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ADOLESCENTS AND ELECTRONIC MEDIA: GROWING UP PLUGGED IN

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OVERVIEW

Over the last decade the daily experience of adolescents has been transformed by developments in electronic media, including the computer, the Internet, and cell phones. Relative rarities only a generation ago, they are the daily tools of communication, information, and amusement for a majority of adolescents. Beyond access, content and capabilities have exploded. Even television, long a ubiquitous presence in American households, has seen content change and has grown dramatically.

Parents, policymakers, and researchers acknowledge the power of this transformation, and have become increasingly concerned both about the potential hazards they present to the health and well-being of young users, and that unequal access to their perceived benefits may limit long-term prospects (the so-called “digital divide”).

In this brief, we provide a concise overview of research relating electronic media to the health, social development, and educational outcomes of adolescents. We also present data describing trends and inequalities in access to electronic media as well as the time adolescents spend and the activities they engage in through these media. We conclude with a brief discussion of the implications for policy, research, and data collection.

*Note: Portions of this brief draw from a recent volume of the journal *The Future of Children* called *Children and the Electronic Media*. Volume 18, Spring 2008. Jeanne Brooks-Gunn and Elisabeth Hirschhorn Donahue (Eds). www.futureofchildren.org*

THE EFFECTS OF ELECTRONIC MEDIA ON ADOLESCENT WELL-BEING

Health and Safety

Health and safety concerns potentially related to the use of electronic media by children and adolescents are wide-ranging and have inspired a growing body of research. Concerns include both behavior-related maladies (obesity, violence, drug use) and threats to physical health (injury, cancer). In addition, some researchers have examined health benefits related to electronic media use. Considerable evidence indicates that certain media influence violence and substance use. By contrast, research linking media to obesity and sexual behavior is less conclusive.

Violence.¹ There is a strong body of research linking exposure to violent television program content in childhood to violent behavior both as children and later as young adults.² An analysis of 217 studies found a medium effect of television violence on aggressive behavior.³ To put that in perspective, the effect size is only a little bit smaller than the effect of smoking on lung cancer.⁴ The research linking playing violent video games to physical aggression is less extensive, but analyses of available research find effect sizes that are only slightly smaller than those found for violent television.⁵

Alcohol and Tobacco Consumption. Several strong research studies have found that adolescents who are exposed to smoking in movies are more likely to take up smoking, even after controlling for other risk factors.⁶ Similar findings relate exposure to alcohol consumption in movies or television and later alcohol use. Little research has been done to date relating exposure through video games or the Internet to adolescent smoking and drinking behaviors.⁷

Obesity. There is concern that excessive media use promotes obesity by reducing time devoted to physical exercise and by increasing consumption of high calorie non-nutritious foods. Several studies have found a relationship between excessive television viewing and obesity among adolescents. When controls were introduced for other known risk factors in one of the analyses, however, the relationship stayed statistically significant for girls only. More rigorous evaluations using experimental/control group methods have produced mixed results. Analyses relating video game playing to obesity have also found some relationship, but only for some groups. In sum, the evidence relating media use to obesity shows some evidence of a relationship, but is not conclusive.⁸

Sexual Activity. Surprisingly, and despite long-standing concerns over the influence of sexual media content on the behavior of adolescents, there is very little relevant research in this area according to a recent review by Escobar-Chavez and Anderson (2008).⁹ Several analyses have found that exposure to sexual content in television and videos was related to more positive attitudes towards pre-marital sex, and to being sexually active, but it was not clear if there was a causal connection.

Injury and Illness. The use of particular electronic media have been linked to several forms of injury and illness. These include:

- *Cancer:* A substantial amount of research has investigated whether the electromagnetic radiation emanating from cell phones causes brain and other forms of cancer. However, the U.S. Centers for Disease Control and Prevention, after reviewing available research, has concluded that there is no evidence of a significant link.¹⁰ Even so, several major studies are ongoing, looking for possible long-term effects. The head of the Pittsburgh Cancer Institute has recommended that people, and particularly children, limit use of cell phones as a precautionary measure while this research proceeds.¹¹
- *Attention Deficit:* A recent review of the literature indicates that evidence linking electronic media use to Attention Deficit Hyperactivity Disorder (ADHD) is inconsistent.¹² A number of studies find that children with ADHD watch more television than other children, though it is unclear whether the ADHD is a cause or consequence of more television viewing. One study has also linked excessive video game playing to attention problems, but again the direction of influence is unclear.
- *Upper Extremity Musculoskeletal Injuries:* A recent comprehensive literature review of research relating computer use to injury found consistent evidence that computer use was associated with greater risk of hand, wrist, forearm, and elbow injuries, related to both keyboard and mouse use. Risk increased with number of hours of use, and was especially pronounced at levels over 20 hours per week.¹³

Positive Health Influences. While most research has focused on the link to negative health outcomes, some research has examined the potential health *benefits* related to electronic media use. A recent survey reveals that 28 percent of adolescents ages 12-17 who use the Internet use it to access information on health, dieting, and physical exercise; however, the impact of that information on their health is unknown.¹⁴

In addition, there is some evidence that social marketing campaigns using electronic media have been successful in positively affecting health behaviors of adolescents. For example, a recent rigorous, quasi-experimental evaluation found that the American Legacy Foundation's *truth* mass media campaign was successful in reducing the number of youth who took up smoking, accounting for 22 percent of the total decline in teen smoking in the U.S. between 1999 and 2002.¹⁵ Evaluations of state-funded anti-smoking campaigns targeting adolescents in Massachusetts and Florida also found some evidence that such campaigns reduced teen smoking.¹⁶

Social Development

Increased access to cell phones and the Internet has vastly expanded options available to adolescents for interacting with their peers and, in the case of the Internet, with strangers. Options include texting, instant messaging, blogs, online gaming, email and, increasingly, social networking sites like Facebook and MySpace.

Subrahmanyam and Greenfield (2008)¹⁷ conclude that, where relationships with others are concerned, adolescents use the Internet primarily to strengthen existing "offline" relationships with friends and romantic interests. They also indicate that online interaction with strangers (strangers at least in terms of their offline lives) can help relieve social anxiety and social isolation for some.

There are also negative social outcomes associated with the growth in the use of electronic media. These include:

Bullying. Adolescents are exposed to electronic bullying through instant messaging, cell-based text messaging, and social networking sites. Bullying behaviors can include sending threatening messages, spreading vicious rumors, personal attacks, and posting embarrassing pictures. A 2005 telephone survey of a U.S. nationally representative sample of 10- to 17-year-olds who had used the Internet at least once per month in the past six months, found that nine percent reported having been the victim of online harassment at least once in the previous year.¹⁸ Using the more strict criteria common to school-based bullying research, which requires both repeated harassment and an imbalance of power between those involved, the percentage was much lower, with slightly more than half of those affected experiencing more than one incident in the previous year.¹⁹ Substantial research has demonstrated the negative effects of bullying in general on child and youth well-being, though little research specifically on the antecedents and effects of cyberbullying.²⁰

Sexual Predation. Online sexual solicitation of children and adolescents represents a serious threat to the safety and well-being of those who are approached. A recent study indicates that reports of unwanted online solicitation have declined in recent years, perhaps due to factors ranging from better privacy controls, more education, and better law enforcement.²¹ A 2005 survey of online respondents ages 10 to 17 indicated that 13 percent had experienced unwanted online solicitation(s), and four percent had experienced *aggressive* sexual solicitation online, where the solicitor attempted to make offline contact.²²

Education

Research indicates that, while access to computers in the home is associated with better education outcomes, the effects of television use on education outcomes only appear once program content is taken into account.

Television and Academic Performance. Children who watch excessive amounts of television score lower on standardized academic assessments than those who watch less television.²³ However, when researchers control for factors like IQ and socioeconomic status, this relationship generally disappears. Research that takes into account program content generally finds that educational programming is associated with positive academic outcomes while entertainment programs are negatively associated, though most of that research focuses on young children rather than adolescents.²⁴

Computers, the Internet and Academic Performance/Skills. While research relating home computer and Internet access to academic performance shows a clear, positive statistical relationship, few studies control adequately for background factors that may be driving the relationship.²⁵ However, home computer access has been associated in one study with higher reading test scores net of income and other background influences.²⁶ Home Internet use has also been shown to be positively related to reading scores and overall GPA among low-income children.²⁷

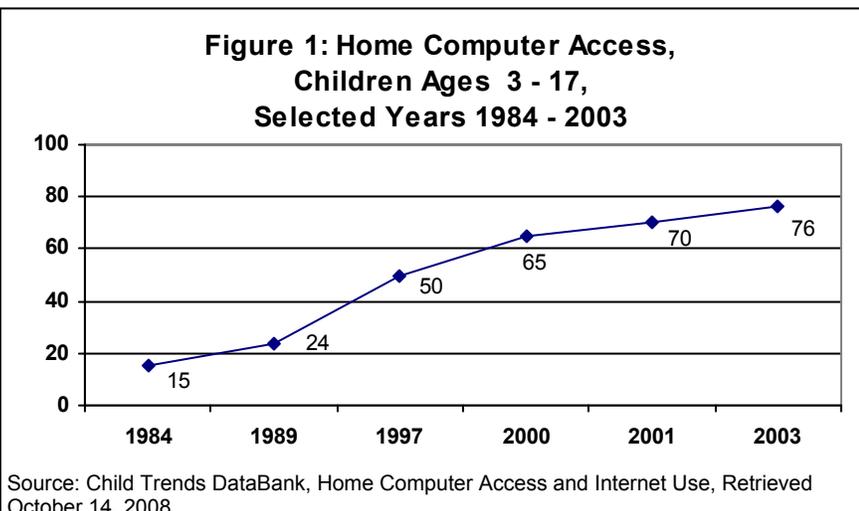
Computer literacy is increasingly acknowledged as a valuable and necessary workforce skill. Those entering the workforce with inferior or no skills in basic computer skills (word processing, spreadsheets, creating presentations) and Internet skills (research, communications) are at a distinct disadvantage in many cases. Some research indicates that such skills are generally better developed among youth from more advantaged backgrounds, even among those who have ready access to computers and the Internet.²⁸ Closing the digital divide may, therefore, require strategies that go beyond equalizing access to the media itself.

ADOLESCENTS' ACCESS TO AND USE OF ELECTRONIC MEDIA

Access

Home Computer Access. Beginning in the early 1980s, personal computers have gone from an expensive home office tool to a basic home appliance for most families. The percentage of children and youth ages 3 to 17 who have a computer in the home rose from 15 percent in 1984 to 76 percent in 2003 (79 percent for teens ages 15 to 17). (See Figure 1) More recent estimates for 8th grade public school students indicate that in 2007, 90 percent had a computer in the home.²⁹ Another 2007 national survey indicates that nearly six in ten (59 percent) adolescents ages 12-17 have their own computer at home.³⁰

The digital divide in home computer access narrowed between 2000 and 2007, though it remains substantial.

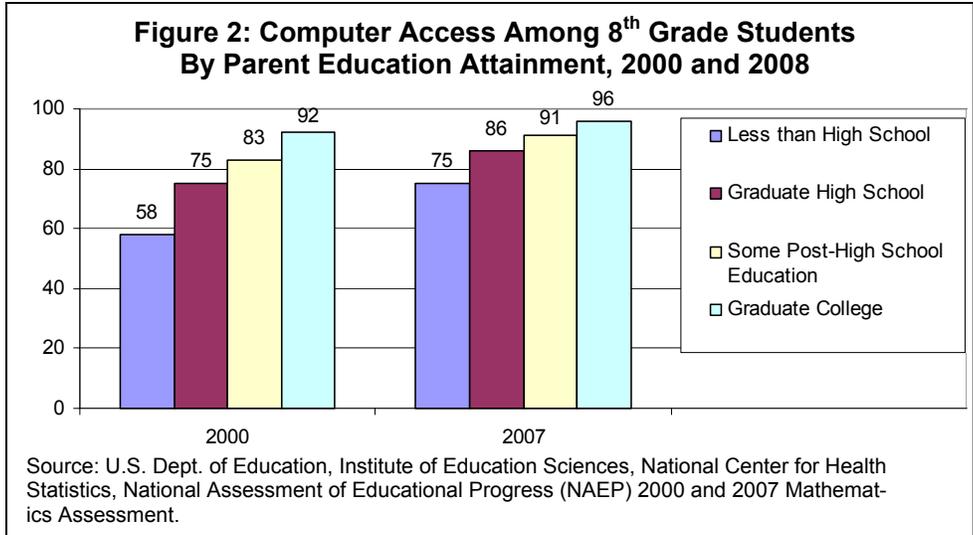


For example, among 4th grade students, the gap between those with parents who had graduated college and those with parents who did not finish high school narrowed from 34 percentage points to 21 percentage points. (See Figure 2)

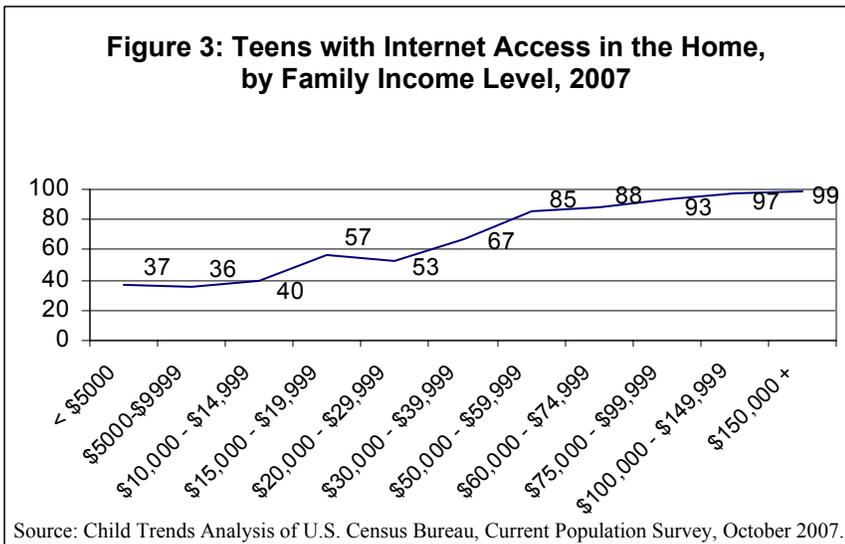
School Computer Access. Computer access at school has become nearly universal among 4th grade students (95%), and for the vast majority of 8th graders (83%).³¹ Differences in basic access are small to nonexistent across

race groups, parent education level, and school lunch program eligibility.³²

Internet Access. In 2007, 75 percent of teens ages 12 to 17 had Internet access in the home. Of those with access, more than four in five (83 percent) had access through a fast connection such as DSL, cable, or satellite (i.e., something other than dial-up).

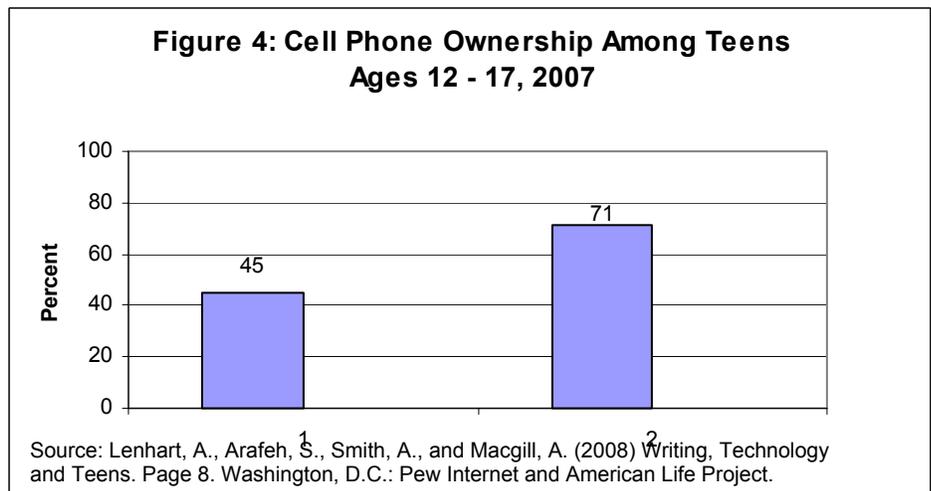


Internet access among children and adolescents ages 3 to 17 has continued to increase in recent years, from 66 percent to 71 percent between 2003³³ and 2007.³⁴



Internet access is still an issue for those in low-income families. Less than 40 percent of teens living in families with total incomes less than \$15,000 per year had Internet access in the home, compared to over 80 percent among those with family incomes exceeding \$50,000, and over 95 percent among those with incomes over \$100,000.³⁵ (See Figure 3)

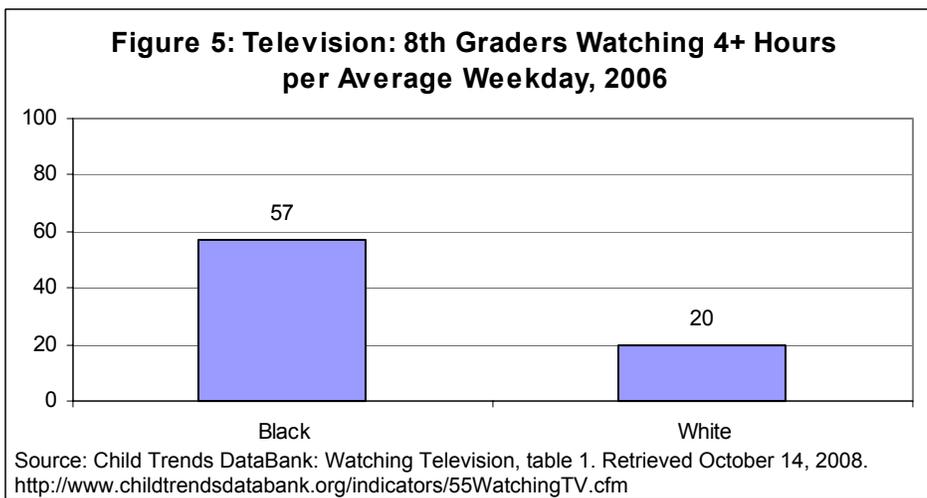
Cell Phones. Adolescent access to cell phones has grown rapidly in the last several years. Between 2004 and 2007, the percentage of adolescents ages 12 to 17 who have cell phones rose from 45 percent to 71 percent.³⁶ (See Figure 4) There are no significant differences in cell phone ownership across white, black, and Hispanic teens, and only modest differences by income level.³⁷



Time and Activities Using Electronic Media

Television. The number of hours spent watching television has decreased among teens since the early 1990s. For example, among eighth grade students, the percentage who watched four or more hours of television on the average weekday declined from 36 percent to 29 percent between 1991 and 2006. During that same period, the percentage watching an hour or less per weekday increased from 20 percent to 29 percent.³⁸

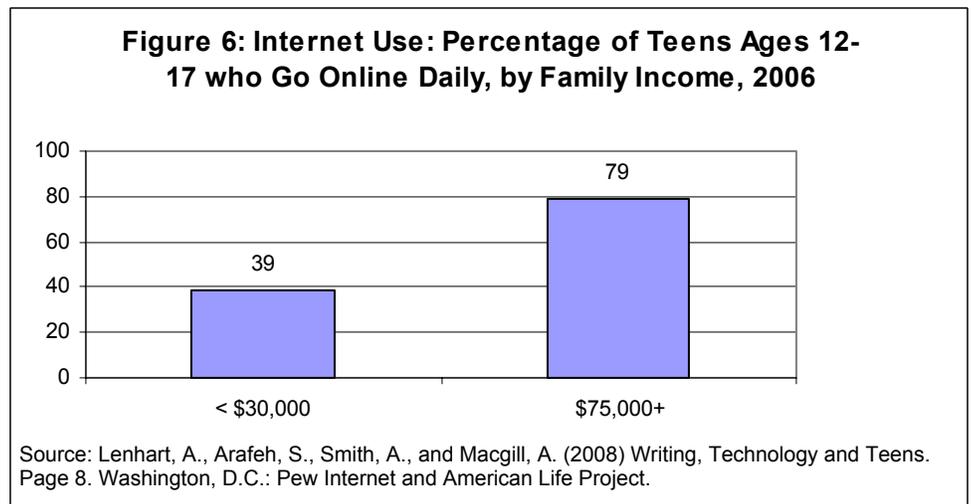
Black teens are much more likely than white teens to watch excessive amounts of television. In 2006, 57 percent of black eighth grade students reported watching four or more hours of television on an average weekday compared with 20 percent of white students.³⁹ (See Figure 5)



Computers. In 2003, among all adolescents ages 12 to 17, just over one-half (51 percent) used computers for something other than homework for at least an hour a day, and 10 percent were using them three or more hours per day.⁴⁰ In 2000, the most recent year for which such estimates are available, about half (47 percent) of eighth grade students used the home computer for school work at least once per week, and about one in five (21

percent) used one almost every day for that purpose.⁴¹

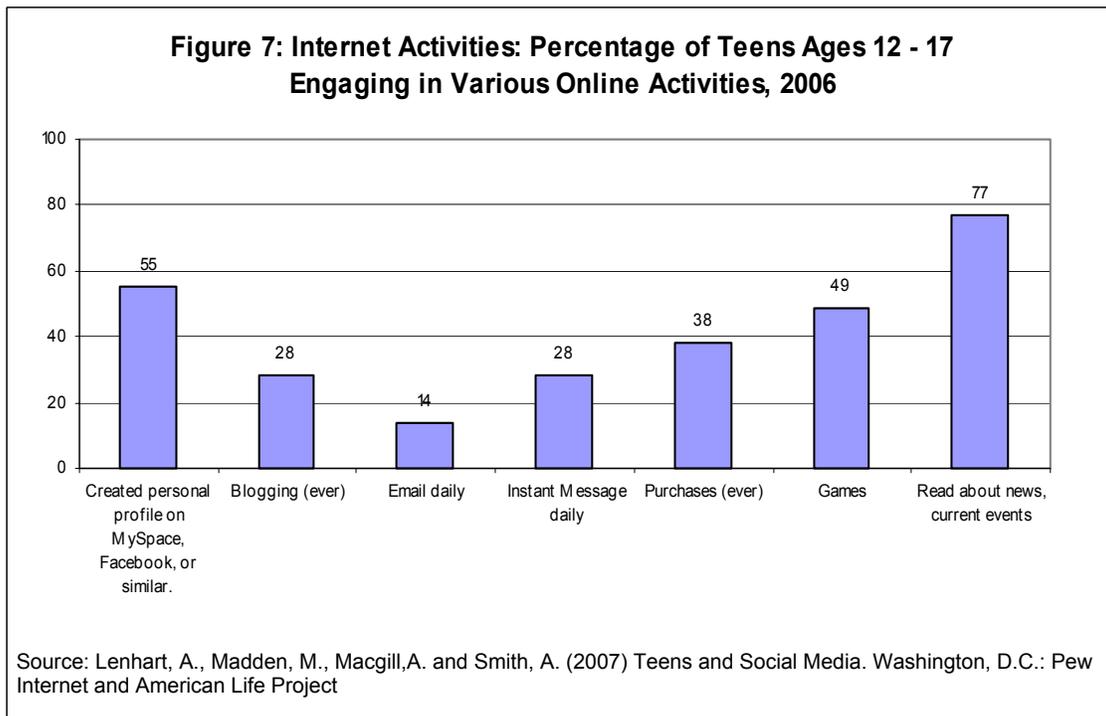
The Internet. Among adolescents ages 12 to 17 who use the Internet, the percentage who use it on a daily basis increased from 42 percent in 2000 to 61 percent in 2006.⁴² Daily use varied substantially across income groups in 2006, ranging from 39 percent for online teens with family incomes of less than \$30,000 per year to 79 percent for those with annual incomes of \$75,000 or more.⁴³ (See Figure 6)



The Internet is a rich resource supporting a wide variety of activities by teens ranging from communications to information gathering, game playing and other forms of entertainment. A recent national survey of teens ages 12 to 17 by the Pew Internet and Ameri-

can Life Project identified the following activities: (See Figure 7)

- *Social Networking Sites*: Over half (55 percent) of those who go online have created a personal profile on MySpace, Facebook, or similar social networking sites. One in five (21 percent) sends messages to their friends through these sites on a daily basis.⁴⁴
- *Blogging*. This is an increasingly popular teen activity, with the percent of online teens who have created a blog or online journal increasing from 19 percent in 2004 to 28 percent in 2006. Girls are more likely to blog; 35 percent compared to 20 percent for boys.⁴⁵
- *Email and Instant Messaging*. Fourteen percent of all teens report using email to communicate with friends on a daily basis, compared with 28 percent who use instant messaging (IM).
- *Purchases*. Over a third of online teens (38 percent) report having used the Internet to make purchases.⁴⁶
- *Information Gathering*. Over a quarter of all online teens report having used the Internet to gather information on health, dieting, or physical exercise. Over half reported using it to gather information on colleges, and over three-quarters reported using it to gather information on news or current events.⁴⁷
- *Games*. Nearly half (49 percent) of all online teens report that they play games on the Internet.



Cell Phones. In 2006, about a third (35 percent) of all teens ages 12 to 17 spoke with their friends using their cell phone on a daily basis. Among teens who have a cell phone, that increases to over one half (55 percent).⁴⁸ Over a quarter of all teens use cell phones on a daily basis to send text messages to their friends.⁴⁹

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The National Adolescent Health Information Center (NAHIC) was established with funding from the Maternal and Child Health Bureau in 1993 to serve as a national resource for adolescent health research and information and to assure the integration, synthesis, coordination and dissemination of adolescent health-related information. For more information, visit <http://nahic.ucsf.edu/>

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