Auditory Effect of Fibonacci and Lucas Sequences on Short-Term Memory

Choi, Kevin (School: St. John's School)

This study explores the potential therapeutic benefits of music created from mathematical sequences, particularly focusing on the Fibonacci and Lucas sequences. The numbers in these sequences were concatenated to the remainder of 12 and translated into chords. Then, the effect of such music on short-term memory enhancement in 114 individuals aged 7 to 10 was tested using the Chimpanzee and Verbal Memory tests. Furthermore, computational analysis techniques utilizing the Python Librosa library examined the melodic elements of music created from the sequences, and the underlying mathematical principles contributing to their appeal were identified. The results showed that 70 to 80% of the students who listened to the music created by the Fibonacci sequence did better in both Chimpanzee and Verbal Memory Tests than those who did not listen to any music ($p < 0.02$). Out of the students, the kindergarteners, or the youngest group, had the highest average percentage increase of 80-120%. These findings elucidate the intricate relationship between mathematics, music, and cognitive function, offering insights into the therapeutic potential of mathematical music for memory enhancement interventions, including a potential music therapy program for elderly individuals suffering from Alzheimer's disease.

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