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Video Game Violence—Update: 10 March 2008

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We have known about the effects of media violence on children and adolescents for more than 50 years. Much of this research is based upon extensive studies of the impact of television violence and the more recent studies of video game violence (Anderson, et al., 2003; Comstock, 2008; Huston, et al., 1992; Murray, 2008; Murray & Murray, 2008; Pecora, Murray & Wartella, 2007; Rich, 2007; Vorderer & Bryant, 2006).

Four recent reports (Bartholow, et al., 2006; Kelly, et al, 2007; Murray, et al., 2006; & Weber, et al., 2006) have shed new light on the ways in which the brains of young children and young adults respond to viewing video violence.

Each study took a slightly different approach to assessing the neurological responses of viewers, but each study came to the same general conclusion, namely: viewing video violence activates specific areas of the brain that are known to be involved in recognizing, remembering, and rehearsing or activating aggressive behavior.

For example, in the case of the study by John Murray and his colleagues, young children (8 to 13 years old) watched video clips of a violent boxing match from a popular movie (Rocky IV) while their brains were scanned in a Magnetic Resonance Imaging (MRI) unit. The study demonstrated that there were very distinct patterns of brain activation when the children watched this violence, contrasted with viewing nonviolent video scenes from other TV programs. In particular, children responded to the video violence by activating areas of the brain involved in fear responses—the amygdala (the organ in the brain that recognizes threat in the environment and prepares the body for “fight or flight”) was activated along with the posterior cingulate (an area of the brain that stores traumatic events for long-term memory—such as that found in PTSD, posttraumatic stress disorder in victims of violence). In addition, there was evidence of activation of the premotor cortex, indicating that the children were attempting to imitate the boxing scenes while viewing the movie.

In the case of the study by Rene Weber and his colleagues, young males played a violent video game while they were resting in an MRI. The young adult males (18 to 26 years) were experienced video game players who played, on average, about 15 hours each week. When viewing and playing the very violent sections of the video game, as contrasted to the sections of the game that involved search for a target rather than active violence, there were changes in an area of the brain (the anterior cingulate cortex—ACC) that indicated a separation of thinking or judgment vs. emotion—a suggestion that the repeated playing of violent video interactions leads to a desensitization to the infliction of pain and suffering as portrayed in the violent video game.



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In the study by Bruce Bartholow and his colleagues, young adult males, who were extensive video game players, were shown images from violent video games while electrodes on their skulls measured brain wave responses (EEG—electroencephalographic measures). The researchers found that a particular brain wave (the “P300” wave), which has been demonstrated to indicate the extent of aversive response to violent or negative scenes, was diminished among the heavy violent game players. Furthermore, in a later part of the study, when the young men were allowed to deliver “punishment” to another participant to disrupt his performance in a competitive game that the two were playing, the subjects with the lowest P300 responses (i.e., the most desensitized to violence) delivered the most punishment.

Finally, in the study by Christopher Kelly and his colleagues Columbia University Neurological Institute, found that repeated exposure to violent media led to diminished activations in the right hemisphere, frontal cortex along with increased activation of the amygdala while viewing the violent material in MRI scanner. This pattern of activations was related to higher levels of reactive aggression (willingness to attack when provoked) which indicated reduced control over aggressive behavior and a greater likelihood of acting on aggressive impulses.

So, what story do these studies tell us about the harmful effects of video violence? Also, we must remember that these studies must be seen in the context of a long history of research (approximately 50 years of studies, see; Pecora, Murray, & Wartella, 2006 and Vorderer & Bryant, 2006) on the topic of the harmful behavioural effects of viewing video violence. Basically, this new research on brain responses to viewing violence begins to identify how and where the neurological processes of children and young adults are modified by the experience of viewing violence. When added to the behavioural research that has accumulated over the past half century, we now know that the effects of so-called “entertainment” violence is far from entertaining. This is a serious source of violence in society; one that parents, teachers, and public officials should take seriously.

References:

- Anderson, C.A., Berkowitz, L., Donnerstein, E., Huesmann, L.R., Johnson, J.D., Linz, E., et al. (2003). The influence of media violence on youth. *Psychological Science in the Public Interest*, 4(3), 31-110.
- Anderson, D.R., Bryant, J., Murray, J.P., Rich, M., Rivkin, M.J., & Zillmann, D. (2006). Brain imaging—An introduction to a new approach to studying media processes and effects. *Media Psychology*, 8(1), 1-6.
- Bartholow, B.D., Bushman, B.J., & Sestir, M.A. (2006). Chronic violent video game exposure and desensitization to violence: Behavioral and event-related brain potential data. *Journal of Experimental Social Psychology*, 42(4), 532-539.
- Brady, S.S. & Matthews, K.A. (2006). Effects of media violence on health-related outcomes among young men. *Archives of Pediatrics & Adolescent Medicine*, 160(4), 341-347.
- Brenick, A., Henning, A., Killen, M., O'Connor, A., & Collins, M. (2007). Social evaluations of stereotypic images in video games: Unfair, legitimate, or ‘just entertainment’? *Youth and Society*, 38(4), 395-419.



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Bushman, B.J., & Huesmann, L.R. (2006). Short-term and long-term effects of violent media on aggression in children and adults. *Archives of Pediatrics & Adolescent Medicine*, 160(4), 348-352.

Comstock, G.A. (2008). A sociological perspective on television violence and aggression. *American Behavioral Scientist*, 51(8), 1184-1211.

Eastin, M.S., & Griffiths, R.P. (2006). Beyond the shooter game: Examining presence and hostile outcomes among male game players. *Communication Research*, 33(6), 448-466.

Funk, J.B., Baldacci, H.B., Pasold, T., & Baumgardner, J. (2004). Violence exposure in real-life, videogames, television, movies, and the internet: Is there desensitization? *Journal of Adolescence*, 27(1), 23-39.

Huston, A.C., Donnerstein, E., Fairchild, H., Feshbach, N.D., Katz, P.A., Murray, J.P., Rubinstein, E.A., Wilcox, B., & Zuckerman, D. (1992). *Big world, small screen: The role of television in American society*. Lincoln, NE: University of Nebraska Press.

Kelly, C.R., Grindband, J., & Hirsch, J. (2007). Repeated exposure to media violence is associated with diminished response in an inhibitory frontolimbic network. *PloS ONE*, 2(12): e1268.
doi:10.1371/journal.pone.0001268

Murray, J.P. (2008). Media violence: The effects are both real and strong. *American Behavioral Scientist*, 51(8), 1212-1230.

Murray, J.P., Liotti, M., Ingmundson, P.T., Mayberg, H.S., Pu, Y., Zamarripa, F., Liu, Y., Woldorff, M.G., Gao, J.H., & Fox, P.T. (2006). Children's brain activations while viewing televised violence revealed by fMRI. *Media Psychology*, 8(1), 25-37.

Murray, J.P. & Murray, A.D. (2008). Television: Uses and effects. In: M.M. Haith & J.B. Benson (Eds.). *Encyclopedia of Infant and Early Childhood Development* (vol.3, pp. 309-318). San Diego, CA: Academic Press.

Pecora, N., Murray, J.P., & Wartella, E.A. (Eds.) (2007). *Children and Television: Fifty Years of Research*. Mahwah, NJ: Erlbaum Publishers.

Rich, M. (2007). Is television healthy? The medical perspective. In: N. Pecora, J.P. Murray, & E.A. Wartella (Eds.) *Children and television: Fifty years of Research* (pp.109-147). Mahwah, NJ: Erlbaum Publishers.

Thompson, K.M., Tepichin, K., & Haninger, K. (2006). Content and ratings of mature rated video games. *Archives of Pediatrics & Adolescent Medicine*, 160(4), 402-410.

Vorderer, P., & Bryant, J. (Eds.) (2006). *Playing Video Games*. Mahwah, NJ: Erlbaum Publishers.

Weber, R., Ritterfeld, U., & Mathiak, K. (2006). Does playing violent video games induce aggression?—Empirical evidence of a functional magnetic resonance imaging study. *Media Psychology*, 8(1), 39-60.