natural sciences, physics and chemistry, Portuguese language, history, and geography. In addition, a multiple linear regression analysis was conducted in order to assess the role played by other potential dimensions (SES and general intelligence) in academic achievement. After including SES in the analysis, the results indicated that music tuition still contributed significantly to the given variance in academic achievement. However, in combination with all the factors (music tuition, SES, and general intelligence), music learning lost its statistical significance. Moreover, contrary to the majority of studies, one noteworthy finding was that SES had no significant impact on academic achievement. In conclusion, the results suggest that musical tuition does have a positive relationship to academic achievement.

Keywords: music tuition; academic achievement; marks; socioeconomic status; general intelligence (g)

A growing body of literature focusing on the effects of musical tuition on academic achievement reports a positive relationship between music lessons/music participation and academic achievement (Catterall *et al.* 1999, Babo 2004, Johnson and Memmott 2006, Fitzpatrick 2006, Kinney 2008,

Southgate and Roscigno 2009, Wetter *et al.* 2009). These studies document higher performance in school subjects such as mathematics (Catterall *et al.* 1999, Johnson and Memmott 2006, Fitzpatrick 2006, Kinney 2008, Southgate and Roscigno 2009, Wetter *et al.* 2009), reading (Babo 2004, Fitzpatrick 2006, Kinney 2008, Southgate and Roscigno 2009, Wetter *et al.* 2009), language arts (Babo 2004, Kinney 2008), English (Johnson and Memmott 2006), German (Wetter *et al.* 2009), French (Wetter *et al.* 2009), science (Fitzpatrick 2006, Kinney 2008), history and geography (Wetter *et al.* 2009), citizenship (Fitzpatrick 2006, Kinney 2008), ~~sports (Wetter *et al.* 2009),~~ and handicrafts (Wetter *et al.* 2009).

Despite the fact that the relationship between music tuition and academic achievement is well documented, in literature on the subject the aspects that may account for this vary. Several researchers have attempted to clarify this relationship by controlling the effects of the variables identified in the relevant literature that traditionally have had a significant effect on academic achievement (e.g. socioeconomic status [SES] and IQ). The results indicate that when the aforementioned aspects are controlled, music tuition still has an impact on academic achievement (Babo 2004, Fitzpatrick 2006), while in other results, the effects of music participation became *non* significant (Robitaille and O'Neil 1981) or less significant when variables intervene (Kinney 2008, Southgate and Roscigno 2009, Wetter *et al.* 2009). Research by Babo (2004) reported that participation in a musical instrument learning programme was a significant variable that accounted for the overall variance in language and arts scores when SES, gender, and IQ were controlled. Kinney (2008) reported that students from two cohorts (6th year and 8th year) who were classified as having a high SES performed significantly better in maths, science, and citizenship subtests (6th year cohort) and language arts, maths, science, and social studies subtests (8th year cohort). Robitaille and O'Neil (1981) attempted to answer the causal/correlational question by comparing musical instrument students in the 5th grade with students who did not study music in terms of IQ and concluded that this match eliminated any differences in academic performance between the two groups. The results showed that any differences in academic achievement between the two were eliminated.

In fact, general intelligence (the *g* factor) represents the best predictor of academic achievement (Deary *et al.* 2007, Chamorro-Premuzic and Arteche 2008). Moreover, Undheim and Gustafsoon (1987) claim that *g* and *gf* (fluid intelligence) are conceptually equivalent.

This study aimed to analyze the relationship between music tuition and academic achievement, including effects of SES and general intelligence.

METHOD

Participants

The sample was composed of 8th year students (n=110, mean age=13 years, 62% girls and 38% boys). Students were recruited from ten Portuguese secondary schools during the academic year 2008-09. The students were divided into two groups: (A) students without music lessons (n=50) and (B) students with 6 to 8 years of formal music tuition (n=60). In Group B, 66.7% of the children had taken musical aptitude tests before they started learning music. The parents' level of education was significantly higher for the students in Group B in comparison with Group A (5.30 versus 4.23, $p<0.001$).

Materials

Data collection involved researching the education system databases, specifically to determine (1) marks for subjects included in the 8th year curriculum, in order to assess academic achievement, and (2) students' socioeconomic status (SES), including parents' education levels.

A Battery of Reasoning Tests adapted for the Portuguese population (BPR/7-9) was used to assess general intelligence. A global score of BPR/7-9 is a measure of general, or fluid, intelligence (*g*).

Procedure

Students were tested individually using the BPR/7-9 at the beginning of the 7th year of the Portuguese education system. Academic achievement in seven subjects—mathematics, natural sciences, physics and chemistry, Portuguese language, English, history, and geography—was compared in the two groups, using a t-test (two-tailed).

A hierarchical regression was carried out in order to analyze the effects of SES and general intelligence, together with music tuition, on academic achievement. Independent variables were entered in block to clarify the relationship between musical training and academic achievement.

RESULTS

The t-test showed significant differences in the global average marks for the groups, with group B scoring higher than group A ($t_{108}=-3.69$, $p<0.001$). They also revealed significant differences in the marks for individual subjects. Group B had higher marks than group A in five subjects: natural sciences ($t_{108}=-5.11$, $p<0.001$), physics and chemistry ($t_{108}=-3.57$, $p<0.001$), Portu-

guese language (t_{108}=-2.69, $p<0.008$), history (t_{108}=-1.99, $p<0.05$), and geography (t_{108}=-5.908, $p<0.001$).

In the regression analysis each variable was entered into the model as follows: (1) music tuition, (2) music tuition and SES, and (3) music tuition, SES, and general intelligence. Music tuition was found to be a significant contributor to models 1 and 2 but not to model 3 when general intelligence was entered. SES was not found to be a significant variable in all models. The combined effect for all variables, model 3, accounted for 27.1% of the variance (R^2=0.271, p=0.000). General intelligence was the main predictor (β=0.46) for academic achievement, with music tuition losing its significant contribution to the given variance in academic achievement.

DISCUSSION

In line with previous research, the results showed that music tuition is significantly related to academic achievement. In fact, the students in the music tuition group scored higher in five out of seven of the subjects analyzed. It should be noted that the groups did not differ significantly in mathematics and English, a result that is not in line with other studies, which report differences for these two subjects as well. However, they did have higher scores, reflecting the trend in other research findings. Our findings also showed that general intelligence had the strongest predictive power in terms of academic achievement.

The research indicated that being involved in learning music can improve intellectual development (Schellenberg 2004). Moreover, musical aptitude is related to general intelligence (Lynn *et al.* 1989). Thus, it can be argued that learning music can probably improve musical aptitude as well as non-musical abilities (Schellenberg 2004). This assumption is in line with the concept of "musical aptitude in development," since musical potential is affected by the quality of environmental aspects. According to Gordon (2000), this occurs at an early age and continues until the child is 9 years old. Additionally, musical aptitude is also related to better academic achievement (Young 1971, Johnson 2000). Music lessons produce a small increase in IQ (Schellenberg 2004) and have slight positive associations with measures of intelligence (Schellenberg 2006). Schellenberg (2006) reported that music lessons were also positively associated with academic performance even after individual differences in general intelligence were established.

Another important dimension to be taken into account is that parents with higher levels of education tend to be more actively involved in their children's educational achievement (Baker and Stevenson 1986). Our results did

not show that the parents' level of education was a significant variable in explaining the children's academic achievement. Despite the fact that this result is not consistent with what has been claimed by other authors, it can be argued, in line with Catterall *et al.* (1999), that regardless of the socioeconomic background of the students, those who were involved in learning music had higher scores than those who did not learn music. This result, in our opinion, is particularly interesting since it seems to support the idea that it is music tuition that has a significant impact on the students' academic achievement. Thus, further research should attempt to clarify the consistency of these results, using student samples from other years, namely 9th year students.

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References

Babo G. D. (2004). The relationship between instrumental music participation and standardized assessment achievement of middle school students. *Research Studies in Music Education*, *22*, pp. 14-27.

Baker D. P. and Stevenson D. L. (1986). Mother's strategies for children's school achievement: Managing the transition to high school. *Sociology of Education*, *59*, pp. 156-166.

Catterall J., Chapleau R., and Iwanaga J. (1999). Involvement in the arts and human development: General involvement and intensive involvement in music and theatre arts. In E. B. Fiske (ed.) *Champions of Change* (pp. 1-18). Washington, DC: Arts Education Partnership.

Chamorro-Premuzic T. and Arteche A. (2008). Intellectual competence and academic achievement: Preliminary validation of a model. *Intelligence*, *36*, pp. 564-573.

Deary I. J., Strand S., Smith P., and Fernandes C. (2007). Intelligence and educational achievement. *Intelligence*, *35*, pp. 13-21.

Fitzpatrick K. R. (2006). The effect of instrumental music participation and socioeconomic status on Ohio fourth-, sixth-, and ninth-grade proficiency test performance. *Journal of Research in Music Education*, *54*, pp. 73-84.

Gordon E. (2000). *Teoria da Aprendizagem Musical para Recém-nascidos e Crianças em Idade Pré-escolar*. Lisbon: Fundação Calouste Gulbenkian.

Johnson D. A. (2000). The development of music aptitude and effects on scholastic achievement of 8 to 12 year olds. Unpublished doctoral dissertation, University of Louisville.

Johnson C. M. and Memmott J. E. (2006). Examination of relationships between participation in school music programs of differing quality and standardized test results. *Journal of Research in Music Education*, *54*, pp. 293-307.

Kinney D. W. (2008). Selected demographic variables, school music participation, and achievement test scores of urban middle school students. *Journal of Research in Music Education*, *56*, pp. 145-161.

Lynn R., Wilson R. G., and Gault A. (1989). Simple musical tests as measures of Spearman's *g*. *Personality and Individual Differences*, *10*, 25-28.

Robitaille J. P. and O'Neil S. (1981). Why instrumental music in elementary schools? *Phi Delta Kappan*, *63*, p. 213.

Schellenberg E.G. (2004). Music lessons enhance IQ. *Psychological Science*, *15*, pp. 511-514.

Schellenberg E. G. (2006). Long-term positive associations between music lessons and IQ. *Journal of Educational Psychology*, *98*, pp. 457-468.

Southgate D. E. and Roscigno V. J. (2009). The impact of music on childhood and adolescent achievement. *Social Science Quarterly, 90*, pp. 4-21.

Undheim J. and Gustafsson J. (1987). The hierarchical organization of cognitive abilities: Restoring general intelligence through the use of linear structural relations. *Multivariate Behavioral Research*, *22*, pp. 149-171.

Wetter O. E., Koerner F., and Schwaninger A. (2009). Does musical learning improve school performance? *Instructional Science*, *37*, pp. 365-374.

Young W. T. (1971). The role of musical aptitude, intelligence, and academic achievement in predicting the musical attainment of elementary instrumental music students. *Journal of Research in Music Education*, *19*, pp. 385-398.