CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

J1213

Project Title

The Beat of Your Heart: Does Music Affect Heart Rate?

Abstract

Objectives/Goals

Our objective was to investigate the effect of listening to various genres of music on heart rate(HR). Based on the literature, we expected that listening to fast tempo music would tend to speed up HR, and listening to slow tempo music would tend to decrease HR. We further hypothesized that music's effect on HR might be a factor of gender or age.

Methods/Materials

Informed consent was obtained from 12 adults, ages 32 to 63, and for 14 students, ages 9 to 12,(N=26). Parental consent was obtained for all students. Each subject was tested in a booth set up in our school library. The booth was lined with white paper to minimize visual distractions. Testing was conducted only while the library was closed to further control for extraneous variables. At the start, each subject was asked to take 20 deep breaths, and their baseline HR was measured (starting after the first 10 breaths) with a ReliOn cuff monitor. Each subject then listened to 6 different types of music (reggae, rap, heavy metal, gospel, jazz, and soundscapes) for 2 minutes each, while wearing ear buds. All subjects listened to the same music in the same order. HR was measured during minute two of each music piece. Between musical pieces, each subject was asked to take 20 deep breaths and HR was measured, as above, to establish a baseline before listening to the next type of music. The total test took about 20 minutes per subject.

Results

For each type of music, we calculated the HR change as the HR while listening to a music piece minus the baseline HR. To help interpret results, we calculated summary statistics for the entire group of subjects, and for the tested group divided by gender (13 females and 13 males) and by age (14 students and 12 adults). Data was sorted and plotted on histogram charts.

Conclusions/Discussion

As hypothesized, HR for the typical subject decreased while listening to soundscapes. The typical subject did experience an increase in HR while listening to the five genres of faster tempo music. For the group as a whole, HR increased the most while listening to heavy metal. Interestingly, while listening to soundscapes, the average student and average male experienced a decrease in HR, while the average adult and average female experienced an increase in HR. We think this type of study has numerous potential uses, especially in the fields of medicine, education, and sports performance.

Summary Statement

We studied the effect of music on heart rate (HR); in particular, we examined the effect of listening to six different genres of music on HR for 26 subjects, and whether gender or age played a role in the observed HR differences.

Help Received

Dr. Spongberg helped with interpretation of statistics; Mother helped to type part of report.