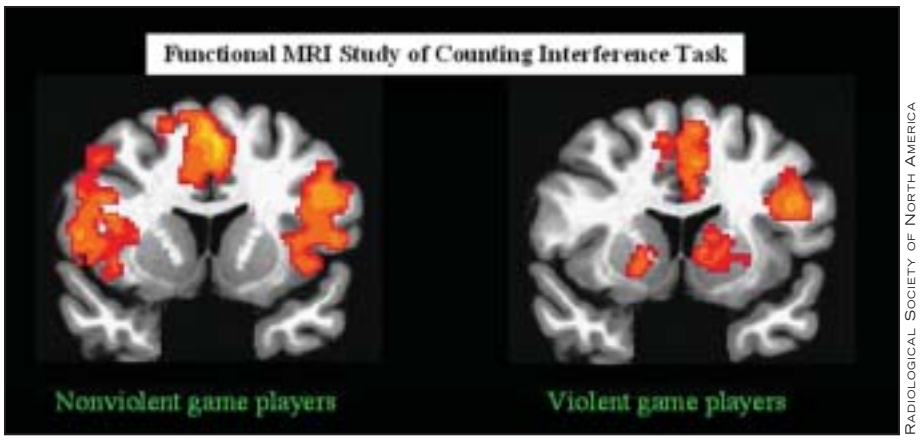

Radiological Society of North America

Functional MRI findings show less brain activation in the frontal lobes and more activation in the amygdala in teens playing violent versus nonviolent video games.

Violent Videos Alter Brain Functioning, Study Shows

BY PATRICE WENDLING
Chicago Bureau

CHICAGO — Adolescents who play violent video games demonstrate distinct alterations in brain activation on functional magnetic resonance imaging, investigators have shown for the first time.

In a study of 44 healthy adolescents, the teens who played violent video games demonstrated less activation in the frontal lobes associated with inhibition, concentration, and self-control, and more activation in the amygdala, which governs emotional arousal, Dr. Vincent Mathews reported at the annual meeting of the Radiological Society of North America.

Additional research is needed to determine if this combination of effects could make these individuals more likely to engage in violent behavior. But for now, the study provides parents, physicians, and scientists with data proving that differences in brain function exist in teens who play violent video games, compared with those who don't.

"The fact [that] we are seeing something should at least alert people to the fact [that] something is going on, and that they should be concerned with the types and amount of media they and their children are exposed to," Dr. Mathews said in an interview.

He and his colleagues at Indiana University, Indianapolis, randomly assigned the adolescents to play either "Medal of Honor," a violent video game, or "Need for Speed," an equally exciting but nonviolent game, for 30 minutes immediately before imaging. Functional MRI data were acquired on a 3-Tesla scanner using a 2D gradient echo-planar imaging sequence during two modified Stroop paradigms.

In the emotional Stroop task, participants pressed different buttons according to the color of the visually presented words. Words indicating violent actions such as "hit" or "harm" were interspersed with nonviolent action words such as "run" or "walk." In the counting Stroop task, participants were required to press buttons to indicate the number of displayed objects, with X's used as control events and numerals presented as activation stimulation.

There was no difference between groups in age, gender, IQ, video playing expertise, or overall violent media exposure. Their mean age was 15 years, and the average IQ was 110 in the nonviolent game group and 108 in the violent game group. There was no significant difference between groups in accuracy or reaction time during the tasks.

The group that played the nonviolent game showed more activation in the frontal lobes, including the anterior cingulate and dorsolateral prefrontal cortex, during both Stroop tasks, reported Dr. Mathews, a professor of radiology at the university.

The group that played the violent game demonstrated less activation in prefrontal lobes during both tasks and increased activation in the right amygdala during the emotional Stroop task. These differences remained after controlling for previous violent media exposure and gender, he said.

"There is a little bit more credence to [physicians] recommending limiting this activity," he said, adding that further study is needed to examine behavior and duration of effect in adolescents who watch violent videos. ■