Testimony of

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March 29, 2006

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Before the Senate Judiciary Committee
Subcommittee on the Constitution, Civil Rights, and Property Rights
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Thank you for the opportunity to testify today. My name is David Bickham and I am a research scientist at the Center on Media and Child Health located at Children's Hospital Boston and affiliated with Harvard Medical School and Harvard School of Public Health. The center is an interdisciplinary group of pediatricians, psychologists, social scientists and child development experts with the mission to research and respond to the effects of media on the physical, mental and social health of children. In my own research, I have investigated media effects ranging from educational television's ability to increase children's literacy skills to violent television's interference with peer relationships. I am here today to review the scientific evidence on violent video games and the concern that these games may contribute to children's violent thoughts and behaviors.

Video games are a relatively new form of entertainment media. While the body of evidence on video game violence is growing, we must consider it within the broader field of research exploring portrayals of violence in television, film, and other forms of visual media. There are five decades of media violence research based on a sound theoretical and empirical understanding of learning, aggression, and social cognition. A core ongoing project of the Center on Media and Child Health is the consolidation of all existing research on media effects into one publicly available database. After 3 years of work, the database includes over 1,200 research reports published in peer-reviewed scientific journals investigating the effects of media violence. These studies show consensus in the state of the science that a strong and consistent relationship exists between viewing violent media and increased levels of anxiety, desensitization and aggressive thoughts and behaviors among young people. This body of research derives from a broad spectrum of academic fields, including psychology, communications, public health, and criminal justice, and it draws added strength from the vast array of methodologies utilized by the different disciplines.

Taken alone, no study is perfect. Even the best study design can be criticized for the limitations of its method. Taken together, however, each study about media violence provides a piece of a single puzzle that all interlock to reveal one picture. In this case, that picture is clear--using violent media contributes to children's violent behavior. A variety of complementary methodologies that have resulted in similar findings have been used to generate this overall conclusion. Scientists have exposed children to violent media in laboratories and found that they behave more aggressively than children who saw non-violent television or played non-violent games. Using survey studies, scientists have found that even after controlling for dozens of complex environmental and individual characteristics linked to aggression, watching violent television and playing violent video games still increases the likelihood that a child will be violent. Researchers have followed children over their entire lives and found that viewing violent television as a child is one of the best predictors of criminal violent behaviors as an adult.

While the large body of research on violent television and film provide a solid foundation for our understanding of the effects of violent video games, there are reasons to believe that the influences of violent video games are stronger than those of other forms of screen violence. All media teach--whether by design or by default. Video games are exceptional teaching tools, incorporating many techniques that promote learning. First, video games are interactive, allowing the player to be closely involved with the main character and to control that character's actions. Second, video games directly reward the child's success in performing the actions, with visual effects, points, and

opportunities to take on new challenges. Third, video games typically require almost complete attention, necessitating constant eyes-on-screen and hand-eye coordination to succeed in the game. Finally, video games are designed to be incredibly engaging and "fun," often leading children to slip deeply into a "flow state" in which they may be at increased susceptibility to the messages of the game. Scientific research has repeatedly demonstrated that children learn what video games teach, and often that lesson is doing violence.

Because the technology and media form are newer, investigating the effects of violent video games is a younger field than television violence research. Early video game research was inconsistent. Studies performed in the 1980s were limited by electronic gaming technology; at the time violent and non-violent games were often very similar. One study, for example, compared the effects of playing Missile Command (considered the violent game) to Pac Man (considered the non-violent game). Both games feature abstract geometric icons interacting with one another; both have the player's icons destroying or devouring other icons. As video games have become more graphically sophisticated and capable of depicting violence in a much more graphic and realistic way, the differences between violent and non-violent video games have dramatically increased. Not surprisingly, research exploring the effects of these newer games is much more clear and consistent than previous research. The newest research has definitively and repeatedly converged on the conclusion that playing violent video games is linked to children's aggression.

We all know that children are not automatons who mimic everything they see, their behavior is much more complicated than that. However, there is a widely held misconception that unless children immediately imitate the violence they experience in a video game, they are unaffected by it. Children who play Grand Theft Auto don't immediately begin stealing cars and shooting police officers. As a result, many would have you believe that this means that violent video games have no influence. We cannot assume that the absence of immediate and direct imitation means that there are no effects on children.

In rare situations violence from media may be directly imitated after a single exposure, but the most pervasive effects of violent media are not direct imitation and come from repeated viewings. With each exposure, the child's perception of the world is shifted to include violence as a common and acceptable occurrence. The child's behaviors evolve to correspond with this perception and can follow "behavioral scripts" established through experiencing violent media.

Four primary effects of violent media that have been consistently documented in the scientific literature: the aggressor, victim, bystander, and appetite effects. The aggressor effect is the most well known--using violent media increases the likelihood that a child will think and behave aggressively toward others. The victim effect is the tendency for users of violent media to see the world as a scary and violent place promoting anxiety and protective behaviors. The bystander effect describes how violent media desensitizes its users to the real life violence making them generally less caring and sympathetic to victims of violence and less likely to intervene when they witness violence. Finally, the appetite effect demonstrates that using violent media often increases children's desire to see more violence.

While each of these effects can have substantial influence on children's behaviors, the aggressor effect is perhaps the most troublesome because it puts children at immediate risk of committing violence. It is, therefore, critical to understand how exposure to violent video games translates into aggressive behavior. This process is grounded in our understanding of how children learn, how aggression in general is cultivated, and how video game violence affects its users.

Violent video games present a world in which violence is justified, rewarded, and often the only option for success. Exposure to this world primes children for hostile thoughts and behaviors immediately after playing a game. When children play violent video games, they become both physically and mentally aroused. Their heart rates increase and their blood pressure rises. They begin to think aggressively and to solve problems with violence. In this heightened and primed state, children are more likely to perceive other people's behaviors as aggressive and they are more likely to respond aggressively. In laboratory studies designed to test this effect, participants who played violent video games were more likely to punish competitors than participants who played non-violent games.

Over time, repeated exposure to violent media can have long-term effects. A person's pattern of behavior can become more aggressive through the adoption of aggressive skills, beliefs, and attitudes, desensitization to violence, and an aggressive approach to interactions with other people. Scientific findings have repeatedly provided solid evidence for this process--using violent media as a child predicts aggressive behavior in adulthood.

Violent video games often have subtle effects but may lead to dramatic consequences for some children. Certain characteristics make some children more susceptible to media effects, while other children are more resilient. However, no known factor or set of factors has yet been identified that completely safeguards children from the influences of violent media.

Children's susceptibility to the effects of media violence varies with their age. Children younger than eight years are more vulnerable to media violence effects because they have not yet developed the ability to discriminate fully between fantasy and reality in media content. Research has consistently shown that young children often behave more aggressively than older children do after playing violent video games

Children who identify with the perpetrator of media violence are also at increased risk of becoming aggressive. Violent video games, particularly the aptly named "first-person shooter" games, place the player in the role of the violent perpetrator. This level of involvement is likely to increase the player's identification with the violence and its subsequent cognitive and behavioral effects.

Cognitive and emotional maturity tends to increase children's resistance to the effects of violent media. It is important to remember, however, that neither these nor any other set of characteristics fully protects a child from all of the subtle and pervasive effects of violent media.

Before moving on to suggesting some strategies for mitigating the effects of violent video games, I would like to clarify two common misconceptions about research on media violence.

First, sound scientific research in this field does not claim that media violence is the sole cause of human aggression. Nor does it claim that media violence is necessarily the original or most important cause--we all know that human aggression has been around much longer than violent video games. Violent media is, however, a substantial, pervasive, and controllable contributor to children's aggression and violent behaviors. Other factors that contribute to children's aggression such as biologic tendencies and family environment are much more difficult, if not impossible to change.

Second, this research does not show that there is something inherently dangerous about video games. As we have seen, video games can be powerful teaching tools. The danger posed by violent video games lies in what they teach, the content they present. Many non-violent puzzle-based games have been shown to increase children's cognitive skills, including visual attention, multitasking, spatial abilities and mental rotation. Well-designed educational video games are able to successfully teach a multitude of academic lessons. Even some violent video games have the potential to teach certain problem-solving and spatial skills. However, along with any positive skills children gain from these games, they also experience the negative effects of exposure to and repeated rehearsal of the violent content. The late Dr. John Wright, one of the founding fathers of this field of research, asserted, "The medium is not the message, the message is the message." If the message is a positive, healthy one, then the resulting behaviors learned will likely be positive and healthy as well.

In order for us to ensure the health and safety of our children, we must do our best to guard them against potentially dangerous environmental influences. Just as we are concerned about the effects of secondhand smoke and lead paint on children's physical health, so should we be concerned about the influence of violent video games on children's thoughts and behaviors.

Just as research has demonstrated this cause for concern, research can inform us on the most effective intervention strategies. We need to know more about individual characteristics that can increase a child's risks and resilience, as well as environmental, parenting, and social factors that can be protective. With this knowledge, we can develop prevention measures for all children and target at-risk children for intervention.

Next, we need to extend and further focus the research that ties violent video game play with real life violence. In order for parents to understand that they should actively monitor what games their children are playing, we need very clear evidence that clarifies the relationship between violent game play and common, problematic aggressive behaviors. One productive focus for this work would be in-school violence. There is anecdotal evidence that many school shooters have been heavy users of video games. Can game play have been a trigger that switched a troubled

child from thoughts of revenge to actual behavior? We don't know, and given the nature of the crime we will never be able to directly study this. But we can examine the relationship between violent media use and precursors of school shootings, the much more common school violence behaviors of bullying and weapon-carrying.

The Children and Media Research Advancement (CAMRA) bill, sponsored by Senators Brownback, Lieberman and Clinton, is an important step in the right direction. When government demonstrates its concern about the effects of media use by dedicating Federal health research dollars, the field will be energized and validated, for scientists, for clinicians, for teachers, and for parents. The research that CAMRA can make possible will help to clarify the risks of violent media and to develop and evaluate practical and effective interventions.

Together with what is already known about the effects of violent video games, results from these studies will inform the creation of successful media literacy programs. Educational interventions based around teaching children to analyze and question media can dramatically reduce the effects of violent media. Children who learn critical thinking skills are equipped to recognize the falsities presented in violent media. When coupled with strategies to reduce their overall exposure, these techniques are particularly successful.

Building on what we already know about the effects of violent video games, results from these studies can inform the creation of successful media literacy programs. Preliminary studies have demonstrated that educational interventions that teach children to analyze and question media can dramatically reduce the influence of media. Children who learn critical thinking skills are equipped to recognize how media fragment, distort and manipulate their perceptions of reality. When coupled with strategies to reduce children's media exposure, media literacy techniques have been particularly successful.

At the Center on Media and Child Health, we are currently evaluating the effectiveness of a school-based media literacy program. As part of their normal art and health classes, students in a Manchester, New Hampshire elementary school learn to deconstruct media messages. They are taught to question what they see and to recognize that the world of violence presented in television and video games is different from the one in which they actually live. Our preliminary evidence shows that children start to change their understanding of media and what they portray after a single class session. Although we have not followed these young people long enough to measure these outcomes, it is reasonable to anticipate that these changes in understanding and attitudes about violence will give rise to less fear, less desensitization, and less aggressive behaviors.

Thomas Jefferson proposed that the new nation he helped to form should offer public education to all citizens because a literate citizenry would be a good citizenry. Today we receive the vast majority of our information from non-print media. Children spend more time with media than they do in school - and they learn as much about the world and the way it works from media as they do from schoolbooks. We still teach the basics of reading and writing words, but our children receive little, if any, education in the language of their times. For children growing up in the Information Age, media literacy classes can be integrated into a variety of standard courses that meet national educational standards, so that children learn necessary academic fundamentals and develop the ability to assess and understand media, protecting themselves from potential negative effects.

As caretakers of the next generation, we have a responsibility to provide children with a safe environment in which to grow, develop, and learn. As a society, we have decided that we should understand and control the quality and safety of the air they breathe, the water they drink, and the food they eat. Research has shown that the media children use have real effects on their knowledge, attitudes, and behaviors. In the Information Age, media must be understood as a powerful, nearly universal environmental health influence. We ensure the safety of what we feed children's bodies, we owe it to their future and to the future of our society to ensure the safety of what we feed their minds.

Thank you