
Music & Spatial Cognition

Effects of Early Music Instruction on Spatial Tasks Performance

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Venue: Burrows Lecture Theatre

The purpose of this study was to investigate the effects of early music instruction on spatial abilities of young children, specifically on visual-motor integration and puzzle tasks. Participants were children between ages four to six, attending kindergartens in Taiwan. Ninety-six children were randomly chosen and divided into two groups. The experimental group received forty-minute weekly developmentally appropriate group instruction for six months. The control group did not participate in the instruction. Children in both groups were assessed on visual-motor integration (Beery, 1997) and puzzle (Wang, 1999) tasks prior to music instruction, and six months later.

Analysis was performed using multiple regression to compare before and after-instruction scores of two groups of children, using gender and age as variables. Results supported those in Orsmond and Miller's study (1999) that children receiving music instruction improved more significantly on the visual-motor integration tasks than children without music instruction. Younger children seemed to improve more significantly than older children on the visual-motor integration scores after instruction, which implied that the earlier children receive music instruction, the better it is.

The current study showed that early music instruction could have significantly positive effect on young children's visual-motor abilities, and partially on puzzle tasks. As a result of this study, systematic group music instruction is strongly recommended for all preschools.

Hold the Music: No Evidence for a Mozart Effect in School Aged Children

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The 'Mozart Effect' refers to claims that listening to the first movement of Mozart's piano sonata (K.488) results in a small to moderate, 10-15 minute improvement in adult performance on tests of spatial-temporal reasoning. This effect is not well replicated and few studies adequately control for confounding factors. Nonetheless, the 'Mozart Effect' has generated considerable scientific, media and commercial interest and it has been speculated that exposing children to Mozart will have significant benefits for their cognitive development. To date, however, there are no published studies examining this effect in children. 2. Aims. The present study aimed to determine whether there was evidence for a 'Mozart Effect' in upper primary school aged children, whilst controlling a range of potentially confounding variables. 3. Method. One hundred and thirty-six grade 5 students were tested from Melbourne metropolitan schools. A within subjects design was used across three experimental conditions 1) Listening to Mozart Sonata K.448 2) Listening to a popular piece and 3) Listening to silence. These were presented in counterbalanced order to classes of students at weekly intervals, followed immediately by a 20-item paper folding and cutting task and mood and preference questionnaire. 4. Results. Repeated measures analysis of variance (ANOVA) revealed no evidence of a 'Mozart Effect', nor any interaction between mood, musical preference and spatial-temporal task performance. 5. Conclusions. The assertion that listening to Mozart enhances spatial reasoning ability in children was not supported. Speculation about the applications of the Mozart Effect needs to be suspended until it can be reliably reproduced.

Effect of Musical Expertise on Visuo-Spatial Abilities: Evidence from Reaction Times and Mental Imagery

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1. **Background.** Recently, the relations between music and nonmusical cognitive abilities have been highly debated. It has been documented that formal music training would improve verbal, mathematical or visuo-spatial performance in children.
2. **Aim.** In the experiments described here, we wanted to test if visual perception and imagery abilities were enhanced in adult musicians compared with non-musicians.
3. **Method.** In our main experiment, we measured reaction times when subjects had to detect on which side of a horizontal or a vertical line a small dot was flashed. In the "imagery" condition the line disappeared one second before the dot was presented. While remaining foveal. Both positions of the line and the dot as well as the distance between them varied from trial to trial. In order to do the task, subjects had to keep a mental image of the position of the line until the dot appeared. In the "perception" condition, the procedure and stimuli were the same except that the line remained on the screen until the dot was displayed.
4. **Results.** In both groups, reaction times were shorter for horizontal compared to vertical discrimination. This is in good agreement with the literature on visuo-spatial acuity. Moreover reaction times were significantly shorter in musicians in all conditions. However, reaction times were significantly longer in the "imagery" condition compared to "perception" condition only in non-musicians, suggesting poorer mental imagery skills.
5. **Conclusions.** Visuo-spatial imagery and perception seem to be improved on the long term by musical expertise. Moreover, preliminary measures of simple and choice visual reaction times indicate that this advantage could be partly explained by better sensori-motor integration in adult musicians.