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COMPARISON OF DURATION PLAYING DEFENSE OF THE ANCIENTS-2 VIDEO GAME WITH REACTION TIME

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ABSTRACT

Background: DotA-2 is the most popular MOBA video game, which ranks the second most sold on the steam platform. Reaction time as a physiological parameter to find out how quickly to respond to a stimulus. Some research states that video games can increase reaction time. **Objective:** To know the correlation of playing video game Defense of the Ancients-2 with the duration of reaction time. **Method**: The study used cross-sectional design. This study was conducted in the area of the Faculty of Medicine, Diponegoro University. In this study found 42 respondents participated. Score of reaction time is measured using a ruler dropped from the respondent's fingertips. Analysis using Shapiro-Wilk test and Pearson test. **Results:** There is significant relationship between playing a DotA-2 status and reaction time. The duration of playing DotA-2 video games to the reaction time there were significant differences between the 3 groups. **Conclusion**: There is a significant relationship between the status of playing video game DotA-2 with reaction time.
Keywords: video game, DotA-2, reaction time.

INTRODUCTION

Some people think that games have many positive aspects, such as increasing attention, increasing multitasking abilities, and increasing the speed of reaction time. Some studies reveal that real time strategy video games can improve cognitive function, there are also studies that action games are being used as an exercise to increase reaction time.[1-3] Based on a survey conducted by the Entertainment Association in 2018, 64% of families in the United States have a device to play video games, 60% of them play video games every day, the average ages of video game player are about 18-34 years.[4] Reaction time as a physiological parameter is used to find out how quickly someone responds to a stimulus. The faster individual reaction time the better visual and motor coordination.[5] DotA-2 game is a Multiplayer Online Battle Arena (MOBA) video game in the form of a fusion of strategy and action game, where players play 5-to-5. To play DotA-2, players require reflexes to visual and auditory stimuli.[6] DotA-2 game is a game that is widely played and there has been no research on the benefits of playing it, therefore it is necessary to conduct further research to determine the benefits of playing game DotA-2, the reaction time is measured with the Ruler Drop Test.

METHODS

This research was an observational analytic study with a cross sectional research design. The study was conducted in Faculty

of Medicine, Diponegoro University. The inclusion criteria in this study were male, 17-25 years old, in a good health, able to operate a computer, and willing to be the subject of research. The exclusion criteria in this study were having a history of brain trauma/injury, musculoskeletal abnormalities, and neurological disease.

The subjects were chosen by using consecutive sampling. Based on the large sample size, the minimum number of samples is 100 samples. The independent variable of this study is the frequency of playing DotA-2 video games, while the dependent variable in this study is the reaction time.

The hypothesis test used were the Pearson test to find out if there was a correlation and the Saphiro-Wilk test to find out if there were significant differences between the 3 groups.

RESULTS

Characteristics of Research Subjects

This research was conducted in the area of the Faculty of Medicine, Diponegoro University. The research subjects were male undergraduate program students of General Medicine FK UNDIP with an age ranged from 17 to 25 years who met the inclusion and exclusion criteria.

Table 1 . Student Distributions Based on Age

Age	n	%
21	23	54.76
22	12	28.57
23	7	16.66

Table 2 . Research Results Test Data Reaction Time

Frequency	N	Minimum	Maximum	Mean ± Standard Deviation
Frequently	14	132	153.66	145.19 ± 6.52
Fairly frequently	14	137.66	171	153.81 ± 7.92
Infrequently	14	146.67	192.67	166.5 ± 11.36

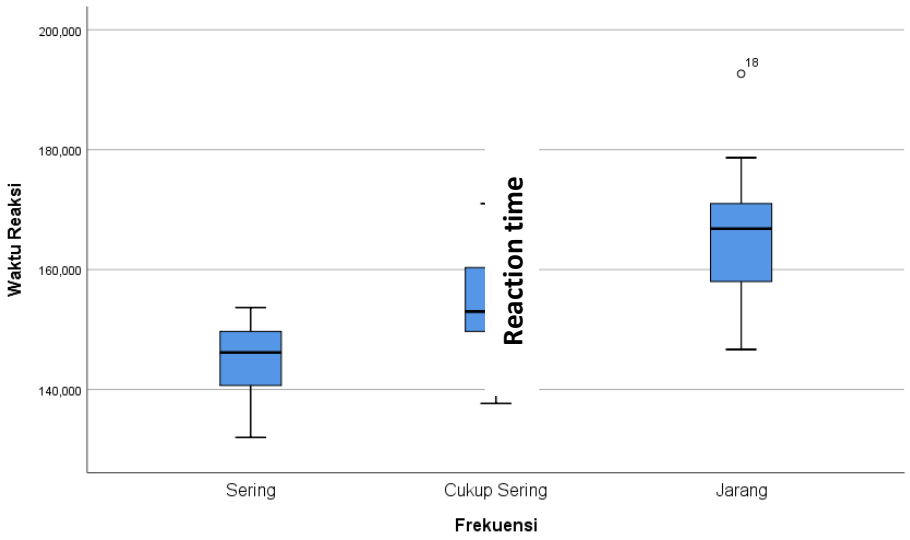

Figure 1 Boxplot between reaction time and frequency

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Relationship between Frequency of Playing Video Game Defense of the Ancients-2 Against Reaction Time

Table 3. Normality Test

Duration	Shapiro-Wilk
	Sig
Frequently	.34
Fairly frequently	.99
Infrequently	.76

The Saphiro Wilk test was used to see the normality of data distribution and obtained the normally distributed data mean. These results would be tested by One-Way Anova test to find out whether there was a significant difference from the 3 groups of playing time.

Table 4. One-way ANOVA test

Duration	Anova
	Sig
Frequently Fairly frequently Infrequently	0.00

The One-Way Anova test resulted the value of p = 0.00 (p≤0.02) showing that there was a significant difference between the playing time and the reaction time.

Table 5. Post Hoc Test

Frequently	Fairly frequently	0.05
	Infrequently	0.00
Fairly frequently	Frequently	0.05
	Infrequently	0.00
Infrequently	Frequently	0.00
	Fairly frequently	0.00

In the Post Hoc test found a significant relationship between frequently playing group with infrequently playing group, and fairly frequently playing group with infrequently playing group.

Table 6. Pearson Correlation Test

	Reaction time
Duration of playing	r = 0.69 p = 0.00 n = 42

In the Pearson correlation test, the value of p = <0.00 indicated that there was a significant correlation between duration of playing and reaction time. Pearson correlation value of 0.69 shows positive correlation with strong correlation.

DISCUSSION

Relationship between Duration of Playing DotA-2 Video Games and Reaction Time

The Pearson test showed a significant value of 0.00 which showed a significant correlation between groups with frequent, fairly frequent and infrequent lengths of time with reaction times. Pearson correlation value of 0.69 shows a positive correlation with the strength of a very strong correlation. These results indicate that the more often playing video games the shorter the reaction time. The results of this study prove the hypothesis proposed by researchers that the length of time playing DotA-2 video game is related to reaction time. The results obtained are in accordance with research that people who do more exercises or play repeatedly have better reaction times.[7] This is also supported by previous research that video games can shorten reaction time,

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because video games are used as an effective exercise to shorten reaction time. Increased reaction time occurs because the person often plays games that are repeated, so they used to it.[8]

Comparison of the Length of Playtime of a *DotA-2 Video Game* and the Reaction Time

The results of this study indicated that there are significant differences between the three groups in the examination of reaction time. Comparison of the average reaction time between groups who frequently, fairly frequently, infrequently playing in one week found the group frequently and fairly frequently playing shows a significant difference to the groups rarely play. This is not in accordance with research conducted by Irfan which states that playing video games with the method of playing 'first person shooter' for 30 minutes and 1 hour every day can shorten the reaction time. The 'first person shooter' video game that author researched showed a point of view, which requires the players to react to visual stimuli in the form of programmed/planned enemies appearing from several directions. The mechanism of playing 'first person shooter' requires keyboard keys to move the character and mouse to direct the view and shoot. 'First person shooter' video game requires the right hand dominant to direct the view of the weapon towards the enemy that has been programmed quickly and precisely.[9] Video games investigated by researchers in the form of multiplayer online battle arena that has a complex game system, with 5-to-5 players in real time. So the players reflex against visual and auditory stimulus from other players. Online multiplayer battle arena players require dexterity in moving the desired screen view and many keyboard keys to release skills and items.[10] This is related to the influencing factors, such as the type of stimulation and use of the right/left hand. Someone with a good reaction time on the visual, doesn't always have a good reaction time on auditory. People who have a dominant left hand have better spatial abilities compared to the right handed people. People who often play video games have a shorter reaction time than those who play rarely. This happens because people who play often play video games accustomed to repetition done, thus providing a better stimulus than playing rarely.[6] The reaction time on a video game player occurs with a cycle, firstly the player receives a visual stimulus from a video game devices, then the stimulus will be sent to the brain, then the player thinks and gives commands through the hands to move the game device. When the player plays the video game, the player will repeat the previous stored memory to be presented again.[11]

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

There is a significant relationship between the status of playing DotA-2 video games with reaction time

Recommendations

1) In this research, it is known that there is a strong relationship between playing the Defense of the Ancients-2 video game to reaction time, as the reaction time are increased. So playing video games can be occupied by those who need an increase in reaction time.

2) Further research needs to be done by observing other games
3) Further research needs to be done by observing with simultaneous examination
4) Further research needs to be done on the effect of playing DotA-2 video games on other cognitive functions
5) Further research needs to be done with different examination.

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