Playing Action Video Games Improves Visuomotor Control

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The present study found that action gamers have better lane-keeping and visuomotor-control skills compared to non-action gamers. Action gaming generally improves the responsiveness of the sensorimotor system to input error signals. The findings support a causal link between action gaming and enhancement of visuomotor control, with the suggestion that action video games can be beneficial training tools.

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The present study found that action gamers have better lane-keeping and visuomotor-control skills than non-action gamers. For this study, non-action gamers were trained with both action and nonaction video games. After playing a driving or first-person-shooter video game for 5 to 10 hours, their visuomotor control improved significantly. Non-action gamers displayed no such improvement after playing a non-action game. Action gaming generally improves the responsiveness of the sensorimotor system to input error signals, and the findings support a causal link between action gaming and enhancement in visuomotor control. It is further suggested that action video games can be beneficial training tools.

- Playing action video games has been shown to result in a wide range of benefits for both basic and higher-level visual functions, such as contrast sensitivity, motion-direction discrimination, visuospatial resolution, visuospatial attention, and top-down guidance in visual searches.
- Gamers have enhanced eye-hand coordination and faster reaction times.

The study

The present study consists of four experiments:

1. How do people who do/do not frequently play action video games perform on a common driving task (lane keeping)?
2. Develop a visuomotor-control task for specifically examining visuomotor control underlying driving in action gamers
3. Non-action gamers played either a driving game or non-action game
4. Non-action gamers played either a first-person-shooter game or non-action game

Participants

Experiment 1 involved 12 action gamers and 12 non-action gamers. Action gamers reported playing ≥5 hours per week, while non-action gamers reported playing <1 hour per month.

Experiment 2 involved 14 action gamers and 14 non-action gamers.

Experiment 3 involved 12 non-action gamers (who were randomly assigned to either action group and trained to play a driving

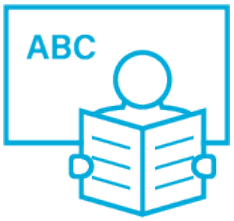
game) and a control group (who were trained to play a non-action game). Training consisted of playing the video game for 10 sessions, each lasting 1 hour.

Experiment 4 involved 16 non-action gamers who were randomly assigned to action and control groups. The action group played a first-person-shooter game.

Findings

- Action gamers exhibited improved precision in lane keeping compared to non-action gamers (Exp. 1).
- Action gamers exhibited improved precision in visuomotor control (Exp. 2).
- The action group's mean root-mean-square (RMS) target position error decreased after playing, while the control group's mean RMS target position error remained constant (Exps. 3 and 4).
- The action group's mean response gain increased after play, while control group's mean response gain did not increase significantly (Exps. 3 and 4).
- The results of Exp. 3 indicate that playing a driving video game improves the responsiveness of the sensorimotor system to visual input errors. However, it does not have much effect on reaction time, the ability to anticipate input errors to generate lead control, or stability of the neuromuscular system.
- The results of Exp. 4 indicate that playing a first-person-shooting video game improves the responsiveness of the sensorimotor system and its ability to anticipate input error to generate lead control. This improvement

in anticipation is accompanied by a decrease in stability of the neuromuscular system.



Summary

- With action gamers, their precision error was 57% smaller, their response amplitude was 24% larger, and their response delay was 29% shorter compared to non-action gamers.
- Action gamers had superior performance on the visuomotor-control task compared to non-action gamers.
- Different types of action video games have both common and different effects on the sensorimotor system.
- The findings of the current study support the claim that easily accessible action video games can be cost-effective training tools to help people improve the essential visuomotor-control skills used for driving.