



Original article

Trends in Youth Reports of Sexual Solicitations, Harassment and Unwanted Exposure to Pornography on the Internet

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Abstract

Purpose: This study was designed to track trends in reports of unwanted sexual solicitations, harassment, and unwanted exposure to pornography via the Internet between 2000 and 2005 across various demographic sub-groups of youth.

Methods: Cross-sectional data was collected in two equivalent national telephone surveys of 1500 Internet users, ages 10 through 17 years. Bivariate and multivariate analyses were used to determine whether the percentage of youth reporting specific unwanted Internet experiences had changed in 2005, as compared with 2000.

Results: The overall incidence and 5-year trends of reporting unwanted sexual solicitations, harassment, and unwanted exposure to pornography varied by age, gender, race, and household income. In particular, the decline in the percentage of youth reporting sexual solicitations was apparent for both boys and girls, all age groups, but not among minority youth and those living in less affluent households. The increase in harassment among particular sub-groups of youth was largely explained by increases in amount of Internet use over the past five years. The increase in unwanted exposure to pornography was particularly apparent among 10- to 12-year-olds, 16- to 17-year-olds, boys, and White, non-Hispanic youth.

Conclusions: The decline in the percentage of youth reporting sexual solicitations may be the effect of education and law enforcement activity on this issue in the intervening years. Targeted prevention efforts for minority youth and those living in less affluent households need to be developed. The rise in unwanted pornography exposure may reflect technological changes such as digital photography, faster Internet connections and computer storage capacities, as well as the more aggressive marketing strategies of pornography merchants. © 2007 Society for Adolescent Medicine. All rights reserved.

Keywords: Trends; Internet; Sexual solicitation; Harassment; Pornography; Youth

The Internet has rapidly become an increasingly central element in the lives of children and adolescents. It has affected how youth conduct their social lives, pursue their educations and entertain themselves. The benefits of Internet technology have been widely touted, but there has also been concern about potential harms associated with Internet use. Have the potential harms to youth on the Internet been

increasing? On the one hand, one might expect that as youth use the Internet environment more frequently and intensively, exposure to perils in that environment would inexorably rise. The increasing media attention to Internet dangers certainly conveys the impression of a growing menace [1–3]. On the other hand, the dangers of new technologies are sometimes exaggerated. It may be that as youth grow more familiar and educated about the Internet and its problems, they become less vulnerable. The recent decade has also been one that has seen rather dramatic declines in a variety of youth risk activities and experiences, for example, teen pregnancy and sexual intercourse [4,5], violent offending and victimization [6–8], certain types of drug usage and

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smoking [5], and sexual and physical abuse [9,10]. Some of this moderation may be the effect of greater education and awareness. Perhaps Internet dangers have been moderating as well. This study looks at three particular Internet perils: unwanted sexual solicitations, harassment and unwanted exposure to online pornography and documents trends between 2000 and 2005 across different demographic sub-groups of youth.

Youth Internet use

Since Internet usage is relatively new and growing, some groups of youth have had more experience and exposure to this medium, its dangers and to awareness about its intricacies. Such differential experience may have an impact on vulnerability. Specifically, differences in usage and experience have been documented based on youth age [11,12], race and ethnicity, annual household income, and gender [11,13]. As children grow older, their exposure to the Internet increases [11,12]. Internet use is higher among White youth than among Black youth and Hispanic youth [13]. Youth living in households with higher family incomes are more likely to use the Internet than those in lower income households [11,13]. Similar numbers of girls and boys use the Internet, however, older teenage girls (ages 15–17 years) use the Internet for communication and information-seeking much more than younger girls and teenage boys of any age [11].

Changes in Internet use and unwanted Internet experiences

Although the Internet provides a wealth of information and opportunities to youth, as with any other aspect of their lives, there are potential risks and dangers. National studies have shown that youth can meet dangerous people online, be exposed to a large variety of sexual and violent material, and fall victim to harassment and bullying [14–17]. The First and Second Youth Internet Safety Surveys (YISS-1 and YISS-2) examined the prevalence of unwanted sexual solicitations, harassment, and unwanted exposure to pornography in two independent samples of Internet users (ages 10–17 years); conducted in Year 2000 and Year 2005, respectively [14,18]. YISS-2 findings revealed the percentage of Internet-using youth reporting sexual solicitations significantly decreased, from 19% to 13% [18]. At the same time, the number of youth reporting online harassment significantly increased, from 6% to 9%, and the number reporting unwanted exposure to pornography significantly increased, from 25% to 34%. However, these percentages represent all Internet-using youth and do not take into account differences among demographic sub-groups. The current article will expand on these findings by examining these changes among different demographic sub-groups, including youth of various ages, gender, race and ethnicity,

and annual household income while adjusting for other demographic characteristics, amount and locations of Internet use.

Methods

Data source sampling method

YISS-1 and YISS-2 were telephone surveys of two independent national samples of 1500 Internet users, ages 10 to 17 years, and a parent or guardian, conducted 5 years apart. Both studies were approved and supervised by the University of New Hampshire Institutional Review Board and conformed to the rules mandated for research projects funded by the U.S. Department of Justice. In both studies, the sample size of 1500 was predetermined based upon a maximum expected sampling error of $\pm 2.5\%$ at the .05 significance level.

YISS-1 sampling

The sample for the YISS-1 was a national sample of households with telephones drawn by random digit dialing (RDD). The sampling was done in conjunction with the Second National Incidence Study of Missing, Abducted, Runaway, and Thrownaway Children (NISMAART 2) [19], conducted by the Institute for Survey Research at Temple University in 1999. Households identified as having a child between 9 and 17 years of age during the NISMAART 2 screening process were flagged for possible YISS-1 selection. In total, 6594 phone numbers were forwarded to YISS-1 interviewers. Interviewers dialed those numbers to identify households with children ages 10 through 17 years who had used the Internet at least once a month for the past six months. Interviewers made successful contact with 3446 households by the end of the survey period. Seventy-five percent ($n = 2575$) of the households contacted completed the eligibility screener, and 72% ($n = 1857$) were identified as eligible for YISS-1 participation. The response rate for YISS-1 was .57 using the American Association of Public Opinion Research (AAPOR) Response Rate 4, which allocates cases of unknown eligibility, but also includes partial interviews [20]. The interviews for YISS-1 took place between August 1999 and February 2000.

YISS-2 sampling

Like the YISS-1 sample, the sample for YISS-2 was drawn from a national sample of households with telephones developed by RDD. The main difference between YISS-1 and YISS-2 was that YISS-2 screening for age-eligible children who met the Internet usage criteria was done in one screening, rather than the two separate screenings in YISS-1. YISS-2 interviewers dialed a total of 54,842 RDD numbers to identify households with children ages 10 through 17 years who had used the Internet at least once a month for the past 6 months. Successful contact was made with 49% of these numbers ($n = 26,853$). Of the households

that were contacted, 53% ($n = 14,316$) completed the eligibility screener. Of the 14,316 households completing the eligibility screener, 28% ($n = 3956$) were eligible for participation in YISS-2 interviews. The response rate from YISS-2 was .45, also using AAPOR Response Rate 4 [20]. The interviews for YISS-2 took place between March 2005 and June 2005.

Methods in YISS-1 and YISS-2 data collection

Schulman, Ronca, and Bucuvalas, Inc., a national survey research firm, conducted the screening and telephone interviews for both studies. Upon reaching a household, interviewers spoke with an adult and determined whether there was an eligible child in the household. Eligible children were aged 10 through 17 years who had used the Internet at least once a month for the past 6 months from any location. Interviewers then asked to speak with the parent or guardian who was most familiar with that child's Internet use and after receiving informed consent, asked them a series of questions about their child's Internet use. At the close of the parent survey, the interviewer asked for permission to interview the child. Interviewers told parents the youth interview would be confidential, include questions about "sexual material your child may have seen," and that youth would receive \$10 for participating. In households with more than one eligible youth, the one who used the Internet the most often was chosen. After receiving parental permission, interviewers spoke with the child and asked for permission to conduct an interview. Interviewers assured youth that their answers would be confidential; they could skip any question they did not want to answer and end the interview at any time. Youth interviews were scheduled at their convenience and at times when they were able to talk freely and confidentially. Youth participants were mailed \$10 checks after completing the survey. The average youth interview lasted 30 minutes and the average parent interview lasted 10 minutes.

Study populations

The demographic characteristics of the YISS-1 and YISS-2 samples were similar with approximately equal numbers of boys and girls; slightly over one-third were ages 10–13 years with approximately 65% ages 14 to 17 years; most were White, non-Hispanic (73% and 71%, respectively); and over half lived with both biological parents (63% and 62%, respectively) (Table 1). The samples differed slightly on two characteristics. In 2005, more youth lived with single, never-married parents and more lived in households with incomes of more than \$75,000. The samples also differed on the amount and locations of Internet use. Multivariate analyses controlled for all demographic and Internet use characteristics included in Table 1.

Measures

Unwanted Internet experiences

Unwanted sexual solicitations were defined as requests to engage in sexual activities or sexual talk or to give personal sexual information that were unwanted or, whether wanted or not, made by an adult (aged 18 years or older). The prevalence rate for sexual solicitation was estimated based on endorsement of one or more of three screener questions: 1) "In the past year, did anyone on the Internet ask you for sexual information about yourself when you did not want to answer such questions? I mean very personal questions, like what your body looks like or sexual things you have done?," 2) "In the past year, did anyone on the Internet ever try to get you to talk online about sex when you did not want to?," and 3) "In the past year, did anyone on the Internet ever ask you to do something sexual that you did not want to do?" Additionally, youth who said they had an online sexual relationship with an adult were included to capture possible statutory sex crimes ($n = 8$; all from YISS-2). Online relationships were considered sexual if youth responded positively to the question: "Was this relationship sexual in any way?" This question was only asked of youth who had met this person face-to-face so the age of the solicitor was apparent. We also defined a subgroup of *aggressive sexual solicitations*, in which solicitors attempted or made offline contact with youth through regular mail, by telephone, or in person.

Harassment was defined as threats or other offensive behavior (not sexual solicitation) sent online to youth or posted online about youth for others to see. The prevalence rate for harassment was estimated based on endorsement of at least one of two screener questions: 1) "In the past year, did anyone ever use the Internet to threaten or embarrass you by posting or sending messages about you for other people to see?" and 2) "In the past year, did you ever feel worried or threatened because someone was bothering or harassing you online?."

Unwanted exposure to pornography was defined as being exposed to pictures of naked people or people having sex without seeking or expecting such pictures, when doing online searches, surfing the web, opening e-mail or instant messages or links in messages. The prevalence rate for unwanted exposure to pornography was estimated based on endorsement of at least one of two screener questions: 1) "In the past year when you were doing an online search or surfing the web, did you ever find yourself in a web site that showed pictures of naked people or of people having sex when you did not want to be in that kind of site?" and 2) "In the past year, did you ever open an e-mail or instant message or a link in a message that showed you actual pictures of naked people or people having sex that you did not want?."

Finally, we identified subgroups of youth who reported *distressing solicitations, harassment, or exposure to por-*

Table 1
Bivariate analysis of youth demographic and Internet use characteristics for the 2000 and 2005 samples

Characteristic	Year 2000 youth no. (%) (n = 1501)	Year 2005 youth no. (%) (n = 1500)	p Value
Demographics			
Gender			
Boy	790 (53)	738 (49)	.06
Girl	708 (47)	760 (51)	
Age			
10 to 13 years old	558 (37)	534 (36)	.37
14 to 17 years old	943 (63)	966 (64)	
Race			
White, non-Hispanic	1091 (73) ^a	1070 (71)	.21
Black, non-Hispanic	153 (10)	161 (11)	
Hispanic or Latino, any Race	108 (7)	130 (9)	
American Indian/Alaskan Native	30 (2)	21 (1)	
Asian	38 (3)	33 (2)	
Other (includes bi-racial)	26 (2)	40 (3)	
Don't know/not ascertainable	55 (4)	45 (3)	
Parental marital status			
Married	1182 (79)	1139 (76)	.001
Living with a partner	19 (1)	37 (3)	
Separated	37 (3)	22 (1)	
Divorced	154 (10)	147 (10)	
Widowed	35 (2)	29 (2)	
Single, never married	73 (5)	117 (8)	
Youth lives with both biological parents			
Yes	949 (63)	926 (62)	.40
No	552 (37)	574 (38)	
Highest level of education completed in household			
Not a high school graduate	37 (3)	30 (2) ^a	.87
High school graduate	320 (21)	305 (20)	
Some college education	336 (22)	344 (23)	
College graduate	474 (32)	481 (32)	
Post college degree	330 (22)	333 (22)	
Annual household income			
Less than \$20,000	119 (8) ^a	123 (8)	<.001
\$20,000 to \$50,000	575 (38)	405 (27)	
More than \$50,000 to \$75,000	350 (23)	355 (24)	
More than \$75,000	347 (23)	494 (33)	
Don't know/not ascertainable	110 (7)	123 (8)	
Internet use			
Amount of Internet use (mean, standard deviation) ^b	.24 (.26)	.41 (.31)	<.001
Locations of Internet use			
Home	1109 (74)	1363 (91)	<.001
Friend's home	1028 (69)	1029 (69)	.90
School	1100 (73)	1356 (90)	<.001

^a Numbers do not add to 100% due to rounding.

^b Amount of Internet use was derived from a factor analysis of the following four items: youth experience with the Internet (scale of 1 to 5), importance of Internet in youth's life (scale of 1 to 5), and hours and days online in a typical week. Values ranged from .00 to 1.0. This particular comparison was examined using a *t*-test rather than a chi-square test due to the continuous nature of the variable.

nography. These include youth who rated themselves as very or extremely upset or afraid as a result of a sexual solicitation or harassment incident, or very or extremely upset because of an unwanted exposure to pornography.

Analyses

We used SPSS 14.0 [21] for all analyses. First, chi-square tests were conducted to compare the 2000 and 2005

samples of youth on the prevalence of unwanted Internet experiences broken down by age, gender, race, and annual household income sub-groups. Second, for significant changes in unwanted Internet experiences identified in the chi-square tests, a series of logistic regression analyses was conducted to examine whether significance persisted after adjusting for other demographic characteristics, amount and locations of Internet use.

Table 2
Bivariate (unadjusted) and multivariate (adjusted) trends in unwanted Internet experiences by youth age

Unwanted Internet experiences	Year 2000 youth no. (%)	Year 2005 youth no. (%)	Unadjusted odds (ratio) in 2005 (95% CI) ^a	Adjusted odds (ratio) in 2005 (95% CI) ^b
Any sexual solicitation				
10 to 12 years	34 (10)	19 (5)	.52 (.29, .93)*	.44 (.24, .82)**
13 to 15 years	152 (21)	95 (15)	.64 (.49, .85)**	.47 (.34, .64)**
16 to 17 years	100 (23)	86 (17)	.70 (.51, .96)*	.53 (.37, .77)**
Distressing sexual solicitation				
10 to 12 years	17 (5)	10 (3)	.56 (.25, 1.2)	-
13 to 15 years	32 (4)	29 (5)	1.0 (.60, 1.7)	-
16 to 17 years	23 (5)	28 (6)	1.1 (.60, 1.9)	-
Aggressive sexual solicitation				
10 to 12 years	3 (1)	4 (1)	1.3 (.29, 5.9)	-
13 to 15 years	23 (3)	35 (5)	1.7 (1.0, 3.0)*	1.2 (.69, 2.2)
16 to 17 years	17 (4)	24 (5)	1.2 (.66, 2.3)	-
Any harassment				
10 to 12 years	18 (5)	16 (5)	.86 (.43, 1.7)	-
13 to 15 years	47 (7)	66 (10)	1.6 (1.1, 2.4)**	1.3 (.83, 1.9)
16 to 17 years	30 (7)	48 (9)	1.4 (.89, 2.3)	-
Distressing harassment				
10 to 12 years	8 (2)	10 (3)	1.2 (.48, 3.1)	-
13 to 15 years	19 (3)	21 (3)	1.2 (.66, 2.3)	-
16 to 17 years	10 (2)	19 (4)	1.7 (.77, 3.7)	-
Any unwanted exposure to pornography				
10 to 12 years	29 (9)	65 (19)	2.5 (1.5, 3.9)***	2.2 (1.3, 3.6)**
13 to 15 years	201 (28)	225 (35)	1.4 (1.1, 1.7)**	1.2 (.94, 1.5)
16 to 17 years	146 (33)	222 (44)	1.6 (1.2, 2.1)***	1.3 (1.0, 1.8)*
Distressing unwanted exposure to pornography				
10 to 12 years	6 (2)	33 (10)	5.8 (2.4, 14.1)***	4.2 (1.6, 10.6)**
13 to 15 years	55 (8)	58 (9)	1.2 (.81, 1.7)	-
16 to 17 years	30 (7)	45 (9)	1.3 (.83, 2.2)	-

95% confidence interval (CI) refers to being 95% confident that the interval contains the population percentage.

Note: Rates represent the percent of youth Internet users in each age category who had unwanted Internet experiences. The following n's apply:

All 10- to 12-year-olds: Total $n = 682$ (Year 2000 $n = 337$ and Year 2005 $n = 345$).

All 13- to 15-year-olds: Total $n = 1376$ (Year 2000 $n = 725$ and Year 2005 $n = 651$).

All 16- to 17-year-olds: Total $n = 943$ (Year 2000 $n = 439$ and Year 2005 $n = 504$).

^a Unadjusted odds ratios are based on bivariate chi-square tests.

^b Adjusted odds ratios are based on multivariate logistic regression tests that control for other demographic characteristics, amount of Internet use, and locations of Internet use. Only relationships significant at the bivariate level were examined in multivariate analyses.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Results

Age differences

A significantly smaller percentage of youth Internet users across all three age groups experienced an unwanted sexual solicitation in 2005 as compared with youth Internet users in 2000, even while controlling for other demographic characteristics, amount of Internet use, and locations of Internet use (Table 2). Specifically, 10- to 12-year-old Internet users were 56% less likely (calculated from the odds ratio: 1.0–.44) to report a sexual solicitation in 2005, 13- to 15-year-olds were 53% less likely, and 16- to 17-year-olds were 47% less likely. An increase in unwanted exposure to pornography was seen among 10- to 12-year-olds and 16- to 17-year-olds while adjusting for other characteristics. The significant bivariate increase in distressing exposure for 10- to 12-

year-olds remained significant in the multivariate model. All other analyses significant at the bivariate level were not significant in multivariate models.

Gender differences

Reports of sexual solicitations declined for both girls and boys in the 2005 survey; however, girls were more likely to report such experiences overall compared with boys (Table 3). This was true even after controlling for other demographic characteristics, amount of Internet use, and locations of Internet use. The significant bivariate increase in unwanted exposure to pornography remained significant for boys in the multivariate model. For girls, a significant multivariate increase in distressing exposure remained. All other analyses significant at the bivariate level were not significant in multivariate models.

Table 3
Bivariate (unadjusted) and multivariate (adjusted) trends in unwanted Internet experiences by youth gender

Unwanted Internet experiences	Year 2000 youth no. (%)	Year 2005 youth no. (%)	Unadjusted odds (ratio) in 2005 (95% CI) ^a	Adjusted odds (ratio) in 2005 (95% CI) ^b
Any sexual solicitation				
Girls	188 (27)	140 (18)	.63 (.49, .80)***	.44 (.33, .59)***
Boys	97 (12)	60 (8)	.63 (.45, .89)**	.51 (.36, .74)***
Distressing sexual solicitation				
Girls	54 (8)	54 (7)	.93 (.63, 1.4)	-
Boys	18 (2)	13 (2)	.77 (.37, 1.6)	-
Aggressive sexual solicitation				
Girls	29 (4)	50 (7)	1.6 (1.0, 2.6)*	1.2 (.73, 2.0)
Boys	14 (2)	13 (2)	.99 (.46, 2.1)	-
Any harassment				
Girls	46 (7)	75 (10)	1.6 (1.1, 2.3)*	.95 (.63, 1.4)
Boys	49 (6)	55 (7)	1.2 (.82, 1.8)	-
Distressing harassment				
Girls	21 (3)	34 (5)	1.5 (.88, 2.7)	-
Boys	16 (2)	16 (2)	1.1 (.53, 2.2)	-
Any unwanted exposure to pornography				
Girls	159 (23)	236 (31)	1.5 (1.2, 2.0)***	1.2 (.93, 1.6)
Boys	216 (27)	275 (37)	1.6 (1.3, 1.9)***	1.4 (1.1, 1.7)**
Distressing unwanted exposure to pornography				
Girls	41 (6)	77 (10)	1.8 (1.2, 2.7)**	1.7 (1.1, 2.5)**
Boys	50 (6)	58 (8)	1.3 (.85, 1.9)	-

95% confidence interval (CI) refers to being 95% confident that the interval contains the population percentage.

Note: Rates represent percent of youth Internet users in each gender category who had unwanted Internet experiences. The following n's apply:

All girls: Total n = 1468 (Year 2000 n = 708 and Year 2005 n = 760).

All boys: Total n = 1528 (Year 2000 n = 790 and Year 2005 n = 738).

^a Unadjusted odds ratios are based on bivariate chi-square tests.

^b Adjusted odds ratios are based on multivariate logistic regression tests that control for all other demographic characteristics, amount of Internet use, and locations of Internet use. Only relationships significant at the bivariate level were examined in multivariate analyses.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Race/ethnicity differences

All of the changes in unwanted Internet experiences were seen among White, non-Hispanic youth (Table 4). There was a significant decrease in sexual solicitation among White, non-Hispanic Internet users in the multivariate model. Similarly, the significant bivariate increases in any unwanted exposure to pornography and distressing exposure among White, non-Hispanic youth persisted in the multivariate models. All other analyses significant at the bivariate level were not significant in multivariate models.

Annual household income differences

Trends in unwanted Internet experiences varied based on the annual income of households (Table 5). The significant bivariate decrease in sexual solicitation among young Internet users living in more affluent households persisted after controlling for other demographic characteristics, amount of Internet use, and locations of Internet use. All other analyses significant at the bivariate level were not significant in multivariate models.

Discussion

Changes in reports of sexual solicitations

The decline in the percentage of youth Internet users who report sexual solicitations is certainly good news. Reports of sexual solicitations decreased among all age groups and among both girls and boys, even when adjusting for other explanatory factors. However, looking at socioeconomic indicators like race/ethnicity and annual household income shows that sexual solicitations did not significantly decline among Black youth, Hispanic youth or youth who lived in lower income households, although small sample sizes could partly account for this result, particularly among Hispanic youth.

There is an additional issue with respect to the decline in the percentage of youth who had unwanted sexual solicitations between the 2000 and 2005 studies. Although we can say the percentage of solicited youth Internet users declined, we cannot say with certainty fewer youth were solicited. This is because the percentage of youth in the general population who became Internet users rose at the same time the percentage of solicited youth fell. Although the estimates do suggest a decrease in the actual number of youth

Table 4
Bivariate (unadjusted) and multivariate (adjusted) trends in unwanted Internet experiences by youth race/ethnicity

Unwanted Internet experiences	Year 2000 youth no. (%)	Year 2005 youth no. (%)	Unadjusted odds (ratio) in 2005 (95% CI) ^a	Adjusted odds (ratio) in 2005 (95% CI) ^b
Any sexual solicitation				
White, non-Hispanic only	207 (19)	128 (12)	.58 (.46, .74)***	.41 (.31, .53)***
Black, non-Hispanic only	28 (18)	32 (20)	1.1 (.63, 1.9)	-
Hispanic or Latino, any Race	27 (25)	24 (19)	.68 (.37, 1.3)	-
Distressing sexual solicitation				
White, non-Hispanic	47 (4)	44 (4)	.95 (.63, 1.5)	-
Black, non-Hispanic	10 (7)	11 (7)	1.0 (.43, 2.5)	-
Hispanic or Latino, any Race	8 (7)	8 (6)	.82 (.30, 2.3)	-
Aggressive sexual solicitation				
White, non-Hispanic	32 (3)	37 (3)	1.2 (.73, 1.9)	-
Black, non-Hispanic	2 (1)	13 (8)	6.6 (1.5, 29.9)**	3.3 (.69, 16.1)
Hispanic or Latino, any Race	5 (5)	10 (8)	1.7 (.57, 5.2)	-
Any harassment				
White, non-Hispanic	70 (6)	105 (10)	1.6 (1.1, 2.2)**	1.0 (.75–1.4)
Black, non-Hispanic	7 (5)	8 (5)	1.1 (.39, 3.1)	-
Hispanic or Latino, any Race	12 (11)	9 (7)	.59 (.24, 1.5)	-
Distressing harassment				
White, non-Hispanic	25 (2)	38 (4)	1.6 (.94, 2.6)	-
Black, non-Hispanic	3 (2)	4 (3)	1.3 (.28, 5.8)	-
Hispanic or Latino, any Race	5 (5)	4 (3)	.65 (.17, 2.5)	-
Any unwanted exposure to pornography				
White, non-Hispanic	279 (26)	381 (36)	1.6 (1.3, 1.9)***	1.3 (1.1, 1.6)**
Black, non-Hispanic	36 (23)	44 (27)	1.2 (.73, 2.0)	-
Hispanic or Latino, any Race	32 (30)	54 (41)	1.7 (.98, 2.9)	-
Distressing unwanted exposure to pornography				
White, non-Hispanic	60 (5)	99 (9)	1.7 (1.3, 2.4)***	1.7 (1.2, 2.3)**
Black, non-Hispanic	16 (11)	12 (7)	.69 (.31, 1.5)	-
Hispanic or Latino, any Race	10 (9)	19 (15)	1.7 (.74, 3.8)	-

95% confidence interval (CI) refers to being 95% confident that the interval contains the population percentage.

Note: Rates represent percent of youth Internet users in each race/ethnicity category who had unwanted Internet experiences. The following n's apply:

All White, non-Hispanic: Total n = 2161 (Year 2000 n = 1091 and Year 2005 n = 1070).

All Black, non-Hispanic: Total n = 314 (Year 2000 n = 153 and Year n = 161).

All Hispanic or Latino, any Race: Total n = 238 (Year 2000 n = 108 and Year 2005 n = 130).

^a Unadjusted odds ratios are based on bivariate chi-square tests.

^b Adjusted odds ratios are based on multivariate logistic regression tests that control for all other demographic characteristics, amount of Internet use, and locations of Internet use. Only relationships significant at the bivariate level were examined in multivariate analyses.

** $p \leq .01$; *** $p \leq .001$.

Internet users who were solicited [18], we do not have a precise estimate of the increase in youth Internet users, so we cannot calculate the exact numerical dimensions of the decline in solicitations in relation to the increase in youth Internet use. For this reason, throughout this article we refer to a decline in the percentage of youth Internet users solicited, but we do not state that fewer youth are solicited.

At least some of the decline in reports of sexual solicitations may be because fewer youth are interacting online with people they do not know in person. In 2005, fewer youth used the Internet to communicate with people they did not know in person, go to chat rooms, and form close relationships with people they met online [18]. These decreases could be attributable to 5 years of prevention messages aimed at educating youth and the public about "Internet predators" [22,23]. The stagnant rate of solicitations among minority and lower income youth suggest prevention messages may not have reached their households as effectively as they have reached households of

White, middle-class youth. Also, some youth in lower income households may be newer Internet users. They may be less experienced and less savvy about avoiding online solicitations. Their parents may also be less familiar with the Internet and less aware of what their children may encounter online. In fact, African-American adults continue to lag behind in terms of Internet use as compared with White adults [24]. Also, the computers that higher income youth use to access the Internet may be more likely to have software that keeps them out of certain sites.

Unfortunately, although the percentage of sexual solicitations decreased overall, aggressive solicitations, the ones most likely to evolve into crimes, did not change among any subgroup of the youth population. If a smaller percentage of young Internet users are receiving sexual solicitations overall, but a similar percentage are receiving aggressive solicitations, it could mean education and law enforcement have deterred casual solicitors, but not the more determined or compulsive

Table 5
Bivariate (unadjusted) and multivariate (adjusted) trends in unwanted Internet experiences by youth annual household income^a

Unwanted Internet experiences	Year 2000 youth no. (%)	Year 2005 youth no. (%)	Unadjusted odds (ratio) in 2005 (95% CI) ^b	Adjusted odds (ratio) in 2005 (95% CI) ^c
Any sexual solicitation				
Less than \$20,000	20 (17)	21 (17)	1.0 (.52, 2.0)	-
\$20,000 to \$50,000	112 (19)	68 (17)	.83 (.60, 1.2)	-
\$50,001 to \$75,000	72 (21)	49 (14)	.62 (.41, .92)*	.47 (.30, .73)***
More than \$75,000	67 (19)	46 (9)	.43 (.29, .64)***	.30 (.19, .48)***
Distressing sexual solicitation				
Less than \$20,000	11 (9)	12 (10)	1.1 (.45, 2.5)	-
\$20,000 to \$50,000	30 (5)	19 (5)	.89 (.50, 1.6)	-
\$50,001 to \$75,000	16 (5)	18 (5)	1.1 (.56, 2.2)	-
More than \$75,000	13 (4)	15 (3)	.81 (.38, 1.7)	-
Aggressive sexual solicitation				
Less than \$20,000	4 (3)	8 (7)	2.0 (.59, 6.8)	-
\$20,000 to \$50,000	17 (3)	22 (5)	1.9 (.99, 3.6)*	1.3 (.67, 2.7)
\$50,001 to \$75,000	8 (2)	17 (5)	2.1 (.92, 5.0)	-
More than \$75,000	10 (3)	14 (3)	.98 (.43, 2.2)	-
Any harassment				
Less than \$20,000	6 (5)	7 (6)	1.1 (.37, 3.5)	-
\$20,000 to \$50,000	40 (7)	35 (9)	1.3 (.79, 2.0)	-
\$50,001 to \$75,000	21 (6)	41 (11)	2.0 (1.2, 3.5)**	1.5 (.87, 2.8)
More than \$75,000	25 (7)	39 (8)	1.1 (.65, 1.9)	-
Distressing harassment				
Less than \$20,000	3 (3)	3 (2)	.97 (.19, 4.9)	-
\$20,000 to \$50,000	13 (2)	13 (3)	1.4 (.66, 3.1)	-
\$50,001 to \$75,000	8 (2)	16 (5)	2.0 (.85, 4.8)	-
More than \$75,000	10 (3)	15 (3)	1.1 (.47, 2.4)	-
Any unwanted exposure to pornography				
Less than \$20,000	21 (18)	31 (25)	1.6 (.84, 2.9)	-
\$20,000 to \$50,000	130 (23)	122 (30)	1.5 (1.1, 2.0)**	1.3 (.94, 1.8)
\$50,001 to \$75,000	94 (27)	121 (34)	1.4 (1.0, 1.9)*	1.3 (.91, 1.8)
More than \$75,000	107 (31)	188 (38)	1.4 (1.0, 1.8)*	1.1 (.82, 1.5)
Distressing unwanted exposure to pornography				
Less than \$20,000	5 (4)	12 (10)	2.5 (.84, 7.2)	-
\$20,000 to \$50,000	38 (7)	36 (9)	1.4 (.86, 2.2)	-
\$50,001 to \$75,000	22 (6)	34 (10)	1.6 (.90, 2.7)	-
More than \$75,000	20 (6)	44 (9)	1.6 (.93, 2.8)	-

95% confidence interval (CI) refers to being 95% confident that the interval contains the population percentage.

Note: Rates represent percent of youth Internet users in each income category who had unwanted Internet experiences. The following n's apply:

All less than \$20,000: Total n = 242 (Year 2000 n = 119 and Year 2005 n = 123).

All \$20,000 to \$50,000: Total n = 980 (Year 2000 n = 575 and Year 2005 n = 405).

All \$50,001 to \$75,000: Total n = 705 (Year 2000 n = 350 and Year 2005 n = 355).

All more than \$75,000: Total n = 841 (Year 2000 n = 347 and Year 2005 n = 494).

^a Data was missing for 7.8% (n = 233) of caretaker respondents on household income and are not reflected in this table.

^b Unadjusted odds ratios are based on bivariate chi-square tests.

^c Adjusted odds ratios are based on multivariate logistic regression tests that control for all other demographic characteristics, amount of Internet use, and locations of Internet use. Only relationships significant at the bivariate level were examined in multivariate analyses.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

solicitors. Also, by definition, aggressive solicitations involve some form of offline contact with the youth. Presumably, most of these youth provided these solicitors with the necessary information to contact them offline. Prevention messages should highlight the potential dangers of providing this information to people they meet online.

Changes in reports of online harassment

All of the bivariate increases in harassment among specific sub-groups of youth were explained by increases in the

amount of Internet use among these groups. This does not mean we should ignore these increases in online harassment. Instead, it provides us with a firm starting point for future prevention in this area. Along with increases in Internet use, some of the increase in harassment could also be attributable to deteriorating civility among youth Internet users. In both surveys, we asked youth about negative behaviors they engaged in online. The numbers of youth who admitted to using the Internet to make rude or nasty comments to other people doubled from 14% to 28%, and the

number that used the Internet to harass or embarrass someone they were mad at increased even more, from 1% to 9% [18]. Being rude or nasty to others online is highly related to online harassment [16]. The increases in both being harassed and harassing others suggest that youth have incorporated online harassment into the everyday bullying that is widespread among young people [17,25].

Changes in reports of unwanted exposure to pornography

YISS-2 also documents an increase in the proportion of youth Internet users reporting unwanted exposure to pornography. Increases were particularly apparent among 10- to 12-year-olds, 16- to 17-year-olds, boys, and White, non-Hispanic youth as this trend persisted even after adjusting for other demographic characteristics, amount of Internet use, and locations of Internet use.

Three factors may be particularly related to the increase in unwanted exposure to pornography. The first is the increase in Internet use among youth. Home Internet access increased from 74% to 91% and school Internet access from 73% to 90% [18]. Youth were also using the Internet more days per week and more hours per day in 2005 than they were in 2000. Yet, increases were seen even when adjusting for these factors so some other potential explanations are warranted. A second possible contributing factor is technological change in the past 5 years, such as increases in the sizes of computer hard drives and memory, faster Internet connections and digital photography, that have increased the capacity of computers to receive, store and transmit images [11,24,26–29]. A third factor is the aggressive marketing of online pornography sites. Marketing techniques include pop-up ads, but also adware and spyware that, among other things, secretly install software that directs unknowing users to pornography sites and that hijacks or installs unauthorized links to pornography in legitimate websites [30–32]. This kind of stealth software is often bundled with the types of files youth download from gaming and other sites frequented by youth [31,32] and may account for a proportion of the unwanted exposure reported by youth, and specific sub-groups of youth in particular.

Implications

Five years ago, YISS-1 documented that many young Internet users were exposed to sexual solicitations, harassment and pornography. YISS-2 shows that youth continue to encounter substantial numbers of offensive episodes online. Some findings, such as the decrease in the percentage of youth reporting sexual solicitations suggest that safety messages about the dangers of communicating online with people met online are getting through to many youth. Other findings, such as the increase in harassment and unwanted exposure to pornography, indicate new directions for prevention education and research. Results of these trends suggest professionals need to continue efforts at prevention,

and to revise efforts to target at-risk populations. In particular, older youth, minorities, and youth living in less affluent households should be targeted. Avenues for prevention education for at-risk populations include schools, teen centers, family-based agencies, and minority-based advocacy groups. Approaches targeted at parents urging better supervision and control of their children may have some impact, but the findings from research about age and risk behavior of youth [33] suggest the importance of direct communications with teens. Finally, some of these changes, harassment in particular, are linked to increases in the amount of Internet use youth are currently engaging in. Parents may wish to place limits on the amount of time their children spend online and talk with them about how specific behaviors may increase their risk for unwanted experiences.

Limitations

This study is the first of its kind to examine changes in unwanted Internet experiences of youth over time. However, it has a variety of limitations. First, the data from these two studies are cross-sectional so we cannot talk about temporal changes among particular youth as we could if this was a longitudinal study. Second, some youth respondents may not have disclosed their experiences, which could result in an undercounting of episodes. Also, some youth declined or were barred from participating, and we do not know whether their inclusion could have changed the results. Third, there was a lower overall response rate for YISS-2. The response rate is reflective of a general decline in response rates for national telephone surveys [34]. However, this decline in participation has not influenced the validity of most surveys conducted by reputable surveying organizations [35]. More specifically, when compared with benchmarks obtained from the U.S. Census and other government surveys with response rates that exceed 90%, the demographic and social composition of the samples in the average telephone survey today is remarkably accurate (p. 1–2). Fourth, there were small sample sizes for some sub-groups of youth, limiting the statistical power to identify changes in some instances. Finally, although YISS-2 was designed in a way so comparisons could be made with the findings from YISS-1, slight differences in the participant sampling method may have affected findings to a limited degree.

Conclusions

The proportion of youth Internet users in the United States who reported sexual solicitations declined between 2000 and 2005. At the same time, online harassment and unwanted exposure to pornography increased. However, these trends were not apparent among all sub-groups of youth. In particular, the decline in solicitations was apparent only among White youth and those living in affluent households. The findings suggest that increased efforts are needed

to target minority and less affluent populations. Efforts to prevent online harassment and unwanted exposure to pornography need to be strengthened and more widely implemented.

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