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Aggressive Behavior and Affective Processing In Video Game Players

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Introduction

The association between exposure to violent video games and real-life aggressive behavior has received increased attention from media in recent years. High-profile shootings, in which the assailant has been found to be an avid player of violent video games, have been focused upon in the media. The much-publicized assault on Columbine High School in Littleton, Colorado, in April of 1999, exemplifies this relation (Brehm, Kassin, & Fein, 2002). The two teenage shooters were both avid players of the extremely violent video game "Doom," a game originally licensed by the U.S. Military to train soldiers to kill the enemy.

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Literature in the field (Walsh, 2001) suggests that violence has become an important part of most modern video games. Violent behavior is often significant to the plot of a game, and players are commonly rewarded for participating in violent behavior. For example, in the popular video game Grand Theft Auto, developed by DMA Design and published by ASC Games, the goal of the game is to rise through the ranks of the criminal element, which you attempt to achieve by stealing cars, running narcotics, performing hits, kidnapping, and other criminal acts. Furthermore, statistics (Walsh, 2001) show that more than 85% of top-selling video games contain violent elements, 75% of video games rated "E" (for "Everyone") have violent content, and 92% of children in the age-group 2 to 17 years old play video games. The increased awareness of violence in video games has resulted in considerable interest from researchers attempting to establish a statistically reliable association between exposure to violence in video games and aggressive behavior in society. Nonetheless, current research is limited, and the reported results are often found to be incomplete.

The following study will investigate two areas of video game play that have received limited attention. The first area of focus is the relationship between violence in video games and subcategories of aggressive behavior. More specifically: overt and covert aggression. Overt aggression refers to behaviors that are acted out, such as physical fights, destruction of property, or verbal aggression towards others. Covert aggression refers to the internal aggressive feelings that are not necessarily are acted upon. These internal feelings are often described as hostility and may be characterized as a person being angry without displaying the emotion, or an individual having the feeling of hurting another person.

Theoretically, playing violent video games might either promote or reduce aggressive tendencies. Based on "social learning theo-

ry" (Bandura, 1986) playing violent video games will increase aggressive behavior in the player because s/he will imitate the behavior that is observed on the screen. "Catharsis theory" (Feshbach & Singer, 1971), on the contrary, hypothesizes that children and adults play violent video games to decrease their level of aggression, or the feeling of stress that co-occur with the internal aggression. According to these two theories it may be suggested that overt aggression is more likely to be associated with social learning theory because the violent content in the video games is acted upon, whereas covert aggression may be related to catharsis theory because it is the feelings of aggression that are affected by the viewed violence and thereby causes a decrease in internal feelings of aggression. The majority of studies (for a review see Griffiths, 1999) have found a correlation between exposure to violent video games and general aggressive behavior. However, no studies have to date attempted to subcategorize the types of aggressive behavior displayed in order to establish whether overt behavior, which the social learning theory suggests, or covert behavior, which is related to catharsis theory, is more likely to be associated with video game violence.

The second major topic that will be explored in this paper is the effect video game play has on processing of affective stimuli. Research has shown that playing video games improve visual selective attention (Green & Bavelier, 2003), hand eye coordination, and reaction time (Streufert, Streufert, & Denson,1983). However, I am aware of no studies that have investigated the relationship between video game play (violent or nonviolent) and responses to stimuli loaded with aggressive and violent emotional content.

Method

Participants

Twenty (10 males and 10 females) right-handed students from the

New School University, New York City, participated in this study. Students were randomly recruited on campus, and each participant went through the same procedures. Participants were offered one candy bar as compensation for their time.

Materials

Materials used in this study were the Demographics and Video Game Playing Questionnaire (created by the author for the purpose of this experiment), Aggression Questionnaire (AQ; Buss & Perry, 1992), Life History of Aggression (LHA; Coccaro, Berman, & Kavoussi, 1997), and an emotional Stroop task (based on Beck, Freeman, Shipherd, Hamblen, & Lackner, 2001).

Procedure

The participants went through identical procedures. After first being randomly recruited and having signed informed consent each participant filled out the ten questions on the Demographics and Video Game Playing Questionnaire. Thereafter the AQ and the LHA were completed, and finally the emotional Stroop task was administered. After the experiment was completed, each participant was debriefed about the purpose of the experiment. The participants received a candy bar as compensation for their effort and time. The study design was approved by the New School University Institutional Review Board.

Results

The results presented in this paper are based on seventeen students (9 females and 8 males). Three students were dropped from the final analysis due to missing data. Thirteen students (5 females and 8 males) played video games an average of 1.89 (SD = 2.73) hours per week in college, whereas the same group played an average of 3.23 (SD = 4.38) hours in high school. The age at which participants started to play video games ranged from 4 years of age to 13 years of age. Four female participants report-

Table 1. Means and Standard Deviations for the Aggression Questionnaire (AQ) and the Life History of Aggression scale (LHA)

		Male (n = 8)		Female (n = 9)	
		M	**SD**	**M**	**SD**
AQ	**Physical**	21.6	6.2	14.0	1.6
	Verbal	12.6	5.6	10.0	4.4
	Anger	14.8	6.6	13.0	4.1
	Hostility	13.0	2.9	10.9	3.8
	Total Score	62.0	17.7	47.9	13.8
	Total Overt Aggression	49.0	15.7	37.0	11.0
LHA	**Total Score**	19.5	4.6	10.1	4.9

Note: M: Mean score; SD: Standard Deviation

ed that they had never played video games. After the nine categories of video games were divided into either an aggressive or nonaggressive category, according to Griffiths' (1999) aforementioned distinction, four participants (all males) were found to prefer video games that contain violent and aggressive elements.
The results of the AQ and the LHA are shown in Table 1. An independent t-test performed on the AQ scores revealed that male participants tended to be more aggressive than females on the total scale scores ($t = 0.360$, $p = 0.092$) and on the Physical Aggression subscale score ($t = 0.277$, $p = 0.015$). There was a similar trend on the overt aggression subscale score ($t = 0.137$, $p = 0.095$; the latter score was obtained by excluding the internally loaded subscale Hostility from the analysis). The other three subscales, Verbal Aggression, Anger and Hostility, showed no gender differences.

The results of the LHA measure showed a similar outcome, in which the male participants scored significantly higher than females, $t = 0.794$, $p = 0.001$. A convergent validity analysis found that the scores obtained on the AQ were significantly correlated with the total scores on the LHA, $r = 0.703$, $p < 0.01$.

Furthermore, there were significant positive correlations between all four AQ subscale scores and the total score on the LHA (Physical Aggression: $r = 0.798$, $p < 0.01$; Verbal Aggression: $r = 0.490$, $p < 0.05$; r = Anger: 0.507, $p < 0.05$; r = Hostility: 0.545, $p < 0.05$).

Analyses of the correlation between aggressive typology (overt versus covert) and type of video game preference (violent versus nonviolent) revealed a non-significant positive trend for all overt aggressive behaviors (all scales excluding Hostility; please see Table 2). The correlation between covert behavior (Hostility) and video game preference was statistically unchangeable.

Table 2. Aggressive Typology and Video Game Preference Results

		Preference			
		Violent (n = 9)		Non-Violent (n + 4)	
		M	SD	M	SD
Overt Aggression	AQ Overt	55.5	18.3	38.8	10.0
	LHA	21.8	4.2	13.1	6.6
Covert Aggression	Hostility	13.7	4.1	11.8	3.3

Note: M: Mean score; SD: Standard Deviation

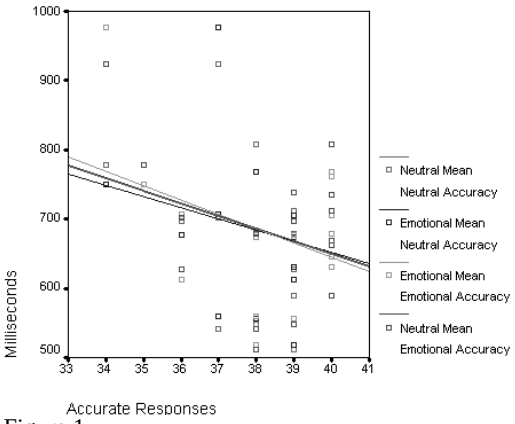

Figure 1.

The results of the emotional Stroop task revealed that average response times tend to decrease, nonsignificantly, with number of accurate responses (Figure 1). Furthermore, there was a tendency for participants who

played video games, as compared to non-players, to respond faster to any type of word-stimuli (Table 3). Video game players showed a trend toward responding slower to the emotionally aggression-related stimuli when compared to responses to neutral stimuli, whereas non-video game players displayed faster reaction times to aggression-related stimuli (Figure 2).

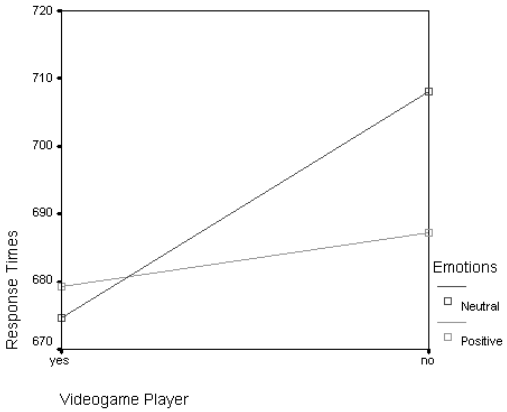

Figure 2.

Although independent t-tests found no significant gender differences, the mean reaction times show that female participants responded faster to both neutral words (M = 661.40 ms, SD = 97.44) and aggression-loaded words (M = 656.98 ms, SD = 82.20), as compared to male students (neutral words: M = 706.20 ms, SD = 110.38; aggressive-related words: M = 708.25 ms, SD = 124.30). Accuracy scores revealed a similar trend. Women displayed more accuracy in responses to both neutral (M = 38.67, SD = 1.4) and aggression-related words (M = 39.33, SD = 0.87) than men (neutral: M = 37.63, SD = 1.69; aggression-related: M

Table 3. Mean Reaction Times on the Emotional Stroop Task

	Neutral Stimuli	**Aggression-Related Stimuli**
Video Game-Players (n = 13)	674.58 (SD = 108.60)	679.22 (SD = 116.61)
Never Played Video Games (n = 4)	708.16 (SD = 90.83)	687.21 (SD = 57.63)

Note: Mean Reaction Times are measured in milliseconds (ms)

= 37.00, SD = 2.07).

Correlation analyses investigating the relation between responses to the aggression measures and the emotional Stroop task revealed mixed results. A non-significant negative correlation was found between the LHA and accuracy for both emotional stimuli, $r = -0.419$, $p = 0.094$, and neutral stimuli, $r = -0.415$, $p = 0.098$. The correlation between the AQ Hostility (covert aggression) subscale and accuracy revealed a positive trend for both neutral stimuli, $r = 0.185$, $p = 0.478$, and positive stimuli, $r = 0.275$, $p = 0.285$. There was low correlation between the AQ overt aggression subscales and accuracy to emotional stimuli, $r = 0.096$, $p = 0.713$, and neutral stimuli, $r = -0.085$, $p = 0.746$. A correlation analysis of the two aggression constructs and the average reaction times to the presented stimuli revealed a non-significant positive trend for all pairs.

Conclusion

Overall, the results of this study contradict the notion of the catharsis theory, which states that people play violent video games in order to relieve internal feelings of aggression. Instead, the findings suggest that the social learning theory offers a better explanation for the association between violent video games and aggressive behavior. Moreover, the results support previous research, which has reported that the playing of violent video games may predict aggressive tendencies. A noteworthy implication of the presented data is that violent video games might be more dangerous than violence observed in television and movies. In accordance with the social learning theory, a video game player controls the actions of the character, which may deepen the identification compared to a TV character that cannot be controlled. In addition, the active role the player takes in playing a video game, as compared to passive role when watching a movie, can result in a stronger internal script for aggression.

The current study emphasizes the importance of continuing to investigate the influence of violent video games on society, such that experts can improve prevention and intervention of aggressive behavior that is related to video game violence. Finally, it remains important that parents and educators continue to show concern with the prevalence of video game playing and the increasing realism in video games.

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