

## Blacker (2014)

### Effects Of Action Video Game Training On Visual Working Memory

This study is used to answer questions on:

Working memory model (CLOA)  
Effects of digital media (HL)

### Abstract

This experiment aimed to test if playing action video games enhances visual working memory. 34 university students (all male, mean age of 20 years old) were selected through advertisements and were paid for their time. The participants played either an action game (Call of Duty 3) or a simulation game (The Sims 3) for 30 hours. Their visual working memory was tested after 1 hour of gameplay and 28 hours of gameplay. Differences in their performance in visual working memory tasks was compared. The results showed that those playing the action game showed improved capacity and accuracy. The researchers concluded that long term play of action video games can improve the capacity and accuracy of the visual working memory.



## Aim

To examine the effect of video games on visual working memory

To examine if video games increases the precision of encoding in the visual working memory

## Method

### Participants

34 male participants (mean age of 20 years) took part in the experiment. They were recruited through university online and campus adverts. They were paid for their time.

### Procedure

Participants completed a questionnaire that indicated how much time they spent playing video games and were then divided into two groups to begin video game training.

Group one played a single player campaign game in an action game (Call of Duty 3). After one hour of play, they played a special mission that contained a never-ending wave of enemies to shoot. Their performance on this mission was recorded through number of kills, headshots, time survived and accuracy which was used to generate a skill score. The participants then continued playing the single player campaign before being tested in the special mission again after 28 hours. The player improvement was measured by comparing their scores after 1-hour of play and 28 hours of play.

Group two played a single player simulation game (Sims 3). They were scored by tracking the number of characters they controlled, the number of in game relationships they created and an overall lifetime happiness score (which was generated by the game).

All participants completed 30 hours of play over 30 days with an average of 1 hour of game play per day.

Once the training phase was over, all participants were administered different visual working memory tests individually.

### Visual Working Memory Capacity Test

Participants were placed in front of a TV screen displaying a grey background. A cross was displayed in the centre of the screen to focus the gaze of the participant. Then 4, 5 or 6 coloured squares were flashed on the screen before disappearing. After a short pause, the squares reappeared in the same locations on the screen, but the colours of the squares may have changed. The participant had indicated whether the square colours were the same or different. They had as much time as they liked to make an answer and were shown the correct answer once they had chosen. They repeated this task 32 times.

### Visual Working Memory Precision Test

Participants were shown either one, four or six coloured squares on the TV screen. These then disappeared and were replaced by white squares in the same locations. One of the squares was

surrounded by a bold border indicating that this was the square that was being tested. The participants had to select which colour they believed the square was before the colour was removed. They selected the colour from a colour wheel on the TV screen using a mouse.

Other assessment tasks were run by the researchers to generate more data. They also used 'spacer' tasks in between the memory tests. The participants were asked to rate their motivation for each task (including the memory tasks) upon completion.

Once finished, the participants were given an exit survey explaining the aim of the study and requesting their feedback about how they believed video games may have affected their performance on the memory tests.

## Results

Individuals who trained on the action game (Call of Duty 3) showed enhanced visual memory capacity than those who played the simulation game (The Sims 3). This was demonstrated by the capacity test.

Individuals who trained on the action game also showed a greater accuracy in working memory than those who played the simulation game. This was demonstrated by the precision test.

## Conclusion

The researchers concluded that playing action video games over a long period can enhance the visual working memory in both capacity and accuracy.



## Evaluation

### Generalisability

- The participants young male students so findings cannot be applied to older people or females.
- Participants with little video game experience were also included which provided balance for the experienced gamers.

### Reliability

- The series of the visual working memory tests was randomised to reduce any possible order effects.
- The tests were run using computer technology that timed and ensured tests were administered identically for each participant.

### Application to life

- Understanding that video games can improve working memory can help with rehabilitation from brain damage that affects memory.
- One issue could be that knowledge of this could cause an excessive use of video games in the belief that it will improve memory.

### Validity

- The participants were paid for their time and so may have put more effort into the task in order to justify their payment.
- The 'spacer' tasks were included to help remove the possibility of participants becoming tired or unfocused on the memory tasks.

### Ethics

- The requirement of participants to complete 30 hours of game play could be an ethical issue although the right to withdraw was given.
- The experiment required a significant amount of time commitment from the participants and while this is not strictly an ethical consideration, it should be considered especially as the participants were paid for their involvement.

