There is more to video games and aggression than violent content

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Introduction

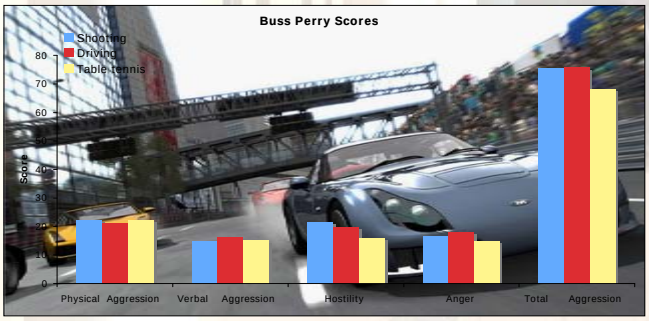
Video games are fast becoming the 'hottest' entertainment media on the face of the planet. In 2008 the annual revenue from the global video game industry was reported to be approximately $40b, a great deal higher than the music and film industry at $30b and $27b respectively. There is a plethora of research (i.e. Silvermann & Williamson, 1987: Ulhmann & Swanson, 2004: Bartholow, et al., 2006: Bartlett, et al., 2007: Giumetti, & Markey, 2007) to suggest that there is a link between video game violence and aggression. The literature suggests that the playing of violent video games results in a significant increase in aggressive thoughts, feelings, and behaviours, and physiological arousal compared to non-violent video games (Anderson, 2004). However, there are methodological problems associated with many of these studies, including participant recruitment, experimental design, video game selection, and the complexity of game play. In addition, previous research soon becomes dated with the advent of new technology bringing with it high definition graphics and levels of immersion never experience before. The aim of the current research was to address many of the methodological issues associated with the previous research and to investigate the cognitive and physiological effects of playing video games.

Method

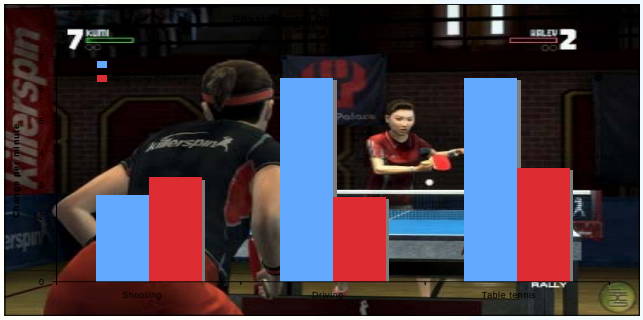
Thirty participants were recruited, aged between 18 and 45 years. Participants were randomly assigned to play one of 3 video games: 3D table tennis, Project Gotham Racing (a driving game), and Perfect Dark Zero (a first person shoot-em up). The games console used was an Xbox 360 and the games were played for 5 minutes on a 40-inch LCD HD Television. Physiological measures were taken before and during game play. A single lead of ECG data was recorded, from which heart rate was calculated, and respiration data was measured using a respiration transducer. EEG was recorded from the frontal, temporal, parietal, and occipital regions at electrodes sites at standard locations using an electrode cap (Electro Cap International, Eaton, Ohio). All electrodes were referenced to the left ear and Electro gel was used as a conducting medium. All physiological measures were amplified using the Biopac MP150 data acquisition system. When the participants finished game play, they were asked to complete the Buss & Perry Aggression Questionnaire, BSPAQ (Buss & Perry 1992).

Results

There was no significant difference in BASPQ scores between any of the conditions, $F_{(2,27)}$=0.46, P=0.636, however, for the driving and FPS games, scores were higher than those of the participants that played table tennis. Both the table tennis and driving games induced a greater change in heart rate than the FPS game, there was little difference between all three conditions for respiratory change. There were no significant differences between conditions for either of these two variables, $F_{(2,27)}$=0.961, P=0.395 and $F_{(2,27)}$=0.324, P=0.726, respectively.



The EEG profiles were analysed over the whole game playing period, with the main region of interest being the temporal lobe. The greatest reduction in alpha waves was observed in the participants playing the driving game, and the least for those playing the table tennis game, however, there were no significant differenced between the conditions, $F_{(2,27)}$=1.364, P=0.273. The greatest reduction in beta waves was observed in the participants playing the driving game, and the least for those playing the FPS game. There was a significant differenced between the conditions, $F_{(2,27)}$=1.364, P=0.008, a post-hoc Bonferroni test revealed that there was a significant difference between the driving game and the FPS and table tennis conditions, P=0.05, and P=0.009 respectively.



Discussion

The findings of the current study have some very important implications for the future of video game research. The participants playing the FPS and driving games had higher BSPAQ scores than those playing the table tennis game, the scores are not relatively high as found with violent offenders and are typical of a 'control' sample (Smith & Waterman, 2004). Physiologically, the violent video game did not induce significant changes in heart rate or respiration as previously reported (Bartlett, et al., 2007). One possible explanation for this phenomenon could be due to the high definition graphics and the immersive qualities of all the video games used in the study. The EEG data suggests that the driving game induced the most activity in the temporal lobes, associated with the processing of emotional information, with reductions in the amplitude of both the alpha and beta waves. The results of this study highlight methodological problems of previous research. It cannot be assumed that aggression is solely related to violent content (Anderson, 2004: Giumetti, & Markey, 2007) or that all participants have the same ability and are responding to the same elements of the video game (Bartlett, et al., 2007). To further understand the relationship between video games and violence, future research should adopt an explorative perspective re-evaluating the paradigm as a whole, whilst using the latest technology.

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