CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

J0412

Project Title

The Effects of Video Games on the Brain

Abstract

Objectives/Goals

To discover how different types of video games affect the human brain.

Methods/Materials

Eight human volunteers were recruited for the experiment, and a quiet environment was created. During each session the subject wore the Mindwave Mobile Headset, which is an Electroencephalogram. Each subject played Spyglass Chess for one complete game, and then played Halo 4. The subject's brain waves were recorded in combinations called "eSense" Attention and Meditation scores ranging from 0-100 (lo-hi intensity). Next the subject filled out a questionnaire on game playing habits like frequency and type of game play to understand behavior. Conclusions were drawn based on data analysis. Materials used were the following: Mindwave Mobile Headset, Plasma TV, Xbox 360 System, Spyglass Chess & Halo 4, PC with NeuroView research software and Excel.

Results

The Halo vs. Chess analysis shows a normal yet slight difference in Meditation and Attention levels. The standard deviation of the Chess group is also higher than that of the Halo group. The E-T vs. M ("Everyone vs. Mature") analysis shows Meditation and Attention differences in Halo and Chess between E-T gamers and M gamers. The M gamers also received slightly above average values in the Chess Meditation of 63.8. While this was slightly above average, it might be irrelevant because of the standard deviation of 15.8. The Time Exposure analysis shows the difference in the Meditation and Attention in Halo and Chess between people who play less frequently and people who play more frequently. In each study group, no values were found significantly outside of the normal range of 40 to 60 eSense units because of the high standard deviation (14-19 units).

Conclusions/Discussion

People often think that violent video games have a negative effect on the human brain. Regardless of gaming background, the results found in this study proved that there is little difference between the violent game and the milder strategy game. The games studied were the "Mature" game Halo 4, and the "Everyone" game Spyglass Chess. Based on the eSense responses of Attention and Meditation as well as questionnaire responses, the results showed that the violent video game in this study does not have a bad effect on the human brain. Even though the data showed these results, future work may look at other brain waves or combinations showing effects not found in this study.

Summary Statement

This project was conducted to show how different types of video games affect human brain waves.

Help Received

Mr. Reo and Mrs. Kyle provided training on experimental design; Mrs. Reo and Mr. Kyle supplied input on board layout; Mr. and Mrs. Kim prepared refreshments; Mrs. Wiebe was the Science Project Advisor from Notre Dame Elementary; NeuroSky Inc. donated the NeuroView software and headset.