

# Media Violence Research and Youth Violence Data: Why Do They Conflict?

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**Objective:** *Contrary to media headlines and public perceptions, there is little evidence of a substantial link between exposure to violent interactive games and serious real-life violence or crime. Conclusion:* *Further research is needed on whether violent games may affect less dramatic but real concerns such as bullying, fighting, or attitudes and beliefs that support aggression, as well as how effects may vary by child characteristics and types of games. There is also a need for research on the potential benefits of violent games for some children and adults. (Academic Psychiatry 2004; 28:144–150)*

It's almost an American tradition to blame the corruption of youth on violent mass media, from the lurid "half-dime" novels of the 19th century to 1930s gangster films and 1950s horror/crime comics (1). In 1972, a report to the U.S. Surgeon General addressed then-growing concerns about violent television. Its authors pondered how television content and programming practices could be changed to reduce the risk of increasing aggression without causing other social harms. They concluded: "The state of present knowledge does not permit an agreed answer" (2).

Violent video games are the most recent medium to be decried by researchers, politicians, and the popular press as contributing to society's ills. In particular, they were implicated in a series of notorious shootings:

Although it is impossible to know exactly what caused these teens to attack their own classmates and teachers . . . one possible contributing factor is violent video games. Harris and Klebold enjoyed playing the bloody, shoot-'em-up video

game *Doom*, a game licensed by the U.S. Army to train soldiers to effectively kill (3)

(Anderson and Dill did not cite a source for the use of *Doom* by the military. However, according to the web site of the U.S. Army Corps of Engineers Topographic Engineering Center, *Doom II* was indeed licensed in 1996 and transformed into *Marine Doom*, which "teaches concepts such as mutual fire team support, protection of the automatic rifleman, proper sequencing of an attack, ammunition discipline and succession of command" [see [www.tec.army.mil/TD/tvd/survey/Marine\\_Doom.html](http://www.tec.army.mil/TD/tvd/survey/Marine_Doom.html)]).

"We've been seeing a whole rash of shootings throughout this country and in Europe that relate back to kids who obsessively play violent video games. The kids involved as shooters in Columbine were obsessively playing violent video games. We know after the Beltway sniper incident where the 17-year-old was a fairly good shot, but Mr. Muhammad, the police tell us, got him to practice on an ultra-violent video game in sniper mode to break down his hesitancy to kill."

—Washington State Rep. Mary Lou Dickerson, on *The NewsHour with Jim Lehrer*, July 7, 2003. (She co-sponsored legislation to ban the sale or rental of games that portray violence against police to children under 17.)

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The series of random shootings by Lee Malvo and John Muhammad created panic in the Washington, DC area. News headlines repeated claims by Malvo's defense team that the youth had been brainwashed and trained to kill while playing video games with sniper shooting modes such as *Halo*, *Tom Clancy's Ghost Recon*, and *Tom Clancy's Rainbow Six: Covert Ops*. The jury was shown clips of these games and of the film *The Matrix*. A psychologist testified that exposure to this kind of entertainment makes violence seem more acceptable and promotes violent thoughts and actions. In response, the prosecutor simply asked, "What about the millions and millions of young American males who play video games and don't go out and kill random people on the street?" (4)

Certainly, the stealing, beating, strangling, and hacking depicted in games such as *Grand Theft Auto III*, *Manhunt*, and *Mortal Kombat: Deadly Alliance* are shocking to many adults. It seems reasonable to assume that wielding virtual guns and chainsaws must be bad for our children. However, the potential of gangster movies to trigger violence or teach criminal methods to the young seemed just as real to previous generations. Local censorship boards in New York and Chicago edited out hundreds of scenes that "glorified gangsters or outlaws" or "showed disrespect for law enforcement" (1).

In that place and time, it's possible that cinema criminals such as James Cagney and Edward G. Robinson were bad influences on some young people. This can't be proved or disproved. Today, however, most of us view these films as quaint entertainment classics. Before we make sweeping assumptions about the effects of media content, we must examine the data.

### School Shootings and Video Games

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In response to the outcry that followed deadly shootings in Colorado, Oregon, Kentucky, and Arkansas, the U.S. Secret Service and the U.S. Department of Education began a study called the Safe School Initiative (5). This involved an intensive review of the 37 incidents of "targeted" school violence, aimed at a specific person, group, type (such as "jocks" or "geeks"), or at an entire school, that took place between 1974 and 2000. The goal was to look for commonalities and create a profile of potential attackers in order to prevent future tragedies.

The conclusion: There was no useful profile. Along with male gender, the most common shared trait was a history of suicide attempts or suicidal thoughts, often with a documented history of extreme depressed feelings. If all schools instituted programs to identify and refer depressed and suicidal youth, more would receive treatment and promising futures could be saved (6). But using those methods to detect potential killers would result in overwhelming numbers of false positives and the stigmatization of thousands.

Moreover, there is no evidence that targeted violence has increased in America's schools. While such attacks have occurred in the past, they were and are extremely rare events. The odds that a child will die in school through murder or suicide are less than one in one million (7). What *has* dramatically increased is our exposure to local and national news about the "recent trend" in school shootings (8). Research has shown that crime-saturated local and national television news reports increase viewers' perception of both personal and societal risk, regardless of actual danger (9, 10).

Constant news coverage leaves the impression that youthful crime is increasing. Some have referred to a "wave of violence gripping America's youth," fueled by exposure to violent media (11). Using data supplied to the FBI by local law enforcement agencies, the U.S. Office of Juvenile Justice and Delinquency Prevention reported (12) that the rate of juvenile arrests increased in the late 1980s, peaking in 1994. At the time, this seemed to be a worrisome trend, but it proved to be an anomaly. Juvenile arrests declined in each of the next 7 years. Between 1994 and 2001, arrests for murder, forcible rape, robbery, and aggravated assaults fell 44%, resulting in the lowest juvenile arrest rate for violent crimes since 1983. Murder arrests, which reached a high of 3,800 in 1993, fell to 1,400 in 2001 (12).

Interestingly, the sharp temporary rise in juvenile murders from 1983 to 1993 has been attributed to a rapid rise in gun use, concentrated among black male adolescents (13, 14). We have no evidence that black male adolescents' use of violent media differed significantly from that of other young people, though there is ample evidence that as a group, they have greater exposure to other risk factors for violence (15). And what of juvenile arrests for property crimes? In 2001, these achieved their lowest level in over 30

years (12). In other words, there's no indication that violence rose in lockstep with the spread of violent games. Of course, this is not proof of lack of harm.

Could violent media have played some role in the rare but horrifying mass murders in our schools? This can't be ruled out, but evidence is scant. According to the Secret Service review, one in eight perpetrators showed some interest in violent video games, one-fourth in violent movies, and one-fourth in violent books, but there was no obvious pattern. Instead of interactive games, their interactive medium of choice was pen and paper. Thirty seven percent expressed violent thoughts and imagery through poems, essays, and journal entries (5).

### Trends in Violent Game Use

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The rapid spread of video games among the young, including violent games, has surprised and unnerved many parents. Games with violent content and "Mature" ratings are available for computers, all three major game consoles (PlayStation 2, Xbox, and GameCube), and portable handhelds such as Game Boy.

According to a 1999 survey by the Kaiser Family Foundation (16), 83% of children ages 8 to 18 reported having at least one video game console in their home, and 45% had one in their bedroom. In addition, 74% have at least one computer at home. Fifty-five percent of boys and 23% of girls said they played video games on a typical day, with nearly 20%, primarily boys, playing an "action or combat [game], (i.e., *Duke Nukem, Doom*)."

These figures have probably increased since that time. According to the Entertainment Software Association (formerly called the Interactive Digital Software Association), sales of video and computer games in the United States have grown steadily, from \$3.2 billion in 1995 to \$7 billion in 2003. The industry group is coy about how many children are actually playing, stating only that among the "most frequent" computer and video game players, 30% and 38%, respectively, are under age 18. Citing market research data from 2000, an IDSA report (17) states that 61% of game users are 18 or older (suggesting that 39% are *under* 18).

Violent games are also widely sold. It is possible to find even gore-laden games such as *BloodRayne* (named for its bustier-clad vampire spy heroine and

described on the maker's web site as "an intense third-person action/horror experience") at child-friendly outlets such as Toys R Us. Similar to R-rated movie restrictions, retailers are supposed to prevent sales of M-rated games to youth under age 17. However, "mystery shopper" studies by the U.S. Federal Trade Commission (18) found that young teens ages 13 to 16 were able to purchase M-rated games 85% of the time. This number declined to 69% in a follow-up survey released in October 2003. In sum, playing video and computer games—including games with violent content—is now a routine activity for American youth, particularly boys.

### Video Game Research and Public Policy

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How has this spurt in electronic game play affected our youth? Along with the Washington, D.C. snipers and school shooters, several academic studies (primarily experiments) have received broad coverage in the popular media and are cited by the press and some advocacy groups as evidence that video games create dangerous, aggressive thoughts, feelings, and behaviors. Local, state, and federal legislation, including criminal penalties for selling or renting certain games to minors, have been introduced based on these studies (19, 20), as have private lawsuits (21).

Many of these studies provide useful insights into the potential for harm (and sometimes benefit) from violent interactive games. But problems arise when the customary discussion of limitations falls by the wayside. Ideas are taken out of context and repeated in the media echo chamber, creating a false sense of certainty. Here are some of the limitations of current studies as a basis for policy making, with illustrative examples.

### Vague Definitions of Aggression

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Some researchers use "aggression" and "violence" almost interchangeably, implying that one inevitably leads to the other (22). Aggressive play that follows exposure to games or cartoons containing violence (23, 24) is not distinguished from aggressive behavior intended to harm. Aggressive thoughts, feelings, and behaviors may be presented as equivalent in importance and treated as valid surrogates for real-life violence, with the assumption that reducing these factors will reduce harm (25). The muddled

terminology and unspoken assumptions can undermine the credibility of studies. After all, most parents of whining toddlers have occasional aggressive thoughts and feelings, but that's a far cry from actual child abuse.

#### *Use of Violent Media Is Not Put Into Context With Other Known Contributors to Aggression or Violence*

Lee Malvo, for example, had a history of antisocial and criminal behavior. He reportedly hunted and killed perhaps 20 cats with a slingshot and marbles (4). Compared to playing violent video games, animal torture is both more unusual and directly related to harming humans. According to public health and juvenile justice research, the strongest childhood predictors of youth violence are involvement in crime (not necessarily violent crime), male gender, illegal substance use, physical aggressiveness, family poverty, and antisocial parents. As children grow older, peer relationships become important predictors: associating with antisocial or delinquent peers, gang membership, and lack of ties with prosocial peers and groups (26).

A final problem with using aggression as a surrogate for violence is that most children who are aggressive or engage in antisocial behavior do not grow up to be violent adolescents or adults, and most violent adolescents were not notably aggressive as children (26).

#### *Test Conditions That Are Difficult to Generalize to the Real World*

Experimental settings are not only artificial, but turn game play into game "work." Subjects may have only 10 minutes to learn and play a game before results are measured and cannot choose when to start or stop playing (27). Most experiments involve a single game exposure, which cannot reasonably represent the effects of playing an array of games in real life (28). Additionally, young people commonly play games with others. In the Kaiser Family Foundation survey, virtually all children played their video games with friends, siblings, or other relatives. (By contrast, the majority of computer games were played alone, although some children played with a

friend in the room or with someone over the Internet.) Effects of the social context of games, be they positive or negative, have received little attention to date (29).

#### *Small, Nonrandom, or Nonrepresentative Samples*

This is another barrier to broad generalization of research results. While it is not uncommon to recruit college undergraduates in psychology courses for experimental studies, those students differ in numerous ways from the typical young American teen—the population of greatest interest to most researchers and policy makers (3). Other studies use samples that are very narrow in age or geography (e.g., 10- and 11-year-old Flemish children) (30).

#### *A Blinkered View of Causality*

Some (but not all) experimental studies have found that aggressive thoughts or behavior increase after playing a particular video game (25, 29). It has been postulated that experimental studies prove causality by ruling out other plausible explanations (25). In the real world, however, this could be a very complex relationship. That is, aggressive children may seek out violent games, and violent games may reinforce aggressive behavior. This may be a two-way relationship or the result of other factors such as lack of parental supervision or connection. Additionally, effects of moderating variables, such as the nature and context of violence in a given game, or subject age or developmental stage are often not considered (29).

#### *Study Findings Are Combined in Ways Not Appropriate for Policy Use*

"Meta-analysis" and related techniques, for example, may be used to merge study findings for a more robust result. A 2004 meta-analysis of the effects of playing violent video games (25) combined studies with subjects of varying age and gender who were exposed to different types and amounts of game violence in a variety of environments (experiments and correlational studies), with varying outcomes—a range of behavioral, cognitive, affective, and arousal measures. Results were represented only in terms of average effect size. Given the different study types, exposures, populations, and outcome measures, this

goes well beyond the prohibition against “comparing apples and oranges” in meta-analyses (31, 32).

Again, however, the primary problem is the way these findings are interpreted. The size and representativeness of study samples were not considered in assessing study quality, and the outcome of concern—real-world violence or related harm—was never directly studied. Despite this, the results were viewed as important evidence that violent game exposure leads to major societal harm.

### **Current Thinking on Game Violence Effects**

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The research community is sharply divided on whether violent games are harmful, and if so, for whom and to what degree. Several well-regarded reviews have concluded that the current body of research is unable to support the argument that the fantasy violence of games leads to real-life violence—although this could change as evidence accumulates (33) or games become more realistic (34).

In an appendix to its chapter on risk factors, the Surgeon General’s 2001 report on youth violence reviewed effects of exposure to violent media. The report noted that there is evidence for a small to moderate short-term increase in physically and verbally aggressive behavior. However, the sum of findings from cross-sectional, experimental, and longitudinal studies “suggest that media violence has a relatively small impact on violence” and that “the impact of video games on violent behavior remains to be determined” (26).

### **Potential Effects of Games on “Below the Radar” Violence**

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This does not mean that we should put research on media violence on the back burner. Instead, we need to put it in context. First, many known risk factors for violence aren’t amenable to change, while exposure to media (content and dose) is potentially alterable. Second, while they may not play a starring role in headline-grabbing crimes, video games and other violent media could have less visible but significant harmful effects on children’s lives. For example, it’s feasible that certain types or amounts of video game play could affect emotions, cognitions, perceptions, and behaviors in ways that promote bullying and victimization.

In recent years, we have become increasingly aware of bullying as a threat to healthy development and well being. A large United States survey of children in grades 6 through 10 found that nearly 30% reported occasional or frequent (at least once a week) involvement as a bully, victim, or both (35). The most recent government report on school crime and safety (36) found that the percentage of children ages 12 to 18 who reported being bullied increased from 1999 (5%) to 2001 (8%). According to the latest National Youth Risk Behavior Survey (37), the percentage of high school students who felt too unsafe to go to school at least once in the previous 30 days increased significantly from 1997 to 2001 (from 4% to 6.6%). In 2001, fewer adolescents reported carrying weapons on school property (which could reflect aggressive intent or a fear-based need for self-protection), but the risk of being threatened or injured with a gun, club, or knife on school property has not decreased, as 8.9% of students reported this had happened to them at least once in the previous 12 months.

### **Suggestions for Future Research**

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In summary, it’s very difficult to document whether and how violent video and computer games contribute to serious violence such as criminal assault or murder. (Practically speaking, this would require a massive and expensive study because game playing is common, and murder is rare.) It is feasible, however, to study how violent games may contribute to some types of everyday violence and aggression and to the beliefs, attitudes, and interpretations of behavior that support them. For example, are heavy players of violent games more likely to view aggression as a first-choice solution to problems instead of a last resort (e.g., instead of talking or seeking mediation first), to see violence as easily justified, to feel less empathy for others, or to interpret ambiguous behavior (e.g., a bump in the school hallway) as deliberately hostile, threatening, or disrespectful (34, 38)? Another issue is whether and how the effects of video game violence might be compounded by exposure to violence in other media. Cautious interpretation is necessary, since there is always the risk of confusing cause and effect or correlation with causation.

To make intervention efforts more effective and cost-efficient, it’s important to focus on which children are at risk. Risk factors for violence tend to occur

in clusters. Violent game play may disproportionately affect children who lack protective factors such as a nurturing relationship with at least one adult and connection to and relative success in school (39). A child's stage of emotional or cognitive development may also be important.

The amount of time spent playing games is also worthy of study. Given the ubiquity of violent game play among boys, we might see a J-shaped curve, similar to common findings in research on adult alcohol use: a little is healthy, but a lot becomes a health risk (40). In other words, a moderate amount of interactive game play may be associated with a healthier social life, while increasing amounts of play (or solitary play) may correlate with poor adjustment or emotional difficulties.

Few researchers have asked children *why* they play games and what meaning games have for them (29). While most probably play for fun or sociability, some children seem to use games to vent anger or distract themselves from problems. This could be functional or unhealthy, depending on the child's mental health and the amount and type of game play. We know almost nothing about the differential effects of games on depressed or anxious children or those with attention deficit-hyperactivity disorder.

There is also a need for research on the effects of different types of games, going beyond the gore level. Does violence that serves a worthy end (e.g., a SWAT team rescuing hostages) or violence that is ultimately

punished (e.g., a criminal protagonist ends up dead or in jail) have different effects than violence that is rewarded, even if the games are equally bloody? Do children who enjoy violent games with story lines differ from those who prefer bouts of fighting? Do violent games that make use of irony and sarcasm, such as *Grand Theft Auto: Vice City*, have differential effects on children who are not cognitively able to detect that irony and sarcasm?

We need to learn more about what activities are displaced by game play. A teenager who spends hours playing games over the Internet might miss key opportunities to build social skills with real people or lose opportunities for healthy physical activity.

Finally, researchers must acknowledge that electronic games are a moving target. The technology is constantly advancing. Studies conducted 5 or even 2 years ago may have limited relevance given improvements in graphics, the rise of Internet gaming (41), the introduction of games controlled by voice or body movements (42), and the potential for increased tactile feedback via "haptics" technology to create the sense of immersion in a virtual world (43).

We might take a lesson from America's history of media hysteria. It's time to move beyond blanket condemnations and frightening anecdotes and focus on developing targeted educational and policy interventions based on solid data. As with the entertainment media of earlier generations, we may look back on some of today's games with nostalgia, and our grandchildren may wonder what the fuss was about.

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## References

1. Springhall J: Youth, Popular Culture and Moral Panics: Penny Gaffs to Gangsta Rap, 1830–1996. New York, St. Martin's Press, 1999
2. U.S. Department of Health, Education and Welfare: Television and Growing Up: The Impact of Televised Violence. A Report to the Surgeon General. Washington, DC, HEW, 1972
3. Anderson CA, Dill KE: Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *J Pers Soc Psychol* 2000; 78:772–790
4. Miller SA: Malvo team cites role of violent media: Movie, video games seen brainwashing defendant. *The Washington Times*, 2003, p B01
5. Vossekul B et al.: The Final Report and Findings of the Safe School Initiative: Implications for the Prevention of School Attacks in the United States. Washington, D.C., United States Secret Service and United States Department of Education, 2002 ([http://www.secretservice.gov/ntac\\_ssi.shtml](http://www.secretservice.gov/ntac_ssi.shtml))
6. Shaffer D, Scott M, Wilcox H, Maslow C, Hicks R, Lucas CP, Garfinkel R, Greenwald S: The Columbia Suicide Screen: validity and reliability of a screen for youth suicide and depression. *J Am Acad Child Adolesc Psychiatry* 2004; 43:71–79
7. Reddy M, et al.: Evaluating risk for targeted violence in schools: comparing risk assessment, threat assessment and other approaches. *Psychology in the Schools* 2001; 38:157–172
8. Donohue E, Schiraldi V, Zeidenberg J: School House Hype: The School Shootings, and the Real Risks Kids Face in America. San Francisco, Center on Juvenile and Criminal Justice, 1998 ([www.cjcj.org](http://www.cjcj.org))
9. Romer D, Jamieson KH, Aday, S: Television news and the cultivation of fear of crime. *J Communication* 2003; 53:88–104
10. Lowry DT, Nio TCJ, Leitner DW: Setting the public fear agenda: a longitudinal analysis of network TV crime reporting, public perceptions of crime, and FBI crime statistics. *J Communication* 2003; 53:61–73
11. Grossman D, Degaetano G: Stop Teaching Our Kids to Kill: A Call to Action Against TV, Movie and Video Game Violence. New York, Crown, 1999

12. Snyder HN: Juvenile arrests 2001, in *Juvenile Justice Bulletin*. Washington, DC, Office of Juvenile Justice and Delinquency Prevention, 2003
13. Snyder HN, Sickmund M: Juvenile Offenders and Victims: 1999 National Report. Washington, DC, Office of Juvenile Justice and Delinquency Prevention, 1999
14. Blumstein A, Rosenfeld R: Trends in rates of violence in the USA. *Studies on Crime & Crime Prevention* 1999; 8:139–167
15. Buka SL, Stichick TL, Birdthistle I, Earls FJ: Youth exposure to violence: prevalence, risks and consequences. *Am J Orthopsychiatry* 2001; 71:298–310
16. Roberts DF et al.: *Kids & Media @ the New Millennium*. Menlo Park, Calif, Kaiser Family Foundation, 1999
17. Interactive Digital Software Association: *Video Games and Youth Violence: Examining the Facts*. Washington, DC, IDSA, 2001, pp 1–11
18. Federal Trade Commission: *Marketing Violent Entertainment to Children: A Review of Self-Regulation in Industry Practices in the Motion Picture, Music Recording & Electronic Game Industries*. Washington, DC, FTC, 2000
19. *Protect Children from Video Game Sex and Violence Act of 2003*.
20. Engrossed substitute House Bill 1009 (Act related to video and computer games depicting violence against public law enforcement officers) 2003
21. Whittier S: The recent school shootings: Are video game manufacturers liable? *New York Law Journal* 1999
22. Anderson CA, Bushman BJ: The effects of media violence on society. *Science* 2002; 295:2377–2379
23. Irwin A, Gross AM: Cognitive tempo, violent video games, and aggressive behavior in young boys. *J Family Violence* 1995; 10:337–350
24. Silvern SB, Williamson PA: The effects of video game play on young children's aggression, fantasy, and prosocial behavior. *J Appl Dev Psychol* 1987; 8:453–462
25. Anderson CA: An update on the effects of playing violent video games. *J Adolesc* 2004; 27:113–122
26. US Department of Health and Human Services: *Youth Violence: A Report of the Surgeon General*. Washington, DC, HHS, 2001
27. Uhlmann E, Swanson J: Exposure to violent video games increases automatic aggressiveness. *J Adolesc* 2004; 27:41–52
28. Griffiths M: Video games and aggression. *Psychologist* 1997; 10:397–401
29. Sherry JL: The effects of violent video games on aggression: a meta-analysis. *Human Communication Research* 2001; 27:409–431
30. Roe K, Muijs D: Children and computer games: a profile of the heavy user. *Eur J Communication* 1998; 13:181–200
31. Light RJ, Pillemer DB: *Summing Up: The Science of Reviewing Research*. Cambridge, Mass, Harvard University Press, 1984
32. Gliner JA, Morgan GA, Harmon RJ: Meta-analysis: formulation and interpretation. *J Am Acad Child Adolesc Psychiatry* 2003; 42:1376–1379
33. Funk JB: Impact of interactive violence on children, in Senate Commerce Committee, 2000
34. Bensley L, Van Eenwyk J: Video games and real-life aggression: review of the literature. *J Adolesc Health* 2001; 29:244–257
35. Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P: Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA* 2001; 285:2094–2100
36. DeVoe JE, et al.: *Indicators of School Crime and Safety: 2003*. Washington, DC, National Center for Education Statistics, Bureau of Justice Statistics, 2003
37. Grunbaum JA, et al.: *Youth Risk Behavior Surveillance—United States, 2001*. Centers for Disease Control—Surveillance Summaries, 51(SS-4). Atlanta, CDC, 2001
38. Funk JB, et al., *Playing violent video games, desensitization, and moral evaluation in children*. *Appl Dev Psychol* 2003; 24:413–436
39. Earls FJ: Violence and today's youth, in *The Future of Children* 1994; 4(3):4–23
40. Thadhani R, Camargo CA Jr, Stampfer MJ, Curhan GC, Willett WC, Rimm EB: Prospective study of moderate alcohol consumption and risk of hypertension in young women. *Arch Intern Med* 2002; 162:569–574
41. Madden M: America's online pursuits: the changing picture of who's online and what they do, in *Pew Internet & American Life Project*. Edited by Rainie L. Washington, DC, Pew, 2003
42. Marriott M: Making high-tech play less work. *The New York Times*. 2004
43. Kushner D: With a nudge or vibration, game reality reverberates. *The New York Times*, 2003