The Mozart Effect

Listening to Mozart boosts your brainpower. That is the theory behind a certain CD called “Music for the Mozart Effect Vol. 1-Strengthen the Mind”. It is a collection of music done by Mozart which is supposed to enhance your brainpower and increase your memory.

About six years ago, researchers reported that people scored better on a standard IQ test after listening to Mozart, calling it the “Mozart Effect”. Rats raised on Mozart run through mazes faster and more accurately. People with Alzheimer’s disease function more normally if they listen to Mozart and the music can even reduce the severity of epileptic seizures.

Gordon Shaw, a neurobiologist at the University of California at Irvine simulated the brain activity. The way nerve cells were connected to one another predisposed groups of cells to adopt certain specific firing patterns and rhythms. These natural patterns, he believes, from the basic grammar of mental activity. In 1988, Shaw and his student Xiaodan Leng decided to turn the output of their simulations into sounds instead of a conventional printout. To their surprise, the rhythmic patterns sounded like baroque, new age, or eastern music. (Klierwer)

Shaw and his colleague Frances Rauscher, a psychologist at the University of Wisconsin at Oshkosh, decide to test how Mozart’s music effect students’ abilities on a standard IQ test. They tested to see whether them music could temporarily boost people’s ability to visualize shapes. This ability forms the basis of many complex thinking skills that involve turning an object over in your mind, including much of mathematics.

In 1995, Shaw and Rauscher asked 79 college students to work out what a paper would look like if folded and cut into a paper doily. After taking the test, one group of students sat in silence for ten minutes. Another group listened to a Mozart piano sonata, while a third group heard either an audiotaped story or repetitive music. They all took the test again. The Mozart group correctly predicted 62% more shapes on the second test, while the “silent” group improved by 14% and the third group by 11%. (Klierwer) This experiment shows the substantial improvement by the Mozart group over the other two groups subjected to either nothing or non-Mozart music.

Psychologist Christopher Chabris at Harvard University, after looking at results from 16 different Mozart Effect studies, concluded that the real reason some people do better is what psychologists call “enjoyment arousal” which is when music improves people’s moods, so they perform better.

Lois Hetland of the Harvard Graduate School of Education found that Mozart listeners outperformed other groups more often than could be explained by chance. She states that Mozart may give a bigger boost to some people than to others, depending on their sex, musical tastes and training, spatial ability and cultural background.

Another psychologist Eric Seigel at Elmhurst College, Illinois, initially started out to disprove the Mozart Effect by using a different spatial reasoning test. In his test, a subject looks at two letter E’s, with one rotated at a skewed orientation in relation to the other. The greater the angle, the harder it is to judge whether the letters are the same or different. The milliseconds it takes the subject to make that judgment are a precise measure of spatial reasoning. To Seigel’s surprise, subjects who took the test after listening to Mozart did significantly better, which Seigel says is in line with Rauscher’s results in the original paper-folding test. (Kliewer)

At the University of Illinois Medical Center, neurologist John Hughes and a musicologist colleague have analyzed hundreds of compositions by Mozart, Chopin and 55 other composers. They made up a scale that would score how other the music’s volume rises and falls in surges of 10 seconds or longer.

Not surprisingly, pop music scored the lowest on this measure, while Mozart scored two to three times higher. Hughes predicts that sequences repeating regularly every twenty to thirty seconds my trigger the strongest response in the brain, because many functions of the central nervous system, such as the onset of sleep and brain wave patterns, also occur in thirty second cycles. And of all the music analyzed, Mozart most often peaks every thirty seconds. Results like these help predict which pieces of music have the strongest effect on the brain.

Julene Johnson of the Institute of Brain Aging and Dementia at the University of California at Irvine gave Shaw’s original paper-folding test to Alzheimer’s patients, who often have impaired spatial reasoning because of their illness. In a pilot study, on patient’s score improved by three or four correct answers out of eight tests items after a ten minute dose of Mozart, but not after being exposed to silence or popular music from the 1930s.

In another study, 30 rats were exposed to Sonata in D for twelve hours everyday for over two months. These rats ran a maze an average of 27% faster with 37% fewer errors than 80 other rats raised with white noise or in silence. These studies conclude that improvement can not be due to the “enjoyment arousal” predicted by the psychologist because rats do not have emotional response to Mozart. They suggest a neurological basis for the Mozart Effect. (Rauscher)

In yet another study, 36 severely epileptic people who suffered almost constant seizures that sometimes left them comatose were used. 29 of those patients experienced milder seizures when the debilitating electric storms that sweep their brains became smaller and less frequently shorter after listening to Mozart. The same patients were then exposed to popular music from the 1930s but did not improve at all. (Hughes)

Dr. Gottfried Schlaug is a neurology instructor at Harvard Medical School who has done a series of experiments using magnetic-reasoning-imaging technology to examine the brains of musicians who began to play an instrument before turning seven, musicians who started later on, and people with no musical background. He found that certain regions of the brain, such as the corpus callosum and the right motor cortex, were larger in musicians who started their musical career before the age of seven. Also, musicians with perfect pitch, or the ability to identify musical notes heard out of context, have larger left temporal lobes that nonmusicians do. This shows that starting music lessons at a younger age may enhance the brain activity.

The belief that classical music, specifically Mozart, can enhance memory as well as brain activity is pretty much accepted. There has been numerous experiments after experiments testing out different types of influences that the music can have. Although listening to Mozart may not increase your IQ, it is sure that it can enhance your memory. Also, knowing how to play an instrument proves to have greater influence than listening to Mozart, no matter how much.

That information makes me feel better, for I am a piano veteran, as well as a flutist for the past couple of years. That makes me wonder about my brother who has never had a music lesson…could that be the reason behind his report cards?

# CONCLUSION

The two mice that I used for this experiment do not make up the whole population of every organism capable of enhanced brain activity due to Mozart. They are, however, a good way to simulate a whole population in a very small scale.

The first initial maze run-through was to test the memory of both the mice before any type of experimenting. With this, I was able to compare the improvement, or lack of, with all the other runs. This first run served the purpose of a “control”, although the real control was mouse “B”. The first run showed the quickness of mouse “B” over the slowness of mouse “A”. (This was not a factor behind choosing “A” to be the one listening to music, though; I have them determined beforehand) In exchange for the small number of mice I had, I tested them for a period of a week, which translates into 168 hours of Mozart for mouse A. I felt that this was a significant amount of time to test the Mozart effect. It was enough time for the mice to adjust to their new environment as well as show encouraging results from the experiment.

With each day of music, it is evident that mouse “A” showed improvement, while mouse B pretty much went up and down randomly. Although the improvements are subtle, they are there. The mouse was successful in increasing the difference of the first run compared to the second run, although not consistently. With each day, I was able to sense more alertness of the mouse than when I first got it. I feel that I got significant enough results, although they are not the incredibly obvious ones that I had anticipated.

The results surprised me. Honestly, I did not think that I would get significant differences from this experiment. I felt that a few mice and some music would not prove much, but I was wrong. A longer period of time, as well as more mice would have been nicer and would have given better, more significant results. However, even with the short amount of time and small amount of data, I was able to see the Mozart Effect taking place. I was able to see that Mouse A, even though was more alert in the maze, was calmer (and easier to pick up) than Mouse B which seemed to have a lot of anxiety and run around more than the other. This could just be a difference in the personalities of each mouse, but I believe it is because the music was able to calm Mouse A and gave it a serenity and peace of mind to do the maze more efficiently.

In conclusion, this experiment proves to be a success. I was able to get workable, interpretable data that shows the Mozart Effect at work, even in the brains of mice.