

A research team exploring the link between music and intelligence reports that music training—specifically piano instruction—is far superior to computer instruction in dramatically enhancing children’s abstract reasoning skills necessary for learning math and science.

The new findings, published in the February 1997 issue of *Neurological Research*, are the result of a two-year experiment with preschoolers, led by psychologist Dr. Frances Rauscher of the University of Wisconsin at Oshkosh and physicist Dr. Gordon Shaw of the

University of California at Irvine. As a follow-up to their groundbreaking studies indicating how music can enhance spatial-reasoning ability, the researchers set

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out to compare the effects of musical and non-musical training on intellectual development. @ The experiment included three groups of preschoolers: one group received private piano/keyboard lessons and singing lessons; a second group received private computer lessons; and a third group received no training. Those children who received piano/keyboard training performed 34% higher on tests measuring spatial-temporal ability than the others. These findings indicate that music uniquely enhances higher brain function required for mathematics, chess, science and

engineering. @ The implications of this and future studies can change the way educators view the core school curricula, particularly since music-making nurtures the intellect and produces long-term improvements. “It has been clearly documented that young students have difficulty understanding the concepts of proportion (heavily based in math and science) and that no successful program has been developed to teach these concepts in the school system,” stated Dr. Rauscher. “The high proportion of children who evidenced dramatic improvement in spatial-temporal reasoning as a result of music training should be of great interest to scientists and educators,” added Dr. Shaw.

### Results Reinforce Causal Link Between Music and Intelligence

The research is based on some remarkable studies that have recently begun pouring out of neuroscience laboratories throughout the country. These studies show that early experiences determine which brain cells (neurons) will connect with other brain cells, and which ones will die away. Because neural connections are responsible for all types of intelligence,

a child’s brain develops to its full potential only with exposure to the necessary enriching experiences in early childhood. What Drs. Rauscher and Shaw have emphasized has been the causal relationship between early music training and the development of the neural circuitry that governs spatial intelligence. Their studies indicate that music training generates the neural connections used for abstract reasoning, including those necessary for understanding mathematical concepts. @ Specifically, earlier studies led by Drs. Rauscher and Shaw reported a causal relationship between music training and spatial-temporal ability enhancement in preschoolers (1994), and among college students who simply listened to a Mozart sonata (1993, 1995). @ References to these and other findings related to music research conducted worldwide are available at the Music and Science Information Computer Archive (MuSICA) at the University of California, Irvine. For more information please access MuSICA on the World Wide Web (<http://www.musica.uci.edu>).

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on current research which documents the critical role quality sequentially-based arts education plays in the complete educational experience of our children. For more information contact the Iowa Alliance For Arts Education, 515•277•1254.