Effects of different music on blood pressure

In this experiment we will be analyzing results and observations in an attempt to create an answer to the underlying question, as to how music affects a person’s blood pressure and heart rate. Blood pressure and heart rate measurements are regularly taken for a variety of reasons. As mentioned by Medline Plus, a high blood pressure or low blood pressure can lead to many different heart problems and diseases. Therefore an irregular blood pressure measurement can signal the presence of health problems, or the risk of developing one if lifestyle changes are not made (Dugdale and Zieve 2009). Many aspects of what a person does can affect their blood pressure and their overall health, such as level of physical activity, and diet. In one experiment that was recorded in the New England Journal of Medicine, the effects of dietary choices on blood pressure were tested. In the experiment a number of adults were fed a controlled diet of healthy foods for a number of weeks. In the end, the healthy diet decreased their blood pressures a significant amount (Appel et al. 1997).

Lifestyle choices are not the only factors that influence blood pressure and heart rate. The five senses and how the brain processes sensory information can have an effect as well. In the Journal of Nervous and Mental Diseases, there was an experiment that tested the effect of dogs on a human’s blood pressure. The results from the experiment show that a dog’s presence, along with the act of petting and touching the dog made children’s blood pressure decrease (Friedmann et al. 1983). In this particular experiment, we will judge the effects of two types of music on blood pressure and heart rate. The hypothesis is that the more up-beat and energetic song (the metal song) will cause the blood pressure and heart rate results to be higher than the blood

pressure and heart rate results affected by the calm, slow song (the classical music). The findings of this experiment is important because it is beneficial to understand how your sense of hearing and your brain’s interpretation of sounds can affect how your body cardiovascular responses and functions.

Materials and Methods:

By using the instructions given in the Biology of Organisms Lab Manual, we first took from each person three basal measurements for blood pressure and heart rate by using an electronic sphygmomanometer. These basal readings were used as a control in our experiment.

For the experiment, we played a metal song (Bleeding Mascara, Warped disc 1 by Atreyu) and a calm classical song (This Year’s Love, White Ladder by David Gray) to judge whether either one had a significant effect in each person’s blood pressure or heart rate. The first song played was the up-beat metal song. Using the electronic sphygmomanometer, the person’s blood pressure and heart rate was measured at specific intervals: 30 seconds into the song, 1 minute and 30 seconds into the song, and 30 seconds after the song was over.

Then the classical song was played. The heart rate and blood pressure was measured and recorded during the same time intervals as the previous measurements during the metal song. In this experiment the dependent variables were the blood pressure and heart rate measurements. The independent variables were the set time intervals (30 seconds into song, 90 seconds into song, and 30 seconds after song) during both the metal and calm song at which each measurement (systolic and diastolic blood pressure,

and heart rate) were taken. Finally, we repeated the same steps for the next group to obtain data on the effects of music on their blood pressure and heart rate as well (Weedman and Sokoloski 2009). We did this by measuring the next person’s blood pressure and heart rate at the before mentioned intervals (30 seconds into song, 90 seconds into song, and 30 seconds after song) during the metal song and the calm song. Once all the data was obtained we analyzed the data. We did this by averaging out everyone’s data together of each measurement at each time interval. Also we calculated and compared the measurements of each song that corresponded to the same time interval using the t-test. The data was recorded on Microsoft Excel and the results of the t-test was calculated using excel as well. There were 22 students data included in this experiment.

The data in the results were obtained through during our time in the biology lab. As was mentioned before, the data was recorded onto a table that depicted the measurements of blood pressure and heart rate and different time periods and after each song. The data was then calculated into percentages using nine different t-tests. To form a proper t-test, the systolic and diastolic blood pressure measurement where separated. These t-tests will be used to judge whether or not there is significant difference between the measurements that corresponds to the same period of time within each song. The results of the t-test are shown by following data table.

Results:

For this experiment the results were considerably similar, and there were many trends seen in between the recorded information. Figure 1 shows that

the mean of the pulse rate during the metal song (Bleeding Mascara) was considerably lower than the pulse rate during the classical song (This Year's Love). Similar trends for systolic and diastolic blood pressure are shown in figures 2 and 3. Figure 2 shows that the systolic blood pressure is much higher during the classical music, than during the metal song. Also figure 3 obviously shows a significant difference between the diastolic pressure between the metal and the classical music. For the mean results shown in table 2, the results vary. But in general the results only very only a few digits (either in BPM, or mmHg) from each other. Also, for the p-value results taken from the t-test where similar. The p-value results are shown in table one. All of the p-value recordings for pulse rate were under 5 percent for both types of music. But, both the systolic and the diastolic blood pressure results were above 5 percent when calculated using the t-test.

Metal Song (Bleeding Mascara)

Calm Song (This Year's Love)

Pulse Rate (decimal percentage)

0. 018544

0. 000557

Systolic blood pressure (decimal percentage)

0. 223369

0. 17594

Diastolic blood pressure (decimal percentage)

0. 103592

0. 015418Table 1 P-Value Results

Table 2 Mean of Blood Pressures and Pulse Rates

Basal

30 sec into metal song

90 sec into metal song

30 sec post metal song

30 sec into calm song

90 sec into calm song

30 sec post calm song

Pulse rate mean (BPM)

72. 136

67. 714

68. 714

69. 476

68. 318

65. 864

68. 409

Systolic BP mean (mmHg)

108. 5

111

104. 619

104. 801

109. 227

103. 046

107. 409

Diastolic BP mean (mmHg)

63. 818

66. 571

66. 762

65. 238

69. 273

65

66. 682

Figure 1

Figure 2

Figure 3

Discussion:

The hypothesis for this experiment was that the metal song which is up-beat will generally cause blood pressure and heart rate to increase and become higher than the results of blood pressure and heart rate when people are exposed to the classical song.

I do not accept my previous hypothesis because the results do not support it at all. This is evident in table 1 and figures 1 through 3. Figure 1 shows that the classical song causes the pulse rate to increase to a higher rate, when compared to the metal song, which does not have as much of an effect on the pulse rate. Figures 2 and 3 also have similar trends when comparing the results from the metal music and the classical music. In both figures 2 and three the heart rates (both systolic and diastolic) in at a higher rate during

the classical song than the metal song; therefore the classical song did have more of an effect. Also table 1 shows that the classical music did have more of an significant difference than the metal music, but not significant enough for blood pressure.

The British Psychological Society published a research experiment that tested the effect that music had on blood pressure. The researchers who conducted the experiment specifically used classical music in the experiment. They did this because they wanted to see if the calm and soothing music would make people relax, and make their blood pressure drop as well. The experiment's result showed that classical music did indeed decrease blood pressure. The results for the experiment showed small but noticeable differences between the rate of blood pressure before and after hearing the classical music. (Chafin et al. 2004). My results for our class does somewhat support this, because the blood pressure results did decrease a sufficient amount. The blood pressure for the blood pressure did decrease during the classical music.

One weakness I have discovered in my results is that some of the people got an error when trying to obtain some measurements. This would have obviously affected the average and results of the t-test. This would affect the average because we do not have all the data needed from every student, which will d have obviously affected the average and results of the t-test. This would affect the average because we do not have all the data needed from every student, which will result in a slightly uneven average. Also another weakness in our result is that all of the people who participated in the experience where young, healthy adults. In other words, our results do

not reflect the overall populations pulse rate and blood pressure response. Another weakness is that not all the students were able to get the measurements at the specific time. An example of this is that someone might not have read the pulse rate right at the 90 seconds period, but a little afterwards. This could have affected our experiment because the results might not be completely accurate. My conclusion for this experiment is that heart rate and blood pressure is definitely affected by music, and that different types of music can have different effects.

Literature Cited

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