Music and spatial task performance

Sip — There are correlational1, historical2 and anecdotal3 relationships between music cognition and other higher brain functions, but no causal relationship has been demonstrated between music cognition and abstract spatial reasoning, pertaining to abstract operations such as mathematical or spatial reasoning. We performed an analysis of variance (ANOVA) performed on IQ scores of 119, 111 and 110, respectively. Thus, the IQs of subjects participating in the music condition were 8-9 points above their IQ scores in the other two conditions. A one-factor (listening condition) repeated measures analysis of variance (ANOVA) performed on IQ scores revealed that subjects performed better on the abstract spatial reasoning tasks after listening to Mozart than after listening to either the relaxation task or to nothing (F(2,31) = 7.68; p = 0.002). The music condition differed significantly from both the relaxation and the silence conditions (Schiffr's F = 3.41, P = 0.002; r = 3.67, P = 0.0008, two-tailed, respectively). The relaxation and silence conditions did not differ (r = 0.795; P = 0.432, two-tailed). Pulse rates were taken before and after each listening condition. A two-factor (listening condition and time of pulse measure) repeated measures ANOVA revealed no interaction or main effects for pulse, thereby excluding arousal as an obvious cause. We found no order effects for either condition presentation or task, nor any experimenter effects. The enhancing effect of the music condition is temporal, and does not extend beyond the 10-15 minute period during which subjects were engaged in each spatial task. Immediate or a delay period (as a variable) between the music listening condition and the testing period would cause us quantitative to determine the presence of a decay constant. It would also be interesting to vary the listening time to optimize the enhancing effect, and to examine whether other measures of general intelligence (verbal reasoning, quantitative reasoning and short-term memory) would be similarly facilitated. Because we only used one musical sample of one composer, various other compositions and musical styles should also be examined. We predict that music lacking complexity or which is repetitive may interfere with, rather than enhance, abstract reasoning. Also, as musicians may process music in a different way from non-musicians, it would be interesting to compare these two groups.

1. Also at Center of Physics.