

Media Matter: But “Old” Media May Matter More Than “New” Media

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“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.”

Alvin Toffler
Future Shock (1970)

“The way adolescents of today learn, play, and interact has changed more in the past 15 years than in the previous 570 since Gutenberg’s popularization of the printing press.

Jay N. Giedd, MD
(2012)

“We put our kids through fifteen years of quick-cut advertising, passive television watching, and sadistic video games, and we expect to see emerge a new generation of calm, compassionate, and engaged human beings?”

Sidney Poitier
The Measure of a Man (2007)

INTRODUCTION

It has now been 50 years since the US Senate held hearings about whether media violence contributes to real-life violence. Thousands of research studies later—including remarkable longitudinal studies from New Zealand,¹ Japan,² and Scotland³—it is clear that traditional media (eg, TV, movies, videos) can potentially have a powerful influence over the attitudes and behavior of children and

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adolescents.^{4,6} By time criteria alone, television will always win out.⁷ What is changing is that children, and especially teens, are watching TV on newer platforms (Figure 1).^{8,9}

What is not clear is the behavioral effect of new media (eg, the Internet, social networking sites, cell phones) on child and adolescent development and behavior. Although new media are being touted as being significant influences and posing significant problems, such as Internet and Facebook depression, cyberbullying, and sexting, there is room for argument and debate over whether new media will ultimately prove to be as powerful as old media in influencing key areas of child and adolescent health (Figure 2). At least 3 recent studies suggest that TV—an “old” medium—has more of an effect than new media on sexual behavior¹⁰ and on obesity.^{11,12} A fourth study finds that despite concerns that excessive use of new media is harmful to adolescent development, in fact, television detracts from academic performance more than heavy use of the Internet or video gaming.¹³ A fifth study compares TV screen time with computer time and finds that only the former is more often associated with poorer cardiometabolic biomarkers such as blood pressure and lipid profiles.¹⁴

Despite the occasional naysayer,¹⁵ most child health experts agree that old media—hereafter referred to as traditional media—can have significant attitudinal and behavioral effects on a whole host of health-related concerns, at least according to numerous epidemiologic studies (Table 1).¹⁶

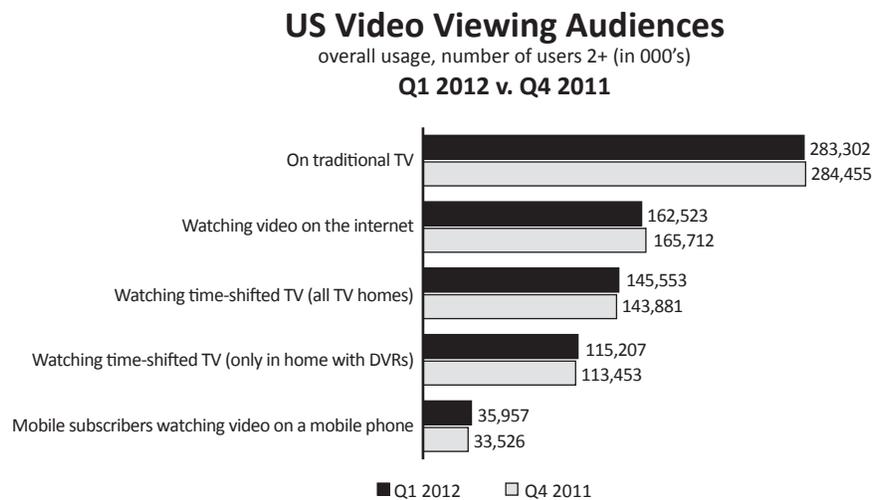


Fig 1. US video viewing audience. Overall usage, number of users 2+ (in 000's) Q1 2012 vs Q4 2011. Copyright © Nielsen. Reprinted with permission.



Fig 2. Evolution of communication. Copyright © Mike Keefe, Denver Post.

Table 1
Health Effects Of Media

Media Violence

- More than 2000 studies show a link with aggressive attitudes and behavior
- Strong desensitization effect
- Exposure of normal children to media violence has been associated with antisocial and even criminal behavior in adults
- No studies exist on the effect of media violence on children or adolescents who are mentally ill

Sex

- Twenty studies have used longitudinal data to show a 2× increased risk of early sexual intercourse with exposure to sexual content at a young age
- Dozens of studies show an effect on sexual attitudes and beliefs

Drugs

- Alcohol and tobacco advertising = 1 cause of adolescent drinking and smoking
- Exposure to movie scenes of smoking and drinking may be the leading cause of teen drinking and smoking

Obesity

- Strong evidence for screen time causing an increased risk of obesity
- Etiologic factors include (1) displacement of active play, (2) exposure to food advertising, (3) changes in eating habits while viewing, and (4) effect of screen time on sleep

Other Findings

- Several studies link TV viewing with attention deficit disorder (ADD) and attention-deficit/hyperactivity disorder (ADHD)
- At least 14 studies now find language delays in babies <2 years exposed to screens
- Association of TV viewing with depression and an increased risk of imitative suicide
- Effect of TV, movies, and magazines on body self-image and on development of eating disorders
- Numerous studies document prosocial effects (eg, increased school readiness, possible effect on altruism, empathy, and acceptance of diversity)

TRADITIONAL MEDIA

Aggressive Behavior

The communications, psychology, and pediatric literature contains more than 2000 studies on the association between media violence and aggression in children and adolescents according to Harvard's Center on Media and Child Health (www.cmch.org). A broad consensus of medical and public health organizations is that the evidence is now clear and convincing that media violence is 1 of the *causal* factors in real-life violence and aggression (although they also agree that it is not the *leading* cause).^{17,18} Of all media-related areas, media violence has been the most thoroughly investigated. The US government has issued several reports as well. A US Surgeon General's report in 1972,¹⁹ a National Institute of Mental Health report 10 years later,²⁰ an FBI report on school shootings in 2000,²¹ and, most recently, a Federal Communications Commission report in 2007²² all have concluded that there is "strong evidence" that exposure to media violence can increase aggressive behavior in children and adolescents. Most researchers agree.^{23,24} While much of the research and many of the government reports have come from the United States, concern about media violence is worldwide.^{4,25}

How much violence is there on TV and in movies? A considerable amount, according to several recent studies. Bullying is surprisingly common in young children's shows and is seen in 92% of the 50 most popular programs watched by 2- to 11-year-olds.²⁶ In addition, a content analysis of the 2012 to 2013 TV season found that guns or bladed weapons are featured every 3 minutes, and that the TV ratings for violence were inaccurate.²⁷ Similarly, in a study of the top 30 films since 1950, researchers found that PG-13 films now contain as much or more violence as R-rated films. In addition, violence has more than doubled since 1950, and gun violence in PG-13 films has tripled since 1985.²⁸ Violence in James Bond films has doubled, and lethal violence has tripled since the first films.²⁹ A content analysis of the top-grossing movies from 1985 to 2010 found that 90% contained a main character involved in violence, and 77% had the same character involved in a risky behavior, usually either sex or substance use.³⁰

But how strong is the connection between media violence and real-life violence? Researchers sometimes disagree. Comstock and Strasburger³¹ assert that the connection may be as high as 30%. Others put the figure at closer to 10%.³² But interestingly, the connection is nearly as strong as the connection between cigarette smoking and lung cancer, and is stronger than many widely accepted public health risks such as lead poisoning and IQ or socioeconomic status and school achievement (Figure 3).³² The mere presence of a weapon can increase aggression.³³

Why, then, do parents and the general public not believe that there is a connection? The answer is complicated.³⁴ But a significant part of the problem may be

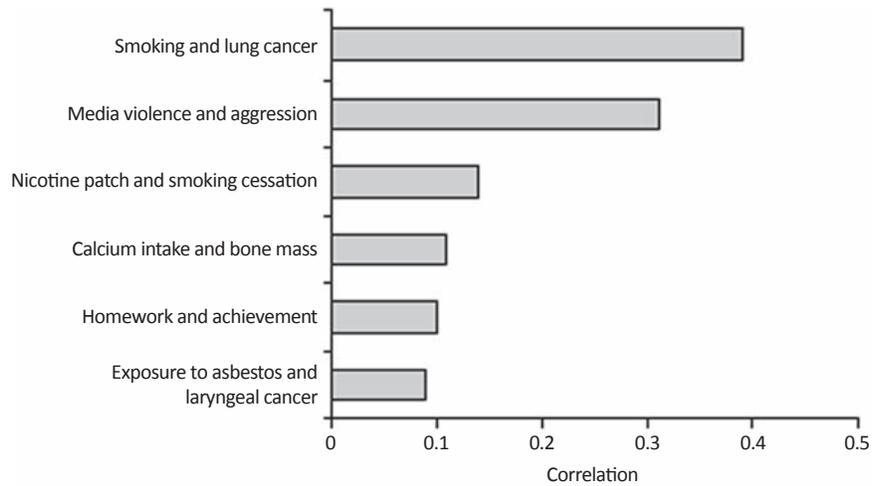


Fig 3. Comparison of media violence-aggression link with other public health relationships that have been established scientifically. (Adapted from Bushman and Huesmann, 2001). Reprinted from Strasburger, Wilson, & Jordan (2014). Copyright © Sage. Reprinted with permission.

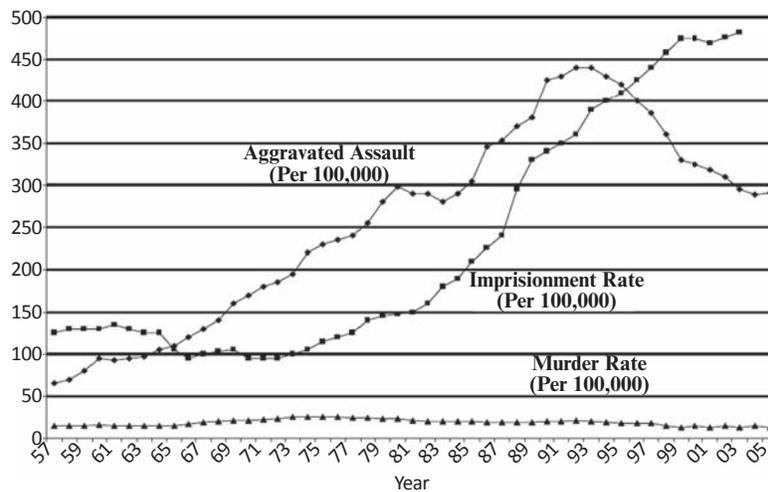


Fig 4. Violent crimes in America. A comparison of murder, assault, and imprisonment rates, 1957-2005. From www.killology.com. Reprinted with permission.

that most critics of the research point to the current low rate of homicide as contradicting any possible relationship between media violence and real life violence. Homicide actually is quite rare, however, and it makes far more sense to use a more common (and perhaps worrisome) measure of interpersonal violence, such as assault rates, which have climbed significantly as media violence has intensified (Figure 4).

Sex

For obvious reasons, there are not nearly as many studies on sexual behavior as there are on aggression. However, to date, there are now 20 studies using longitudinal data that potentially allow cause-and-effect conclusions to be drawn (Table 2),^{10,35-53} and virtually all of them show a significant effect of sexual content in the media on adolescents' sexual behavior.⁵⁴⁻⁵⁶ In addition, dozens of older studies document how the media can shape children's and adolescents' beliefs and attitudes about sex and sexuality.⁵⁴⁻⁵⁶ Nearly all of the studies deal with traditional media, sometimes in combination with newer media. In particular, the risk of early sexual intercourse seems to double with exposure to a lot of sexual content at a young age.^{55,56}

Drugs

Within the past decade, many new longitudinal correlational studies, both in the United States and Europe, have established that exposure to scenes of cigarette

Table 2
Recent Longitudinal Studies of the Effect Of Sexual Content on Sexual Behavior

| Study | N | Media Type | Duration | Findings |
|-----------------|------------------------|---|----------|---|
| Wingood (2003) | 480 14-18 y females | Rap videos | 1 y | Exposure to sexual rap videos predicted multiple partners |
| Collins (2004) | 1792 12-17 y | TV | 1 y | Sexual media exposure strongly predicted intercourse a year later |
| Martino (2005) | 1292 12-17 y | TV | 1 y | Exposure to popular teen shows with sexual content increased risk of intercourse 1 year later |
| Ashby (2006) | 4808 7th-12th grade | TV | 1 y | >2 h TV per day increased risk of intercourse 1.35× |
| Brown (2006) | 1107 12-14y | Sexual media, media diet (TV, movies, magazines, music) | 2 y | 2× increased risk of sexual intercourse for white teens with high sexual media diet |
| Martino (2006) | 1242 12-17 y | Music | 3 y | Degrading sexual content predicted earlier intercourse |
| Bersamin (2008) | 887 12-16 y | TV | 1 y | Parental co-viewing of TV protective against early intercourse and oral sex |
| Bleakley (2008) | 501 14-16 y | TV, movies, magazines, music, video games | 1 y | Positive and reciprocal relationship between media exposure and intercourse |

| | | | | |
|------------------|------------------------|---|-----|---|
| Chandra (2008) | 744 12-20 y | TV | 3 y | Sexual media exposure = strong predictor of teen pregnancy |
| L'Engle (2008) | 854 12-14 y | Sexual media diet, including Internet | 2 y | Peer and media exposure increased risk of early sex; stronger connection to parents and schools were protective |
| Peter (2008) | 962 13-20 y | Internet | 1 y | Exposure to sexual content on the Internet increased sexual preoccupation |
| Brown (2009) | 967 7th-8th graders | X-rated movies, magazines, Internet pornography | 2 y | Early exposure to X-rated media predicts earlier onset of sexual intercourse and oral sex |
| Delgado (2009) | 754 7-18 y | TV, movies | 5 y | Watching adult-targeted TV increases the risk of intercourse by 33% for every hour per day viewed at a young age |
| Hennessy (2009) | 506 14-18 y | TV, movies, magazines, music, video games | 2 y | Increased risk of intercourse for white teens and sexual media |
| Primack (2009) | 711 9th graders | Music | 1 y | Exposure to degrading sexual lyrics doubled the risk of intercourse |
| Bersamin (2010) | 824 14-18 y | TV | 1 y | Premium cable TV viewing associated with casual sex |
| Gottfried (2011) | 474 14-16 y | TV of varying genres | 1 y | No effect of sexual content overall on sexual intercourse, but exposure to TV sitcoms did predict earlier intercourse |
| Ybarra (2011) | 1159 10-15 y | X-rated media (movies, magazines, Internet pornography) | 3 y | Intentional exposure to violent X-rated material predicted a nearly 6× risk of sexually aggressive behavior |
| O'Hara (2012) | 1228 12-14 y | Movies with sexual content | 6y | Exposure to sexual content in movies, decreased age at first intercourse and likelihood of using condoms, and increased number of sex partners |
| Ybarra (2014) | 1058 14-21 y | TV, movies, music, Internet, video games | 2y | Exposure to sexual content in TV, movies, and music doubles the risk of intercourse; sexual content on TV and in movies has greater effect than does Internet content |

smoking in movies may be the leading cause of teenagers beginning to smoke.⁵⁷⁻⁶¹ Several studies have found the same connection between scenes of movie drinking and alcohol use in US and German teens,^{60,62,63} but the literature on the connection between alcohol advertising and onset of adolescent alcohol use is clear and convincing.⁶⁴⁻⁶⁶ Similarly, a meta-analysis of 51 separate studies found that exposure to tobacco marketing and advertising more than doubles the risk of a teenager beginning to smoke (Table 3).⁶⁷ In Germany, teenagers were found to be 40% more likely to start smoking for every 10 exposures to tobacco ads in a 2½-year study of 1300 schoolchildren aged 10 to 15 years.⁶⁸

Obesity

Some of the most exciting research currently being done is now linking screen time to the risk of obesity in young people. Again, some of the most impressive studies are long-term international studies. For example,

- Researchers in Dunedin, New Zealand, followed 1000 subjects from birth to 26 years of age and found that average weeknight TV viewing between the ages of 5 and 15 years was strongly predictive of adult body mass index (BMI), even when all other known factors for obesity were controlled for.¹
- A 30-year study in the United Kingdom found that a higher mean of daily hours of TV viewed on weekends predicted a higher BMI at age 30 years, and for each additional hour of weekend TV watched at age 5 years, the risk of adult obesity increased 7%.⁶⁹
- A study of 8000 Scottish children found that viewing more than 8 hours of TV per week at age 3 years was associated with an increased risk of obesity at age 7 years.³ Similarly, a study of 8000 Japanese children found that TV viewing at age 3 years resulted in a higher risk of overweight at age 6 years.²

What is not as clear is why. Is it exposure to ads for junk food and fast food on TV?⁷⁰⁻⁷³ Is it the displacement effect of 7 hours or more of media use per day?^{74,75} Is it the effect of screen time on changing eating behaviors?^{76,77} Or is it the effect

Table 3
How Good Is the Research Linking Tobacco Marketing to Onset of Adolescent Smoking?

| Research Question | No. of Studies | No. of Subjects Studied |
|---|---|-------------------------|
| Are nonsmoking children exposed to and more aware of tobacco promotion? YES. | 4 prospective 12 cross-sectional | }37,649 |
| Does exposure to promotions increase the risk of initiation? YES. | 12 prospective 14 cross-sectional 2 time-series | }349,306 |
| Does a dose-response relationship exist? YES. | 2 prospective 7 cross-sectional | }25,180 |

of screen time on sleep?⁷⁸ All have been implicated, although the displacement effect is the least convincing mechanism according to the research.^{79,80}

Other Health Influences

Several studies have found a possible causal link between exposure to unhealthy body imagery in mainstream media and eating disorders.^{81–84} Certainly, the effect of traditional media on young girls' body self-image can no longer be disputed,⁸⁴ although black girls seem to be more resistant.⁸⁵ Music choice has also been found to be a strong marker of later problem behavior in a 4-year longitudinal study testing the Music Marker Theory.⁸⁶ Traditional media have also been linked to the development of attentional problems,^{87,88} depression, and suicide,^{89,90} but none of these studies are as strong as the studies on media violence or obesity.

In addition, traditional media lead the way in terms of time spent with media: TV remains the most commonly used medium for children and adolescents. Television viewing is now at an all-time high in the United States (for which the best data have been accumulated).⁹¹ Black and Hispanic children spend 5 to 6 hours per day watching TV, compared with 3.5 hours for white youth.^{92,93} What has changed is that TV is not necessarily viewed on the television set in the living room or den anymore. Increasingly, teens are downloading shows to their computers, iPhones, iPads, and cell phones. About 60% of young people's TV viewing consists of live TV on a TV set, but the other 40% is now either time-shifted or watched online, on mobile devices, or from DVDs.⁹²

New Directions

As voluminous as the research on traditional media is, there remain significant gaps and a need for continuous monitoring of important content. The National Television Study was completed in the late 1990s, but no comprehensive content analysis of violence in American TV shows has been done since then. Likewise, Dale Kunkel's content analyses of sex on American TV are now at least 7 years old.⁹⁴ However, researchers have done a better job of keeping up with drug advertising trends and content analyses of Hollywood movies.^{28,30} Although the United States is the leading exporter of media in the world, there is no reason why content analyses could not be done on a country-to-country or even a regional basis.

The debate over media violence has primarily narrowed into a discussion surrounding violent video games (video games seem to fall on the border between old and new media, with "Pong" and "Pacman" being old, and "Call of Duty" and "Halo" being new). In 2011, the US Supreme Court overturned a California law that attempted to limit the sale of violent video games to children younger than 18 years (*Brown v. Entertainment Merchants Association et al*, No. 08-1448). The law was poorly written and could not pass constitutional muster, but the

Supreme Court's reasoning showed how little even some extremely intelligent justices understand media effects.³⁴ Communications research will never be able to resolve the issue of whether first-person shooter video games contribute to mass murders, but the research is increasingly clear that such games do increase aggressive beliefs, attitudes, and even short-term behaviors.⁹⁵ Still, more research would be useful in this area, particularly regarding any link between mental illness and violent video games.

The last comprehensive government report on children and media was in 1982, before the advent of the Internet, cell phones, and iPads.²⁰ A new report would be extremely useful in summarizing the current state-of-the-art knowledge and new directions for researchers. For example, most correlational and longitudinal studies are epidemiologic in nature; what are now needed are cogent reasons why certain racial and ethnic groups react differently to the same content (eg, black girls are relatively resistant to body self-image problems compared with white girls).⁸⁵ Finally, the dilemma over which aspect of traditional media contributes most to the current obesity epidemic needs to be resolved. And it would be useful to understand whether antiobesity campaigns will tip certain vulnerable teens over into eating disordered behaviors.⁹⁶

Given the power of the media and the sheer amount of time that young people spend with it, one might think that media literacy would now be a high priority. That is the case in many western countries but unfortunately not in the United States. A hundred years ago, to be literate meant a person could read and write. Now, literacy means being able to read, write, download, text, and tweet. Several studies now attest to the power of media literacy to mitigate against harmful effects of media.⁹⁷⁻¹⁰¹

NEW MEDIA

Despite all that is known about traditional media and their effects, new media have certainly arrived! In the United States American 18-year-olds now average nearly 40 hours per week online from their home computers, including 5.5 hours of streaming video. In a 2012 survey, 78% of 12- to 17-year-olds owned a cell phone, 23% had a tablet computer, and 95% used the Internet.¹⁰² More than three-quarters of all teens visit social networking sites, and 94% of teens have a Facebook profile or account (with an average of 300 friends).^{103,104} At the same time, 19% of teens say that they have posted updates, comments, photos, or videos that they later regretted posting.¹⁰⁴ Although teens actually talk less on their cell phones than any other age group except for seniors, one-third of teenagers send an average of more than 3000 texts per month,^{91,103} and the average teen sends 60 texts per day.¹⁰⁵

Possibly because new media are so new or because they have been adopted far quicker than traditional media were, a seemingly disproportionate amount of attention has been focused on them compared with traditional media. Coverage

about media violence, sex in the media, and alcohol and tobacco advertising seems to pale in comparison with stories on Internet use (and depression), sexting, cyberbullying, and Facebook and Twitter. Only the issues of obesity and food advertising have gained any traction recently, for obvious reasons.

Because new media are recent, the amount of research that attests to their behavioral effect is scant at best: a handful of studies on any of the health-related concerns mentioned compared with hundreds or even thousands of studies on traditional media. In addition, because new media are often being used to access traditional media, any behavioral effects found may be the result of the latter, not the former. Most studies on new media are either content analyses or studies of usage. Nevertheless, there are studies with results that are very concerning, and both cyberbullying and sexting may represent new and unique media threats to child and adolescent health.

Media Violence

A study of 1500 10- to 15-year-olds found that 38% had been exposed to violent scenes on the Internet.¹⁰⁶ Video games may represent a kind of transition between “old” and “new” media, and there is more research on the effect of video games than of other, newer media. Half of all video games contain violence, including more than 90% of games rated appropriate for children 10 years and older.¹⁰⁷ Violent video games are extremely popular with male adolescents and can mimic sexual assault (“RapeLay”), the Columbine massacre (“School Shooter”), or torture (“Soldier of Fortune”), or involve gruesome scenes like playing “fetch” with dogs chasing the heads of slaughtered victims (“Postal 2”). Despite the recent US Supreme Court ruling, there is ample evidence from both correlational and longitudinal studies that violent video games can affect both attitudes and behavior.^{95,108} Recent research suggests that playing violent video games that feature violence against women is positively associated with rape myth acceptance and negative attitudes toward women.⁹⁵

The most concerning aspect of new media violence, however, is cyberbullying. The magnitude of the problem is difficult to pinpoint. Reports indicate that 9% to 35% of young people say they have experienced electronic aggression.^{109–111} Most recently, an analysis of the 2011 Youth Risk Behavior Survey found that 16% of high school students reported being cyberbullied in the past year.¹¹² Recent research has found that cyberbullying may be a strong predictor of serious aggressive behavior in perpetrators.^{110,113} More importantly, the effect of cyberbullying may be far harsher than traditional bullying because (1) cyberbullying occurs in the home so that children and teens no longer feel safe there, (2) the bullying is anonymous, unlike in-person bullying at school¹¹⁴ and (3) the content can remain in cyberspace indefinitely. In fact, in a recent meta-analysis, cyberbullying was more strongly related to suicidal ideation than traditional bullying.¹¹⁵

Sex

The Internet has given millions of teenagers potential access to a plethora of pornography that formerly existed as mostly girlie magazines. Recent studies have found that more than half of teens have been exposed to “unwanted” sexual material online.⁵⁴ Of concern is the fact that many popular pornographic videos depict violence against women.^{116,117} A few of the studies listed in Table 1, particularly the work of Valkenburg and colleagues in Amsterdam,⁵⁰ have implicated Internet pornography in earlier onset of sexual intercourse among teens. However, pornography has been available for decades, and the existing research on adults seems to indicate that nonviolent pornography may not have the same behavioral effects as violent pornography.⁵⁴ Only 5 studies have specifically examined children or teenagers

1. A longitudinal study of more than 1500 10- to 15-year-olds found a nearly 6-fold increase in the odds of self-reported sexually aggressive behavior with exposure to violent X-rated material over time, whereas exposure to nonviolent X-rated material was not significantly related.⁵³
2. Another longitudinal study found that exposure to X-rated material in a variety of media platforms (magazines, movies, and Internet) increased the risk of early sexual intercourse and oral sex.⁴³
3. A third study found an increase in “sexual preoccupation” with exposure to Internet pornography.⁴⁰
4. A cross-sectional study of 433 adolescents in New York City found that visiting sexually explicit Web sites was linked to a greater likelihood of having multiple lifetime sexual partners and greater sexual permissiveness.¹¹⁸
5. In the Growing Up With Media longitudinal study of 1058 young people aged 14 to 21 years, 9% reported some type of sexual violence perpetration, and perpetrators had greater exposure to violent X-rated content.¹¹⁹

What is *brand new* is sexting—the transmitting of sexual images via cell phone. Its prevalence varies widely, depending on the timeframe studied, the exact definition used, and the population studied (Table 4).^{120–136} The best estimate with the most careful research design seems to come from the recently published Youth Internet Safety Survey 3, which puts the figure at 1.3%.¹²⁶ But even if only 1% to 2% of teenagers are engaging in sexting, that would represent tens of millions of teens worldwide. To date, the exact behavioral effect of sexting has not been well studied, other than the possible legal repercussions.¹³⁷ Only 3 studies have linked sexting with an actual increase in sexual behavior.^{129–131}

Research on social networking and sexual content is still in the early stages as well. A study of 270 profiles of 18-year-olds on MySpace found that 24% referenced sexual behaviors,¹³⁸ but of course MySpace has now been eclipsed by Facebook. Many teenagers now feel that Facebook will soon be eclipsed by Instagram,¹¹⁹

Snapchat, or other social networking sites.^{104,139-141} Snapchat may change the entire incidence and nature of sexting because photos automatically disappear 10 seconds after being opened (Figure 5). Adolescents who display explicit sexual references on Facebook have online friends who do likewise,¹⁴² perhaps the “super-peer” aspect of media influence.⁶ Among college freshman, displaying sexual references is positively correlated with intention to begin having sexual intercourse.¹⁴³ Similarly, adolescents who meet their sexual partners online are more likely to report a higher number of sex partners and a lower age at first intercourse, but not having more sexually transmitted infections (STIs).¹⁴⁴ As might be expected, young people who view sexually suggestive Facebook photos estimate that more of their peers are having unprotected sex and sex with strangers.¹⁴⁵

Drugs

Of all of the health aspects of old and new media, substance use may be the least likely to be influenced by new media compared with traditional media. Research consists mostly of content analyses. For example, 40% of more than 1000 teens surveyed nationwide reported seeing pictures of kids getting drunk, passing out, or using drugs on social networking sites in a recent study.¹⁴⁶ In another analysis of 400 randomly selected social profiles, 56% contained references to alcohol.¹⁴⁷ Until recently, teenagers could actually purchase cigarettes online in the United States, and they still can buy alcohol online.¹⁴⁸ Only 3 studies to date have examined the behavioral effect of new media on substance use. A correlational study from Columbia University found that compared with teens who spend no time

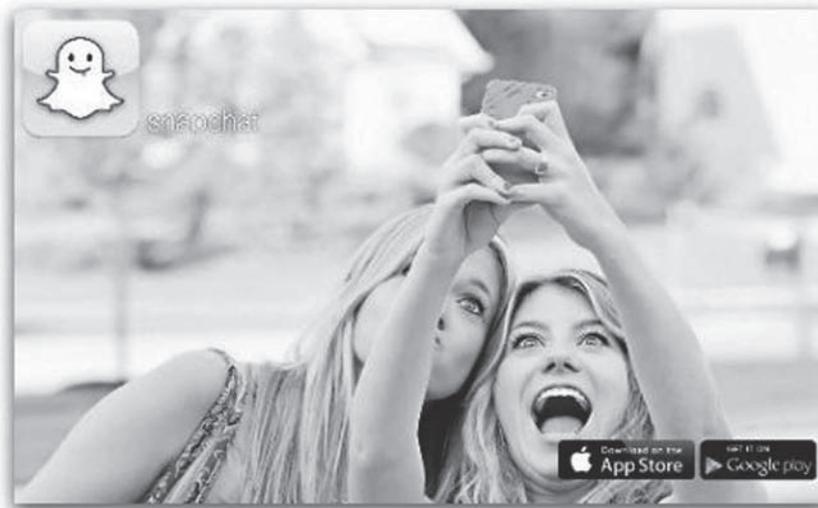


Fig 5. Snapchat.

Table 4
How Prevalent Is “Sexting”?

| Study | Sample | Prevalence | Definition |
|--|---|------------|--|
| Sex Tech Survey (2008) | 653 teens 13-19y 627 20-26 y | 20% | Sent or posted online nude or seminude picture or videos |
| Harris/Teen Online (2009) | 655 teens 13-18y | 19% | Received sexually suggestive text messages or e-mails with nude or nearly nude photos |
| AP-MTV Survey (2009) | 1247 14-24y | 9% | Sent messages or e-mails |
| South West Grid Survey (2009) | 535 teens 13-18y | 45% | Sending or receiving nude photos of themselves or sexual partners via cell phone |
| Pew Internet Project (2009) | 800 teens 12-17y | 40% | Students who knew friends who had shared “intimate” pictures or videos |
| Texas High Schools | 948 14-19 y | 4% | Sent a sexually suggestive nude or seminude picture or video via cell phone |
| Youth Internet Safety Survey 3 (YISS) (2012) | 1560 10-17-year-olds | 9% | Received picture or video |
| Los Angeles (2012) High School (HS) Survey | 1839 HS students | 28% | Sent a sexually explicit picture (2012) (increased risk of early sex + risky sexual behaviors) |
| Young Adults (2013) | 3447 18-24 y | 31% | Asked someone to send a sext |
| Southwestern HS Survey (2013) | 602 HS students in 1 private high school | 57% | Was asked to send a sext |
| | | 7.1% | Creating, appearing in, or receiving pictures showing breasts, genitals, or bottoms during the past year: 1.3% appeared or created image; 5.9% received an image |
| | | 15% | Sent a sext |
| | | 54% | Knew someone who had sexted (sexters were 7× more likely to be sexually active) |
| | | 57% | Nonsexters |
| | | 28% | Sent and received sexts |
| | | 13% | Received a sext |
| | | 2% | Sent a sext |
| | | 17%-18% | Sent a sexually explicit picture |
| | | 31%-50% | Received a sexually explicit picture |

| | | | |
|--|-------------------|---------------------------------|--|
| Urban Texas HS (2013) | 1034 10th graders | 21% 24% 31% 18% 44% | Sent a nude or seminude picture Sent a sexually suggestive message Received a nude or semi-nude picture Received a sexually suggestive message Had a nude or seminude picture or video originally meant to be private shared with them Sent or received a sexually explicit or suggestive photo 32% of sexters reported having sex with a new partner for the first time after sexting with them Reported sexting |
| Young Adults (2013) | 763 18–25 y | 87% | Reported sexting in past 6 months 17% messages, 5% pictures |
| YMISM (2013) (Young Men Who Have Sex With Men) | 1502 18–24 y | 20% 5% | Received a sext Sent a sext Students texting 100×/day were more likely to send or receive a sext; students who sent or received a sext were more likely to be sexually active |
| Project TRAC (2014) (Talking about Risk and Adolescent Choices) | 410 7th graders | 6% 9% 7% | Sent or showed sexual pictures of themselves either via text or in person during the past year |
| Los Angeles Middle School Students (2014) | 1173 10–15 y | 33% 54% | Females reporting partner asked for nude or seminude pictures Reported sexting in high school (28% photographic) |
| Flemish Teens (2014) | 1943 11–20 y | | |
| Ybarra & Mitchell (2014) | 3715 13–18 y | | |
| California (2014) | 1008 14–19y | | |
| NE University undergraduates (2014) | 175 18–22y | | |

on social networking sites, those who do were 5 times likelier to use tobacco, 3 times likelier to use alcohol, and twice as likely to use marijuana.¹⁴⁶ A 6-month longitudinal study of 1563 10th-grade students in 5 Southern California high schools found that exposure to friends' online pictures of partying or drinking was significantly associated with both smoking and alcohol use.¹⁴⁹ An even larger study of 1787 California students in the 6th to 8th grades studied over 2 years examined all media use (Internet videos, social networking sites, movies, television, magazine ads, songs, and video games) and found that greater alcohol-related media exposure in 7th grade was significantly associated with a higher probability of alcohol use in the 8th grade.¹⁵⁰

Obesity

Since obesity has clearly been associated with sedentary behavior, new media—especially Internet use and video game playing—may be contributing significantly. The effect may also be filtering down to young children with the advent of advergames. A study of the top 5 brands of food and beverages found that all had Internet Web sites, 63% had associated advergames, 50% used cartoon characters, and 58% had a designated children's area.¹⁵¹ Fewer than 3% actually educated children about healthy nutrition.¹⁵² Meanwhile, food companies are investing more money on online, mobile, and viral marketing to children and teens. In 2009, food companies spent \$1.79 billion on marketing to youth aged 2 to 17 years. Spending on marketing in new media increased 50% from 2006 to 2009.⁷² Despite the fact that the Children's Food and Beverage Advertising Initiative pledged to advertise only healthy dietary choices to children, between July 2009 and June 2010 there were 3.4 billion food advertisements displayed on kids' Web sites, and two-thirds were for breakfast cereals or fast food.¹⁵³ Currently nearly 150 Web sites use advergames to market foods with low nutritional value to young children.¹⁵⁴ On the positive side, popular video games like *Dance Revolution* are increasingly being used to encourage exercise at home and to treat or prevent obesity.¹⁵⁵⁻¹⁵⁸

Other Health Influences

Pro-anorexia nervosa Web sites have proliferated and apparently are popular with eating disordered teens; more than 100 such site now exist.¹⁵⁹ Use of these Web sites may be predictive of having an eating disorder according to 2 recent studies,^{160,161} but there are no cause-and-effect data to date. One study does suggest a synergism between portrayals of thin women on TV, more time spent on social networking sites, and the development of eating disorders.¹⁶² Another study found that cyberbullying of females is often directed at their appearance and results in poorer body self-image.¹⁶³ Similarly, there are no cause-and-effect studies on the influence of new media on attentional disorders.

In a large and unique study of 12,395 adolescents in 11 European countries, researchers recently found a correlation between media use (Internet, TV, and

video games) and a variety of psychological problems, including suicidal thoughts, anxiety, and depression.¹⁶⁴

Cyberbullying has resulted in a few very well-publicized and tragic suicides in the media.^{165,166} While the possibility of Internet and Facebook depression and addiction has often been raised and has been studied several times,¹⁶⁷⁻¹⁷⁴ it remains controversial compared with the far more robust literature on the effect of traditional media on depression and suicide. Heavy use of the Internet or social networking sites may be more of a symptom of mental health problems than a cause.¹³ On the other hand, college freshmen who display depression references on their Facebook page do want friends to offer support, preferably in person.¹⁷⁵ One preliminary longitudinal study in Korea of 195 adolescents and their smartphones found a connection between “addiction” and problematic behavior.¹⁶⁷ Far more research is needed, with attention to using exact definitions of addiction, depression (eg, Beck’s Depression Inventory), and more longitudinal timeframes.

CONCLUSIONS

The most significant problem to date seems to be that new media allow unbridled and unsupervised access to old media, for which the behavioral consequences are now well known. Could new media be more efficacious in influencing attitudes and beliefs than traditional media? That seems unlikely. Traditional media tell stories, and societies have always placed a very high value on storytelling.

However, there *are* certain aspects of new media that are unique and may represent significant threats to child and adolescent health, especially cyberbullying, access to very graphic pornography, and sexting. There also is no question that media, both traditional^{176,177} and new,^{95,178-181} can have very positive effects. By the end of 2013, at least 98 studies of the effects of social media on health communication and new media interventions have been performed, and many have shown positive effects.¹⁸¹⁻¹⁸⁴ They include the following:

- Dozens of new studies are documenting the potential effect of high-impact video games on physical fitness and body weight.^{158,185-188} New video games have also been used to augment cancer chemotherapy in children¹⁸⁹ and to try to dissuade teens from driving drunk.¹⁹⁰ A video-based method is now being used to improve social skills in teens with autism.¹⁹¹ There is increasing interest in building video games that stimulate prosocial behavior and improve attention and cognitive control.¹⁹² In addition, music videos have been used to improve resilience outcomes in adolescents undergoing stem cell transplants.¹⁹³
- Texting is being used to remind teens of clinic appointments and to send them educational messages about taking care of their asthma,¹⁹⁴ preventing

STIs,^{195,196} and using condoms.¹⁹⁷ In New York City, texting NOTNOW to 877877 connects to a teenage pregnancy “adventure game.”¹⁹⁸ Teens in New Mexico can text their sex questions to BrdsNBz and get an answer within 24 hours from a health expert.¹⁹⁹ Text messages could be used in an emergency department for violence prevention and depression screening.²⁰⁰

- Social networking sites have been used successfully to increase condom use.²⁰¹ A college e-mail program to alert students about the risk of disclosing sex/substance behaviors on their public profiles has been successful.¹³⁸
- Web-based programs have been shown to be effective in treating adolescent depression,²⁰² increasing the rate of influenza vaccination,²⁰³ treating chronic fatigue syndrome,²⁰⁴ increasing tobacco cessation efforts,²⁰⁵ improving adherence and social coping skills in preteens with type 1 diabetes,²⁰⁶ treating obesity and overweight,²⁰⁷ improving eating behaviors in teenagers,²⁰⁸ increasing condom use,^{209,210} decreasing STIs,²⁰⁹ and even treating common mental disorders.²¹¹ Two Web-based interventions have been successful in delaying initiation of sexual intercourse²¹² and oral or anal sex.²¹³ Teens in 7 California counties can have a pack of 10 condoms delivered confidentially by requesting them online, thanks to the Condom Access Project.²¹⁴
- As part of its “Staying Alive” campaign, Music Television (MTV) has developed an iPhone app that searches via GPS for the nearest place that sells condoms.²¹⁵ The University of Oregon’s sex ed app is available for free through the Apple iTunes store.²¹⁶

New media may have a substantially greater effect in schools than traditional media, and the main behavioral effect of new media may lie in changing the nature of learning and communication rather than affecting health-related issues.²¹⁷

Clearly, more research is urgently needed on new media before substantial and accurate conclusions can be drawn.^{218–220} Private foundations and governments must now recognize the urgency of funding such research. With the availability of media 24/7 to most children and teenagers, the need to teach young people media literacy is greater than ever.

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