

IS MUSICAL TRAINING REFLECTED BY SACCADIC EYE MOVEMENT?

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Background

In the context of the debate on music and intelligence or cognitive transfer effects of music, mental speed was introduced as an independent measure of intelligence (g factor model). Here, it could be demonstrated that mental speed and musical activities interact in young children. However, there is no causal link between mental speed and music. Therefore, the question remains open whether or not neurophysiological correlates for musical training and music achievement can be identified.

Aims

The study starts with the hypothesis that musicians who practice from notation and sight read perform a special training for their eye movements and can, therefore, be differentiated from non-musicians. Furthermore, if such a difference can be demonstrated it will be investigated whether this difference remains stable over the life span. For this, collected data from musicians and non-musicians are related to the average score of a large population of the same age group.

Method

70 subjects of 3 age groups (30 subjects 10 years of age, 20 subjects 25 years, 20 subjects 60 years) – half of them musicians, half non-musicians – are measured with respect to their saccadic and anti-saccadic eye movements (standard overlap

and anti gap). For this, an infra red beam helmet (ExpressEye, developed by Blick Labor, brain research center of the University of Freiburg) is used for measurements. Data are analysed for reaction time, correct saccades or anti-saccades, mean distribution, and fixation stability. These data are, then, related to general intelligence (Raven Matrices), musical aptitude (Gordon's Advanced Measures of Music Audiation) and rankings of sight reading (six point Likert scale).

Results

Former investigations have shown that there is an increase of achievement up to the age of 20, followed by a continuous decrease with increasing age. Although measurement and analysis are not finished yet, a trend seems apparent that subjects with special musical training perform better on eye movement tasks relative to the average score of their age group. These data will be compared to intelligence and musical aptitude to find out whether there is a correlation between musical training and saccadic reaction time.

Conclusions

If it can be confirmed that music training effects saccadic eye movement, a neurophysiological correlate exists. This may refer to general intelligence as the basic g factor or to music aptitude as a special human property. Further research may focus on the neurobiological effects of music on the brain and its processing structures.