

# EFFECTS OF PIANO, SINGING, AND RHYTHM INSTRUCTION ON THE SPATIAL REASONING OF AT-RISK CHILDREN

*Frances H. Rauscher*

Department of Psychology, University of Wisconsin Oshkosh, USA

## Background/Aims

Children score higher on spatial tests following piano instruction. Three studies were conducted to answer three questions: (1) Which cognitive processes are enhanced by piano instruction? (2) Do different types of instruction have differential effects? (3) Are these effects durable and generalizable? All studies involved disadvantaged Head Start (HS) preschool children.

## Method

*Study 1:* Children were pre- and post- tested using cognitive tests following two years of weekly training in piano (P), computer (C) or no training (NT).

*Study 2:* Children were pre- and post-tested following two years of weekly training in piano (P) singing (S) or rhythm instruments (R).

*Study 3:* Music children from Studies 1 and 2 (M) were tested at the beginning and end of the school year along with at-risk children not in HS (AR), HS children who had no music (HS), and middle-income children who had no music (MI).

## Results

*Study 1:* P scored higher than C and NT on spatial-temporal tests. Non-spatial tasks were not enhanced. C and NT did not differ on most measures.

*Study 2:* P and S scores replicated Study 1 and did not differ from each other. R scored higher on temporal and arithmetic tasks than P and S. R, P and S mental imagery scores did not differ.

*Study 3:* M scores equalled MI's on certain spatial-temporal and arithmetic tests. M scored higher than HS, who scored higher than AR. The effects of Study 2 were maintained. No effects were found for verbal, memory, or reading tests.

## Conclusions

Disadvantaged children who received two years of music instruction scored equal to middle-income children on certain spatial-temporal tasks, including arithmetic, two years after instruction ended. Instruction emphasizing different musical components affected different types of spatial tasks. These results suggest that music instruction should therefore be included among the core elements of intervention.