

The Impact of Highly Activating Computer Games on Memory

Harald Kindermann, Andrija Javor

Corresponding author: harald.kindermann@fh-steyr.at

Playing with highly activating computer games is a huge pastime for male students at the age of 15 to 19 years. Particularly shooter-games are very popular and favoured by these individuals. The consequences of such behaviour are discussed most contradictory within the scientific community. One group posits a causal negative impact on aggressiveness, the other group competes against that proposition (cf. e.g. Spitzer, 2007, Köhler, 2005, Batinic/Appel, 2008). A broad consensus was only reached in one point: “playing regularly with violent games” and the “readiness to use violence” is correlated positively (cf. e.g. Anderson/Dill, 2000; Anderson/ Bushman, 2001, Roberts/Wickenhäuser, 2010, Kindermann/Auinger, 2010). The most salient question of the real cause of higher aggressiveness of shooter-game-players is still not finally answered. So it could be assumed that a predisposition to violence is the pre-condition for choosing such games. Referring to a preceding survey (cf. Kindermann/Auinger, 2010), a second issue arises: A correlation has been identified between “shooter game playing” and “school performance” – regardless of the duration of playing. Assuming that shooter-game-playing is highly activating and stressful – the player is permanently threatened – it is obvious that the cortisol-level, one of the most important stress hormones, will increase. Even though the effect of an acute elevation of cortisol levels on memory is complex and not yet fully understood (Het et al. 2005), our hypothesis of a negative influence (Takahashi et al. 2004) could explain the lower school performance of shooter-game players versus non-players. As to these two aspects – the certain predisposition to violent computer games and the reduced school performance – we are going to conduct an experimental study in April 2012 to get valid clues to reveal the real causal relations.

The scheduled survey is designed as a monocentric pilot-study. Therefore we are going to recruit 90 male students between 15 to 19 years, who play shooter games every day for more than one hour. On the day of the experiment these 90 students will be randomly separated into three groups. After a controlled physiological memory-test (LGT-3-Test by Bäumlner) each group has to do 3 different activities for one hour: (1) playing counter strike (2) doing sports like running or walking (3) drawing pictures. Subsequently to these activities the memory test is conducted again (only the test part). Our hypothesis is, that the CS group will show a significant lower performance in recalling the answers than the other two groups. During the experiment we will collect saliva samples at different points in time to see how the 3 activities affect the individual basal cortisol level (cf.

Figure 1). The increase of cortisol will then be compared to the results of the memory tests.

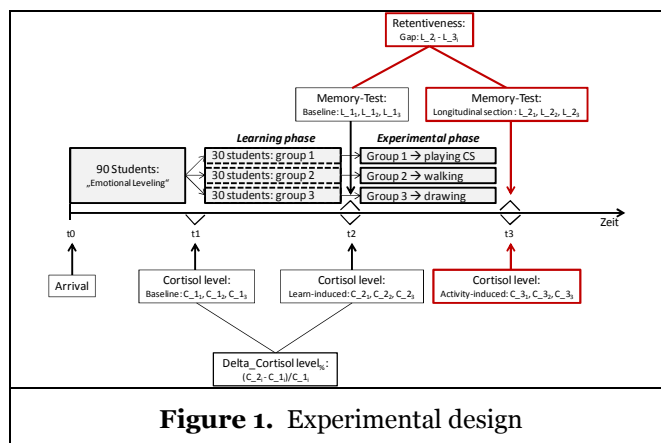


Figure 1. Experimental design

Additionally to this briefly described experiment we will also use the saliva samples for genetic analyses in order to find polymorphisms linked to aggression and violence. Therefore we will analyse, if there are differences in the genotyp of shooter-game players vs. non-players. Preliminary results could be presented at the NeuroIS 2012 in Gmunden. In case of confirmation our hypotheses coherences to the techno-stress study might become evident (cf. Riedl et al., 2012).

Our study has been approved by the ethical committee of Upper Austria.

REFERENCES

- ❖ Anderson, C.A., Bushman, B.J. (2001): Effects of Violent Video Games on Aggressive Behavior, Aggressive Cognition, Aggressive Affect, Physiological Arousal, and Prosocial Behavior: A Meta-Analytic Review of the Scientific Literature, *Psychological Science*, Vol. 12, No. 5, pp. 353-359.
- ❖ Batinic, B., Appel M. (2008): *Medienpsychologie*, Heidelberg.
- ❖ Bäumlner, G. (1974): *Lern- und Gedächtnistest LGT-3*, Verlag für Psychologie Dr. C.J. Hogrefe, Göttingen.
- ❖ Het, S., Ramlow, G. Wolf, O.T. (2005): A meta-analytic review of the effects of acute cortisol administration on human memory, *Psychoneuroendocrinology* (2005) 30, pp. 771–784
- ❖ Kindermann, H., Auinger, A. (2010): *Die Nutzung neuer Medien und deren Wirkung, Ergebnisse eines Forschungsprojekts der FH OÖ im Programm Sparkling Science des BMWF, BoD, Norderstedt.*
- ❖ Köhler, E. (2008): *Computerspiele und Gewalt. Eine psychologische Entwarnung*, Spektrum Akademischer Verlag.
- ❖ Riedl, R., Kindermann, H, Auinger A., Javor, A. (2012): *Technostress from a Neurobiological Perspective*, *Business & Information Systems Engineering*.
- ❖ Spitzer, M. (2007): *Lernen. Gehirnforschung und die Schule des Lebens*, Spektrum Akademischer Verlag.
- ❖ Takahashi, T., Ikeda, K., Ishikawa, M., Tsukasaki, T. Nakama, D., Tanida, S., Kameda, T. (2004): Social stress-induced cortisol elevation acutely impairs social memory in humans.