Impact of Media on Children and Adolescents:
A 10-Year Review of the Research

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ABSTRACT

Objective: To review the research literature published within the past 10 years regarding the impact of media on children and adolescents. **Method:** Media categories researched with computer technology included television and movies, rock music and music videos, advertising, video games, and computers and the Internet. **Results:** Research prior to 1990 documented that children learn behaviors and have their value systems shaped by media. Media research since has focused on content and viewing patterns. **Conclusions:** The primary effects of media exposure are increased violent and aggressive behavior, increased high-risk behaviors, including alcohol and tobacco use, and accelerated onset of sexual activity. The newer forms of media have not been adequately studied, but concern is warranted through the logical extension of earlier research on other media forms and the amount of time the average child spends with increasingly sophisticated media. *J. Am. Acad. Child Adolesc. Psychiatry*, 2001, 40(4):392–401. **Key Words:** media, television, violence, sexual activity, substance use.

Concern from parents, professionals, and the populace at large about the impact of the media on children and adolescents has grown steadily over recent years. Recent events, most prominently the school murders of the past 2 years, in Pearl, Mississippi; Jonesboro, Arkansas; Paducah, Kentucky; and Littleton, Colorado, have drawn attention to the volatile confluence of culture and psychopathology. It has become imperative for clinicians to understand the role of media exposure on children in order to diagnose and treat behavioral problems as well as to prevent further tragedies.

This review synthesizes relevant media research since 1990 regarding the impact of media on children and adolescents. It begins by providing a historical overview

through a brief summary of review articles, policy statements, and scientific books. This literature, while not new research, is important because it provides a historical context for the research of the 1990s. The following specific categories of media were chosen for research review: television and movies, music and rock videos, advertising, video games, and computers and the Internet. These were selected because they are standard components of the American child's media diet, often occupying large amounts of time on a daily basis.

HISTORICAL OVERVIEW

Dietz and Strasburger's review (1991) summarized the research of the previous 20 years, which demonstrated the multiple effects of television on child and adolescent cognition and behavior. Looking at topics ranging from cognitive development, to obesity, to aggressive behavior and violence, drug use, suicide, sexual activity, and the promotion of stereotyping, this article highlighted earlier findings and provided the basis for much of the recent research. From this point, particularly in the area of television and movies, the research became heavily oriented

toward content analysis and viewing patterns, with the widely accepted premise that children gain knowledge, learn behaviors, and have their value systems significantly shaped by exposure to media.

In 1996 the American Medical Association's brochure "Physician Guide to Media Violence" (Walsh et al., 1996) further highlighted the direct correlation between media exposure and violent behavior and called on physicians to incorporate a media history into the routine assessment of patients as part of an effort to stem the growing epidemic of violence in America. More recently, Strasburger and Donnerstein (1999) updated the media topic by providing an overview article, "Children, Adolescents, and the Media: Issues and Solutions." With more than 150 references, this article detailed research, popular press articles, governmental publications, and survey data. The article summarizes the research findings and examines the roles of parents, health professionals, the media, and government in providing solutions.

The American Academy of Pediatrics (AAP) has published five well-researched policy statements pertaining to the media during the past decade:

- "Media Education" (Committee on Public Education, 1999)
- "Impact of Music Lyrics and Rock Music Videos on Children and Youth" (Committee on Communications, 1996)
- "Media Violence" (Committee on Communications, 1995c)
- "Sexuality, Contraception, and the Media" (Committee on Communications, 1995a)
- "Children, Adolescents, and Advertising" (Committee on Communications, 1995b)
- "Children, Adolescents, and Television"(Committee on Communications, 1995d)

Each statement defined the extent of the problem, described the existing research, and provided relevant recommendations for practicing pediatricians to use in their everyday work with children and families. The most recent statement, "Media Education," is a culmination of the previous policies designed to complement the AAP's 5-year "Media Matters" public education campaign. The premise of this policy is research which strongly suggests that media education may result in young people becoming less vulnerable to negative aspects of media exposure. Citing Canada, Great Britain, Australia, and some Latin American countries as having successfully incorporated media education into school curricula, the policy state-ment urges that the United States embrace media education as an effective approach to help mitigate against the potentially harmful effects of various media on children.

Three scientifically oriented books are noteworthy. The first, *Big World, Small Screen: The Role of Television in American Society* (Huston et al., 1992), began as a review by the American Psychological Association of research-based studies done in the previous 20 years in behavioral psychology and communications journals, as well as government surveys and studies. *Media, Children and the Family: Social Scientific, Psychodynamic, and Clinical Perspectives* (Zillman et al., 1994) and *Media Effects: Advances in Theory and Research* (Bryant and Zillman, 1994) also review the most authoritative scholars of the previous 30 years. Particularly noteworthy are chapters describing how media has affected family life and the reality of children's use of the media being primarily socialized (learned) in the family, plus sections on the effects of violence and horror, sexual content, and the effects of erotica and pornography.

TELEVISION AND MOVIES

Two major meta-analytic reviews were published in the 1990s. Wood et al. (1991) examined 28 research reports on children and adolescents exposed to media violence and subsequently observed in unconstrained social interactions. The authors concluded that exposure to media violence increases aggressive interactions with strangers, classmates, and friends. In a larger review of 217 studies conducted between 1957 and 1990, Paik and Comstock (1994) looked at the effects of television violence on antisocial behavior. The age range represented was from 3 to 70 years of age, with 85% of the sample aged 6 to 21 years. The analysis revealed a positive and significant correlation between television violence and aggressive behavior, regardless of age. The greatest effect size was demonstrated for preschool children, even though the aggression they exhibited was, by the nature of their age and size, the least problematic. The authors, in a prescient way, cautioned as to the nature of the aggression being dismissed and wondered about the long-term consequences of such large effects on subsequent behavior. The effect on males was only slightly higher than the effect on females, and the effect size for erotica and violent erotica combined was greater than that for violence only programs. This later outcome is viewed as supportive of the "sexual callousness" model described by Zillman and Weaver (1989) and Mullin and Linz (1995), which proposed that erotica with or without violence that depicts women as promiscuous

may encourage the subsequent development of callous attitudes or behavior toward women among males so exposed.

Recent research has continued to focus on television, largely because children spend the most time with this medium and it reaches the youngest ages. Nielsen Media Research (1998) data indicate that the average American child spends more than 21 hours per week viewing television. Television viewing also occurs earlier than other forms of media, often beginning before age 2 years. Within the past year, television shows particularly designed to appeal to infants and toddlers have emerged, causing great concern and public debate about television viewing at an early ages as an alternative to more developmentally authentic human interaction. The rapid proliferation of videocassette recorders and the expansion of cable television and movie channels have also dramatically increased the diversity of what young people and their families see (Bryant, 1990) and have significantly reduced the distinction between television fare and movies.

Violence and Aggression. In an effort to understand the content of American television, the National Television Violence Study (Federman, 1996, 1997, 1998) rigorously examined more than 10,000 hours of programming across a variety of channels, cable and noncable, at all hours of the day in three consecutive years from 1994–1997. There was surprising consistency of the data from year to year, with an alarming amount of violence present. It was estimated that young people view 10,000 acts of violence per year, with 61% of shows containing violence of some kind. The type of violence and the context was also consistent, with 26% of violent interactions involving the use of weapons, 38% of violent acts being committed by "attractive perpetrators," more than 50% of violent incidents showing no apparent pain associated with the violence, and almost 75% of violent acts involving no evident remorse, criticism, or penalty for the violence. To the contrary, humor accompanied the violence in 41% of the incidents.

The three volumes of the National Television Violence Study concluded the following:

1. Television violence contributes to antisocial effects on viewers.
2. Three primary effects arise from viewing televised violence:
   a. Learning of aggressive behaviors and attitudes
   b. Desensitization to violence
   c. Fear of being victimized by violence

3. Not all violence poses the same degree of risk of these harmful effects.

With the content established as consistent over each of the 3 years, the last volume attempted to identify how each of nine specific contextual features heightens the probability that a given depiction of violence will generate one of the three primary types of effects. The predicted impact of contextual factors based on social science research rated attractive perpetrator, presence of weapons, and humor as associated with learning aggression; graphic violence and realistic violence associated with generating fear; and humor and graphic violence associated with predicting desensitization.

Centerwall (1992) raised further concerns about television and violence through epidemiological research spanning more than 20 years. Postulating a 10- to 15-year lag between the time of childhood exposure to television and the primary behavior-modifying effects, which become operant in adulthood, Centerwall examined the change in the homicide rates following the introduction of television into South Africa in 1975. As of 1987, the white South African homicide rate had reached 5.8 per 100,000, a 130% increase from the rate of 2.5 per 100,000 in 1974, the last year before television was introduced. Although acknowledging television exposure as only one factor that influences violence, Centerwall hypothesized that if television technology had never been developed, there would be 10,000 fewer homicides in the United States each year, 70,000 fewer rapes, and 700,000 fewer injurious assaults.

Trauma Symptoms. Two current articles have looked at trauma symptoms and television watching. Joshi and Kaschak (1998), in a study using a self-report questionnaire administered to 702 high school students, noted that 75% reported exposure to violence in the media at moderate to high levels, with 10% reporting that they sought counseling for the negative sequelae. Symptoms reported included bad dreams and nightmares, anxious feelings, being afraid of being alone, withdrawing from friends, and missing school.

Singer et al. (1995) examined viewing preferences, symptoms of psychological trauma, and violent behaviors among children who watch television. The data from their survey of 2,245 students, grades 3 through 8, showed that children who watched more than 6 hours of television per day reported more trauma symptoms and more violent behaviors. In addition, children who showed a preference for viewing "action and fighting shows" reported higher levels of violent behaviors.

High-Risk Behaviors. Television viewing has also been shown to be associated with less dramatic, but still very concerning, risky behaviors by adolescents. Klein et al. (1993) examined data derived from in-home surveys of 2,760 randomly selected 14- to 16-year-old adolescents in 10 urban areas. Participation in eight potentially risky behaviors (sexual intercourse, drinking, smoking cigarettes, smoking marijuana, cheating, stealing, cutting class, and driving a car without permission) increased among adolescents who listened to radio and watched music videos and movies on television more frequently, regardless of race, gender, or parental education level.

Substance Abuse. Klein and colleagues' (1993) findings are consistent with content-based research on how alcohol is portrayed in television programming. Research from the 1980s demonstrated that alcoholic beverages are commonly portrayed either neutrally or positively (Breed and De Foe, 1981; Wallack et al., 1990a,b). Grube (1993) and Signorielli (1993) reported separately that a viewer can observe more than a dozen drinking episodes in one average evening of television.

Sexual Promiscuity. The amount of sexual material, including sexually violent material, has increased over the past decade. The Kaiser Foundation report indicated "family hour" of television (8 to 9 P.M.) currently contains more than eight sexual incidents per hour, a 4-fold increase from 1976 (Kunkel et al., 1996). In the most recent Kaiser Foundation study (Kunkel et al., 1999), described as the most extensive study ever conducted of sexual conduct on television, more than 1,300 shows across 10 channels were analyzed. The results show that while more than 50% of shows—and 66% of prime-time shows—contain sexual content, only 9% contain any reference to the possible risks or responsibilities of sexual activity or any reference to contraception, protection, or safer sex. A closer examination of media content by genre showed that it was talk shows that most often addressed sexual risk or responsibility, but even here this occurred only 23% of the time. The report goes on to present survey data revealing that 76% of teenagers indicate that one reason young people have sex is because television shows and movies make it seem more normal for teenagers.

The Family and Family Interactions. Skill and Wallace (1990) studied patterns of interpersonal conflict and resolution in families as depicted in prime-time network television shows. Major findings included the following: conflict-resolving acts occurred almost twice as often as conflict-escalating acts; intact families were least likely to engage in conflict escalation and blended families were most likely; brothers were most likely to escalate conflict and mothers were most likely to engage in conflict-resolving behaviors. The strategies shown for resolving conflict were diverse, and parents and children across family types tended to display respect and concern for one another.

A second study by Comstock and Strzyzewski (1990) examined the depiction of conflict, jealousy, envy, and rivalry in family interactions in prime-time network programs. The data showed that more than 30% of the conflict situations involved parents and children, 19% involved spouses, and 13% involved siblings. Integrative strategies, considered to be the most healthy, were used most by mothers and sons, and more destructive strategies were used by siblings and spouses. The authors concluded that although family conflict and jealousy are frequently portrayed on prime-time television, the portrayals are not predominantly antisocial.

Content analyses of movies in Comstock and Strzyzewski's (1990) study revealed the disturbing fact that one of eight Hollywood films depicts a rape. Although there are studies on college age subjects exposed to erotica and violent erotica showing them to be less sympathetic to actual rape victims (Linz et al., 1989), for obvious reasons there are no such studies on children. However, it is clear from content analysis of television and movies that children are routinely being exposed to such violence on a regular basis from early ages.

Fear. The fear response deserves separate consideration from violence because of the extensive work in the 1980s and 1990s, primarily by Cantor (1989, 1991; Cantor and Hoffner, 1990). Surveys have shown that many children are exposed to frightening movies such as *Poltergeist, Jaws, Halloween,* and *Friday the Thirteenth.* A substantial portion of children subsequently indicated regret that they watched because of the intensity of the fright reactions experienced. Cantor (1991) summarized this research as demonstrating that transitory fright responses occur in a substantial proportion of children and that intense and even debilitating reactions affect a small proportion of particularly susceptible viewers.

Survey research (Cantor et al., 1993) of 1st, 4th, 7th, and 11th graders regarding reactions to televised coverage of the Persian Gulf War revealed no differences in prevalence of intense negative emotional reactions. However, children at different ages were upset by different aspects of the coverage as described by parents, with younger

children more upset by the visual aspects of coverage and older by the more abstract, conceptual aspects.

Further research has been conducted on helping children to overcome their fear through cognitive strategies. Again it was demonstrated, however, that younger children processed information differently. For example, there was no fear reduction when young children were provided a warning about the unreality of the situation they were about to see (Wilson and Weiss, 1991). A few studies have used news and documentary programming to look at the effect of reassuring children when the threat is actually real. Studies using explanations such as "this probably will not happen to you" have shown that it is very difficult to explain away threats that have induced fear in young children (Hoffner and Cantor, 1990).

Field surveys of real-world disasters and highly publicized events, such as the space shuttle Challenger disaster (Cantor and Omdahl, 1991), have generally shown mild and transient responses in young viewers. The issue of the transient nature of fear responses has not been adequately studied. The study of such is difficult because the process of interview inquiry may have a secondary therapeutic effect and reduce symptoms.

A study that potentially bears on long-term implications (Cantor and Omdahl, 1991) examined children's self-reports of worry after exposure to dramatized depiction of a house fire or a drowning. Those who saw a movie that depicted a drowning were less willing to go canoeing, and those who saw a movie with a house fire were less eager to build a fire in a fireplace. The duration of these effects was not measured, and the effects were short-lived because talking with the children about what they had seen and how it might have affected them was done to prevent long-term distress. One can nonetheless speculate about the impact of accumulated fear over time in youths without responsible adult intervention.

ROCK MUSIC AND MUSIC VIDEOS

During the 1970s and 1980s, rock music lyrics became more explicit in their references to sex and drugs (Fedler et al., 1982). The AAP's revised policy statement in 1996 stated that although there were no studies documenting a cause-and-effect relationship between sexually explicit or violent lyrics and adverse behavioral effects, there is ample evidence given the content to be concerned about desensitization to violence, promotion of sex-role stereotyping, and acceptance of risk-taking behaviors.

Several studies have in fact looked at whether music preference is associated with adolescent turmoil and even suicidality. Weidinger and Demi (1991) provided the first look at the preference for heavy metal music in disturbed or drug-abusing adolescents in a small sample of 60 adolescents hospitalized on a psychiatric unit. This was followed by Arnett (1992), who surveyed 248 students in 10th and 12th grade in a southern metropolitan area about their musical preferences and reckless behaviors. The reckless behaviors included driving while intoxicated, driving at speeds of greater than 80 mph, drug use, sexual promiscuity, shoplifting, and vandalism. The results demonstrated a clear association between heavy metal and hard rock as a musical preference and reckless behavior. The author cautioned that the results not be interpreted as causative, but instead that the heavy metal and hard rock music appeals to adolescents who have high levels of sensation-seeking behavior.

Martin et al. (1993) surveyed 247 high school students in two Australian government high schools about their musical preferences and aspects of their psychological health and lifestyle. The results showed a marked gender bias, with 74% of the girls preferring pop music compared with 71% of the boys preferring hard rock/heavy metal music. They also reported significant associations between a preference for hard rock/heavy metal music and suicidal thoughts, acts of deliberate self-harm, "depression," "delinquency," drug taking, and family dysfunction. They suggested that there is a group of young people with preexisting personal family psychopathology who may choose hard rock/heavy metal music because its themes resonate with their own feelings of frustration, rage, and despair. Many of these adolescents report that listening to hard rock/heavy metal music actually makes them feel happier. The article did, however, identify 11% of the sample who claimed that listening made them feel sadder and postulated that it is perhaps this group that is at most risk for suicidal behavior.

In a larger study by Stack et al. (1994), the relationship between the subculture of heavy metal magazine subscriptions and adolescent suicide was examined in all 50 United States. The authors concluded that the greater the extent of heavy metal subculture, the higher the suicide rate. They further asserted that this music, which is marked by themes of despair, alienation, and chaos, "nurtures suicidal tendencies already present in the subculture" (p. 15).

Using a smaller clinical sample of 88 psychiatric patients, Took and Weiss (1994) further questioned the rela-

tionship between musical preference and adolescent turmoil. This study was the first to include rap music as a preference category. Although the initial results indicated that those who preferred heavy metal and rap had worse school grades, more school behavior problems, increased sexual activity, and increased drug and alcohol use and arrests, when controlled for gender, only below-average current and elementary school grades and a history of counseling in elementary school for school problems remained significant.

Waite et al. (1992) examined the potential causal effect of music television on violent behavior. They collected data over a 55-week period between January 1989 and February 1990 on 222 patients on six wards of a forensic hospital between the ages of 18 and 67 years, mean age 28.65 ± 9.45 (SD) years. The study was prompted by their observation that at least one and often both of the two television sets on each ward were often tuned to the Music Television (MTV) network. Noting the high levels of sexual and violent themes present, and seeing signs of clinical deterioration after prolonged viewing, they designed a study that looked at the number of assaultive incidents before and after MTV removal on the wards. The results showed a statistically significant reduction in incidents per week from 44 to 27 after removal of MTV that was further supported by time-series analysis.

Six recently published studies looked carefully at the content and possible effects of music videos. Brown and Schulze (1990) examined the effects of race, gender, and "fandom" on how older adolescent audiences interpreted two Madonna music videos. Their study showed a clear racial difference, with white viewers almost twice as likely as African-American viewers to see the video "Papa Don't Preach" as being about teenage pregnancy, whereas African-American viewers were twice as likely to see it as a story about father–daughter relationships.

Building on studies from the 1980s which showed the frank violent content of more than 50% of MTV, Durant et al. (1997a) analyzed the content of 518 music videos from MTV, VH1 (Video Hits One), CMT (Country Music Television), and BET (Black Entertainment Network). The study showed 22% of MTV videos portraying overt violence, with the other three networks carrying programs of which 11% involved violence. As for music genre, 20% of rap videos portrayed violence, and the carrying of weapons was the highest in rap and rock videos (approximately 19%). Among the videos with weapons, a child was portrayed as carrying the weapon 15%

of the time and an adolescent 8%. Similarly, children were engaged in violence 11% of the time and adolescents 8%.

Durant et al. (1997b) examined the content of tobacco and alcohol use behaviors on television. The results showed that a high percentage (26%) of MTV videos portrayed tobacco use. The percentage of alcohol use on MTV was still the highest at 27%, but differences with the other networks were not statistically significant. Of note, given the influence of modeling and imitation in young people, videos that portrayed alcohol and tobacco use depicted the lead performer as most often the one observed to be smoking or drinking. Sexuality was also portrayed in a higher percentage of videos with drinking. BET contained the highest percentage of videos with sexuality or eroticism.

Rich et al. (1998) looked at the differences in the genders and races portrayed as aggressors and victims in acts of violence in music videos. The results showed that 15% of the videos contained portrayals of individuals engaging in overt interpersonal violence. In more than 80%, the aggressor was an attractive role model, with males more than three times as likely to be aggressors. White females were most frequently victims, and black males and females were overrepresented compared with U.S. demographics as both aggressors and victims.

ADVERTISING

While advertising has not been as extensively studied as television programming, the studies of the past decade document in a compelling fashion the influence of advertising media on the attitudes of young children and adolescents in ways that ultimately shape later behaviors. During the past decade research has focused on the areas of tobacco and alcohol advertising, since in 1993 alone the tobacco industry spent $6 billion on advertising (Report to Congress for 1993 Pursuant to the Federal Cigarette Labeling and Advertising Act, 1995).

Tobacco. The seminal study (Fischer et al., 1991) looked specifically at the influence of advertising on very young children, aged 3 to 6 years, by examining brand logo recognition in a sample of 229 children in two preschools in Georgia. Each child was asked to match a logo with a picture of the product using 22 brand logos, 10 with products targeted to children, 5 representing cigarette brands, and 7 with logos targeted to adults. While, as expected, the Disney Channel logo recognition was higher for subjects aged 3, 4, and 5, by age 6 years the sil-

houette of Mickey Mouse and the face of Old Joe Camel were equally recognized and correctly matched by all children, independent of use of cigarettes in the home.

Subsequent studies of older ages considered the influence of various advertising and marketing techniques and later susceptibility to smoking. Evans et al. (1995) examined data on 3,536 adolescents who had never smoked to determine their susceptibility to smoking; they surveyed two indices: (1) a 5-point index of an individual's receptivity to advertising as evidenced by recognition of advertising messages, having a favorite advertisement, naming a brand he or she might buy, owning a tobacco-related promotional item, and willingness to use a tobacco-related promotional item; and (2) an index classifying the individual's reported exposure to family and peer smoking. The relationship of receptivity to advertising and susceptibility to smoking was stronger than the relationship of family or peer smoking and susceptibility, indicating that advertising is a more powerful influence than exposure to peer or family smoking. Four recent research articles, with large sample sizes and different geographical locales, have looked more specifically at the relationship between tobacco promotional items and smoking susceptibility: Altman et al. (1996), random U.S. survey of 1,047 adolescents aged 12–17 years; Schooler et al. (1996), survey of 571 California adolescents aged 13 years; Sargent et al. (1997), survey of 1,265 rural New Hampshire and Vermont youths aged 10–19 years; Pierce et al. (1998), survey of 1,752 California adolescents aged 12–17 years.

Each study has documented a strong association between an awareness of and involvement with tobacco promotions and subsequent susceptibility to tobacco use. Pierce's study was the only longitudinal examination of the link between advertising, exposure to promotional tobacco items, and later smoking. Spanning a 3-year period from 1993 to 1996, the study found that adolescents who had a favorite cigarette advertisement in 1993, compared with those who did not, were twice as likely either to have started smoking by 1996 or to be willing to start, and those who owned or were willing to own a promotional item were three times as likely to have started smoking by 1996 or to be willing to start.

Alcohol. Studies from the 1980s showed significant correlation between exposure to alcohol advertising and drinking beliefs and behaviors (Atkin et al., 1983, 1988; Atkin and Block, 1981). In the 1990s two major studies examined the effects of alcohol advertising on children and adolescents. Grube and Wallack (1994) looked specif-

ically at the relationship between television beer advertising and drinking knowledge, beliefs, and the intention to later drink. The sample queried was a random group of 468 fifth and sixth graders, using self-administered questionnaires and structured interviews. They measured television viewing, awareness of beer advertising, knowledge of beer brands and slogans, alcohol beliefs (both positive and negative), intention to drink as an adult, perceived parental and peer approval of drinking, perceived parental and peer drinking, and demographic and background variables. Children with more knowledge of beer brands and slogans held more favorable beliefs about drinking and more frequently intended to drink as adults. The positive values associated with drinking included romance, sociability, and relaxation.

Madden and Grube (1994) furthered this area of research by looking at the frequency and nature of alcohol and tobacco advertising through extensive content analysis of advertising in a random sample of 166 televised sports events from fall 1990 and 1992. The events included college and professional sports events representing 443.7 hours of broadcasting. Two hundred eight unique beer commercials were identified, with a total of 685 alcohol commercials shown. Only 10% of the commercials were oriented to product image, taste, or quality, with 15% showing celebrity endorsement and 37% containing either driving or water-related activities. These images and themes were noted as clearly at odds with the recommendations of former Surgeon General Koop, who admonished the advertising industry not to portray activities that are dangerous when combined with drinking and not to use endorsements of celebrities, especially those who appeal to youths.

VIDEO AND COMPUTER GAMES

The annual industry growth of video and computer games in the United States has been meteoric, from $100 million in 1985 to $7 billion in 1994 (Provenzo, 1991). Funk (1993) surveyed 357 seventh- and eighth-grade students regarding the frequency and location of video game use. The average time spent playing was 4.2 hours per week. Boys played more frequently in video arcades (50% compared with only 20% of girls playing in arcades). The content of almost half of the games was violent, and 40 of the 47 most popular video games were violent.

Very few research articles have examined the effects of this billion-dollar industry on children and adolescents. Dorman (1997) provided a comprehensive review of the

research looking at potential negative consequences in five areas: cardiovascular implication, video game–induced seizures, "Nintendinitis," pathological preoccupation with video games, and aggression and prosocial behavior. Of the 36 references, few are research articles printed in the past decade. Ferrie et al. (1994) documented 50 cases of video game–induced seizures reported worldwide. One third of the cases had documented previous seizures, not related to video games. Keepers (1990) reported a single case study of video game preoccupation, yet there are no other such case reports.

Four studies have examined the relationships between video games and aggression versus prosocial effects. Scott (1995) examined college students and found little support for the theory of playing games as inducing aggressive behavior. Additional studies with Japanese children also support that video game–playing is not associated with social maladjustment. Sakamoto (1994) studied 307 elementary students and found no relationship between video game use and social adjustment. To the contrary, Shimai et al. (1990), in a study of kindergarten children who played video games, found them to have superior development in several areas of social skills compared with nonplayers. In another study, Subrahmanyam and Greenfield (1994) found video games useful in teaching spatial performance, particularly for children with relatively poor skills in this area.

These few studies that look at the teaching ability of video games do not dismiss their capacity to teach violence. The literature on violent games is non–research-based, with its origin in the military and law enforcement application of classical conditioning and operant conditioning. David Grossman described in his book *On Killing: The Psychological Cost of Learning to Kill in War and Society* (1996), how the military train soldiers to kill by using video games much like those being played daily by millions of children. There still remains no research in the specific area of violent games and children.

COMPUTERS AND THE INTERNET

The use of computers and the Internet has not been studied using research techniques to date, yet 89% of teenagers report using a computer, 61% report "surfing the net," and 14% report seeing something that they do not want their parents to know about (Princeton Survey Research, 1997). Commentaries and news stories abound in response to linkages made between recent killers and computer use. McGee and DeBernardo (1999), in their article describing "school avengers," a profile of the recent school killers, noted that almost all were computer-savvy and frequented sites where they could obtain violent, anarchist-oriented material. The fact that the current generation of children are often more adept with computers than their parents adds an additional level of concern for parents. The speed and easy access to the world through the web of cyberspace will clearly have an effect on the growth and development of children just as other forms of media have contributed. Although it is likely that it will have both positive and negative effects, further research is indicated to delineate each.

DISCUSSION

The predominant theme of the research literature of the 1990s was the careful delineation of content in all forms of the typical American child's media diet. This, combined with survey information about how much time children and adolescents continue to spend with various forms of media, leads naturally to growing concern about what children are learning. There is no doubt that media has a tremendous capacity to teach, different from standard teaching techniques. Whether through television or computers, music lyrics or music videos, the messages conveyed are received by children and become part of their internal world, thus either directly or subtly influencing their behavior.

With the dawn of the millennium and further rapid advances in technology, one can predict that time spent with current media, and new forms yet to be developed, will only increase. This leads to further concerns about the potential for increased social isolation and limited capacity to understand human relationships. Excessive media use, particularly where the content is violent, gender-stereotyped, sexually explicit, drug- or alcohol-influenced, or filled with human tragedy, skews the child's world view, increases high-risk behaviors, and alters his/her capacity for successful, sustained human relationships.

Studies are needed that look at how the harmful effects of media can be prevented. This kind of media literacy training will take a major place in education. *Understanding Media* (McCannon, 1999), a CD-ROM teaching device developed as part of the New Mexico Media Literacy Project, is an example of a statewide school approach. Other curricula are being developed rapidly, and it is hoped that they will become a part of the lexicon for helping children to grow emotionally healthy.

Health care professionals, and particularly child and adolescent psychiatrists, should incorporate a media history into the standard evaluation of children and adolescents. With the growing evidence that certain media use is included as a risk factor for acting out violently, as well as for other high-risk behaviors, the standard of practice has evolved over the past decade to warrant incorporation of the media history into everyday clinical practice. For adolescents, this needs to include careful questioning about music preferences and the meaning of the music to the adolescents. This should extend to actively educating parents about the potential dangers of the television as an "electronic baby-sitter" for young children, televisions in children's bedrooms, prolonged periods spent playing violent video games, and the risks of unsupervised Internet use.

The challenge to adults who deal with children, either personally as parents or professionally, will be to monitor media use in ways that foster curiosity and the positive aspects of the ability of media to teach, yet simultaneously protect children from spending too much time with media at the expense of human interactions, from being overexposed to material that cannot be adequately processed or understood, and from having their value systems shaped in negative ways by media content. The cost of ignoring the impact of the media on children and adolescents will be enormous, both in absolute dollars and in the immeasurable cost of human pain and suffering.

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