



WWC Single Study Review

A review of the design and summary of findings for an individual study



June 2016

WWC Review of the Report “Music Training Alters the Course of Adolescent Auditory Development”^{1,2}

The findings from this review do not reflect the full body of research evidence on music training.

What is this study about?

The study authors examined whether high school students who chose to enroll and remain in a music training program improved their auditory and literacy skills more than students who did not choose to enroll in a music training program. The music program included instruction on playing instruments in groups using written music.

The study authors used a quasi-experimental design to compare the outcomes of 40 students in three Chicago-area high schools that offered both the music training program and a Junior Reserve Officers Training Corps (JROTC) program as part of their curriculum. The intervention group consisted of students who chose to enroll in the music training program in the summer before high school and remained in the program during the first 3 years of high school, and the comparison group consisted of students who chose to enroll and remained in the JROTC program during the same time period.³

The music training program and the JROTC program had similar class sizes and session duration, including 140–180 minutes of instruction per week each year. The JROTC program included classroom-based instruction and fitness-based training to hone leadership skills, character-building, and self-discipline. The rest of the high school curriculum was identical for both groups.

The study authors assessed students’ auditory skills through two outcomes that used electrodes to measure the consistency and relative magnitudes of their brains’ electrical responses to sounds. They measured literacy skills using three composites of subtests within the Comprehensive Test of Phonological Processing, which included phonological awareness, phonological memory, and rapid naming ability. Researchers administered these assessments just before the students entered their first year of high school and again 3 years later, in the summer before their senior year.

Features of Music Training

The music training provided in the study schools was intended to prepare students for music performance classes in college. The classes included 25–30 students and lasted between 140–180 minutes per week during each of the first 3 years of high school. Instruction covered instrument playing techniques, practice performing in groups, sight reading of written music, instrument care, and student assessments on topics such as performance and music theory. All students participated in at least two public performances in a school year.

What did the study find?

None of the analyses presented in this study meet WWC standards and therefore, the study findings are not presented in this report.

WWC Rating

The research described in this report does not meet WWC group design standards

The study used a quasi-experimental design to compare students who enrolled in either a music training program or a Junior Reserve Officers Training Corps (JROTC) program in the same school. This design requires demonstration of baseline equivalence in order to *meet WWC group design standards with reservations*. The music training and JROTC groups had baseline differences in the outcome measures that were greater than 0.05 and less than 0.25 standard deviations, and the analysis did not include the necessary statistical adjustments for these differences (e.g., analysis of covariance). For this reason, the study is rated *does not meet WWC group design standards* and therefore, the findings from this study are not presented in this WWC report.

Endnotes

¹ Tierney, A. T., Krizman, J., & Kraus, N. (2015). Music training alters the course of adolescent auditory development. *Proceedings of the National Academy of Sciences*, 112(32), 10062–10067.

² Single study reviews (SSRs) examine evidence published in a study (supplemented, if necessary, by information obtained directly from the authors) to assess whether the study design meets WWC design standards. The review reports the WWC's assessment of whether the study meets WWC design standards and summarizes the study findings following WWC conventions for reporting evidence on effectiveness. This study was reviewed using the single study review protocol, version 2.0.

³ The authors note that this design resulted in the intervention and comparison samples being similar at pretest with respect to percentage of females, age, non-verbal IQ scores, and maternal education.

Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2016, June). *WWC review of the report: Music training alters the course of adolescent auditory development*. Retrieved from <http://whatworks.ed.gov>

Glossary of Terms

Attrition	Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.
Clustering adjustment	If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.
Confounding factor	A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.
Design	The design of a study is the method by which intervention and comparison groups were assigned.
Domain	A domain is a group of closely related outcomes.
Effect size	The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.
Eligibility	A study is eligible for review if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.
Equivalence	A demonstration that the analytic sample groups are similar on observed characteristics defined in the review area protocol.
Improvement index	Along a percentile distribution of individuals, the improvement index represents the gain or loss of the average individual due to the intervention. As the average individual starts at the 50th percentile, the measure ranges from -50 to +50.
Multiple comparison adjustment	When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.
Quasi-experimental design (QED)	A quasi-experimental design (QED) is a research design in which study participants are assigned to intervention and comparison groups through a process that is not random.
Randomized controlled trial (RCT)	A randomized controlled trial (RCT) is an experiment in which eligible study participants are randomly assigned to intervention and comparison groups.
Single-case design (SCD)	A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.
Standard deviation	The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample are spread out over a large range of values.
Statistical significance	Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ($p < .05$).
Substantively important	A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the [WWC Procedures and Standards Handbook \(version 3.0\)](#) for additional details.



Intervention
Report



Practice
Guide



Quick
Review



Single Study
Review

A **single study review** of an individual study includes the WWC's assessment of the quality of the research design and technical details about the study's design and findings.

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