

A Comparison of Reaction Time and Mental Imagery of Video Game Players and Two-Wheeler Drivers

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ABSTRACT

The study aimed to identify whether significant difference exist between video game players and non-players, as well as two-wheeler drivers and non-drivers in reaction time and mental imagery. The samples being male video game players (N=30), and non-players (N=30), two-wheeler drivers (N=30) and non-drivers (N=30) were collected from one of colleges of Kerala. A random selection, of total 120 samples which consisted of four groups of 30 each aged between 18 to 23, was done. Personal data schedule to obtained Reaction time apparatus; to determine their reaction time, mental imagery questionnaire; to assess the sensory experiences was administered. The data analyzed using T-test showed significant difference in the choice reaction time, between video game players and non-players. Except choice reaction time, mental imagery and simple reaction time showed no significance in any group. Thus hypothesis that there is no significant difference between video game players and non players in mental imagery and reaction time and there is no significant difference between two-wheeler drivers and non-two wheeler drivers in mental imagery and reaction time are accepted. However significant difference in choice reaction domain of the reaction time was observed.

Keywords: Reaction Time, Mental Imagery, Videogame players, Drivers

The phenomenon of reaction time has been studied extensively since the development of the field of Experimental psychology. Reaction is a purposeful voluntary response to an external stimulus. There is certain time period between the application of external stimulus and appropriate motor response to the stimulus and it is referred to as the reaction time. It depends on nerve connections and signal pathways and is the measurement of how long it takes for brain and nerves to react to a stimulus. Reaction time is important when driving, when playing sports, in emergency situations, and in many day-to-day activities. Reaction time is part of the human make up, and is apparent in everyday life. It is found highly applicable in the context of driving where we need to make immediate response to stimuli.

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Driving is a physical act involving the use of visual, auditory, motor and other cognitive skills and errors in attention and information processing may result in accidents leading to disastrous consequences. Errors in detecting relevant information may occur due to internal distraction as people tend to engage in other physical or mental tasks during the act of driving. The formation of mental imagery, especially visual imagery, is a crucial aspect in the context of driving. Studies in the past have indicated that drivers use visualization to learn new tracks and practice driving techniques. Similarly playing video games have been identified as enhancing one's reaction time (Filders & Allan, 1989; Tejas P. Ghuntla 2014). The association between the act of driving, playing video games, formation of mental imagery and reaction time is a promising area of research. The present study was undertaken to understand whether video game playing and driving enhance one's reaction time and facilitate the formation of mental imagery.

Need and significance of the study

Several studies in the past have tried to explore the influence of video game playing in enhancing a wide variety of skills. Expert video game players are found to outperform non-players on measures of attention and performance. Recent research has pointed out a casual relationship between playing video games and improvement in visual and attention skills. It has also been found that playing targeted games are associated with increased reports of risky driving habits. Studies have identified faster reaction times in the case of experience video game players. But there have been instances where the effect of video games was mediated by increase in sensation seeking and rebelliousness. In this context, an attempt is made to understand whether video game players differ from non-players in their reaction time and mental imagery. The study also tries to identify the differences between two-wheeler drivers and non-drivers in the above variables.

Problem

- To compare the reaction time and mental imagery of inexperienced and experienced video game players and two wheeler drivers

Objectives of the study

1. To identify whether there exist any significant difference between video game players and non-video game players in mental imagery and reaction time.
2. To identify whether there exist any significant difference between two-wheeler drivers and non-two wheeler drivers in the variables of mental imagery and reaction time.

Statement of the problem

The present study is entitled '*Reaction time and mental imagery of video game players and two-wheeler drivers*'.

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Hypotheses

1. There will be no significant difference between video game players and non-video game players in the variables of reaction time (simple and choice reaction time).
2. There will be no significant difference between video game players and non-video game players in the variables of mental imagery (visual, auditory and organic).
3. There will be no significant difference between two-wheeler drivers and non-two wheeler drivers in the variables of reaction time (simple and choice reaction time).
4. There will be no significant difference between two-wheeler drivers and non-two wheeler drivers in the variables of mental imagery (visual, auditory and organic).

METHODOLOGY

Sample

The sample consisted of randomly selected 120 male participants, between the age group of 18 to 23, 30 Sample for each group i.e. video game players, non-video game players, two wheeler drivers and non-two wheeler drivers, from a college in Ernakulum district, Kerala.

The Test Materials

The study was carried out using the following tools.

1. Mental Imagery Questionnaire (Rajamanickam, 1996)
2. Reaction time apparatus (Donders, 1868)
3. Personal data schedule

Administration and scoring

For recording simple reaction time, the following instructions were given to the subject, “This is an experiment on reaction time. We are interested in measuring the speed with which you can react to the appearance of the light. You have got a red light here. As soon as you see the red light, press the key on your left side as quickly as you can”. The investigator gave a couple of trials for demonstration and he started with the experiment. He pressed the key for the red light and as soon as the subject pressed the key, he noted the time recorded in the chronoscope. Before switching on the light, each time a ‘ready’ signal was given, and light was presented for 2 seconds. 20 trials were given to the subject. The average reaction time was calculated.

For the choice reaction time, both the green and red stimuli were used and the following instructions were given to the subject, “In this part of the experiment, I’ll continue to measure speed with which you react to the appearance of the light. But this time, I’ll present sometimes green light and sometimes red light. Place your right hand index finger on the right hand-side key and left hand index finger on the left hand-side key. Your job is to react to green light with your right hand index finger and red light with your left hand index finger only by releasing the key.” The investigator then presented the red and green lights in a prearranged random order. 40 trials were taken, 20 each for red and green light. Wrong responses were not counted as trial. The time taken to respond to stimuli was recorded.

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Procedure/Design Of The Study

Taking into consideration the personal convenience of the investigator, it was decided to restrict the location of the study to one district in Kerala, viz., Ernakulam. Based on the objectives of the study, the subjects were selected based on the extent to which they engage in playing video games and drive two-wheelers. Only male students were included in the present study as it was difficult to identify female students meeting the requirements of the study. The consent of the students was sought in advance and the assessment was made.

RESULTS

Table 1, Details of t-test done on scores obtained by video game players and non-video game players in the variables of reaction time.

No.	Variables	Groups	N	Mean	Std. Deviation	t-value	Sig.
1	Simple reaction time	Video game players	30	0.46	0.06	1.286	0.20
		Non-video players	30	0.44	0.057		
2	Choice reaction time	Video game players	30	0.48	0.058	2.135	0.03*
		Non-video players	30	0.45	0.04		

Table 2, Details of t-test done on scores obtained by video game players and non-video players in the variables of mental imager

No.	Variables	Groups	N	Mean	Std. Deviation	t-value	Sig.
1	Visual	Video game players	30	3.65	0.77	0.705	0.48
		Non-video players	30	3.78	0.63		
2	Organic	Video game players	30	4.19	0.75	0.472	0.63
		Non-video players	30	4.10	0.64		
3	Auditory	Video game players	30	1.77	0.72	0.378	0.70
		Non-video players	30	1.84	0.66		

Table 3, Details of t-test done on scores obtained by two-wheeler drivers and non-drivers in the variables of reaction time.

No.	Variables	Groups	N	Mean	Std. Deviation	t-value	Sig.
1	Simple reaction time	Two-wheeler drivers	30	0.453	0.057	0.19	0.84
		Non-drivers	30	0.450	0.062		
2	Choice reaction time	Two-wheeler drivers	30	0.474	0.058	0.28	0.78
		Non-drivers	30	0.47	0.052		

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Table 4, Details of t-test done on scores obtained by two-wheeler drivers and non-drivers in the variables of mental imagery.

No.	Variables	Groups	N	Mean	Std. Deviation	t-value	Sig.
1	Visual	Two-wheeler drivers	30	3.77	0.57	0.56	0.57
		Non-drivers	30	3.66	0.82		
2	Auditory	Two-wheeler drivers	30	3.93	0.73	1.01	0.31
		Non-drivers	30	4.11	0.63		
3	Organic	Two-wheeler drivers	30	4.32	0.6	1.89	0.06
		Non-drivers	30	3.98	0.75		

The results obtained in the present study indicated no significant difference between the groups of video game players and non-players in simple reaction time and visual, auditory and organic aspects of mental imagery. But the group of video game players were found to obtain a greater choice reaction time score than non-video game players. Exposure to video games was found to be associated with greater time to respond to stimuli. The results of t-test to find out the differences between two-wheeler drivers and non-drivers indicated no significant difference between the groups in simple and choice reaction time as well as the visual, auditory and organic aspects of mental imagery. These results lead us to assume that variables other than exposure to video games and driving may be involved in determining one's nature of response to stimuli.

INFERENCES

The findings obtained in the present study shed light into certain important aspects related to the phenomenon of reaction time and mental imagery. The finding of no significant difference between the groups of video game players and non-players in simple reaction time is of great relevance in the context of research focused on identifying methods to improve reaction time. Several studies in the past have identified an improvement in reaction time as a result of exposure to video games. The findings obtained in the present study are suggestive of involvement of factors other than playing video games in determining one's reaction time.

One of the striking findings of the present study was that people exposed to video games took more time to respond to stimulus in the discrimination task, i.e., in the context of choice reaction time. The finding is of relevance in that those exposed to video games may develop a tendency to respond impulsively to stimuli or situations and commit more errors in responding. They make therefore take more effort in trying to reduce the occurrence of errors which result in they taking more time to respond in the case of choice reaction.

The study also helped to reveal that the formation of mental imagery is not related to whether one is exposed to video games or driving practices

IMPLICATIONS

The present study was initiated to explore the nature of reaction time and mental imagery in the case of video game players and two wheeler drivers. The results obtained in the study helped to gain an understanding regarding the influence of video game playing and driving. Contrary to what has been observed in previous studies, the present study revealed that playing video games may not lead to an improvement in one's reaction time, rather may even reduce one's speed to respond to stimuli. Researchers in this field of study have been attempting to find out whether exposure to video game playing result in a reduction in reaction time which generalizes to tasks beyond video game playing. The present study therefore offers a revelation that exposure to video games need always lead to an improvement in one's response to situations, and may also make them more impulsive and prone to errors. Involvement in driving activity was not found to be related to any decrease in reaction time or mental imagery. The study therefore probes us to delve into other aspects of behavior such as ones speed of information processing, intelligence etc. in determining one's reaction time. The formation of mental imagery was also not found to be related to one's involvement in video games or the act of driving. Mental imagery may also be considered as being influenced by a multitude of factors other than the above conditions.

LIMITATIONS OF THE STUDY

In spite of the sincere efforts taken to make the work free from errors, several shortcomings have been noticed:

1. The total sample consisted of 60 college students who were categorized into video game players and non-players, two wheeler drivers and non-drivers. Inclusion of more number of students in each category would have enabled more generalizable comparisons between the subgroups of the study.
2. Though it was originally intended to make a comparison of the groups based on the criteria of exposure to both video game playing and driving and absence of both criteria, this could not be made due to insufficient sample size. Difficulty in obtaining sample satisfying the required criteria was one of the chief limitations of the study.
3. Though many studies have reported aggressiveness and impulsivity in the case of students exposed to video games, the rate of occurrence of road accidents and other behavioral problems as a result of involvement in video games was not assessed in the present study.

SUGGESTIONS FOR FURTHER RESEARCH

Based on the experience gained in conducting the present work, the following suggestions are put forth for further research in this area:

1. The study may be replicated in a larger sample with inclusion of more number of participants satisfying the required criteria.
2. Future research should aim towards a comprehensive evaluation of all relevant cognitive and psychosocial variables related to video game playing and driving.

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3. Studies focused on identification of strategies other than video game playing to enhance one's processing skills and other abilities may be undertaken.

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