

ARTICLE

Unwanted and Wanted Exposure to Online Pornography in a National Sample of Youth Internet Users

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ABSTRACT

OBJECTIVE. The goal was to assess the extent of unwanted and wanted exposure to online pornography among youth Internet users and associated risk factors.

METHODS. A telephone survey of a nationally representative sample of 1 500 youth Internet users aged 10 to 17 years was conducted between March and June 2005.

RESULTS. Forty-two percent of youth Internet users had been exposed to online pornography in the past year. Of those, 66% reported only unwanted exposure. Multinomial logistic regression analysis was used to compare youth with unwanted exposure only or any wanted exposure with those with no exposure. Unwanted exposure was related to only 1 Internet activity, namely, using file-sharing programs to download images. Filtering and blocking software reduced the risk of unwanted exposure, as did attending an Internet safety presentation by law enforcement personnel. Unwanted exposure rates were higher for teens, youth who reported being harassed or sexually solicited online or interpersonally victimized offline, and youth who scored in the borderline or clinically significant range on the Child Behavior Checklist subscale for depression. Wanted exposure rates were higher for teens, boys, and youth who used file-sharing programs to download images, talked online to unknown persons about sex, used the Internet at friends' homes, or scored in the borderline or clinically significant range on the Child Behavior Checklist subscale for rule-breaking. Depression also could be a risk factor for some youth. Youth who used filtering and blocking software had lower odds of wanted exposure.

CONCLUSIONS. More research concerning the potential impact of Internet pornography on youth is warranted, given the high rate of exposure, the fact that much exposure is unwanted, and the fact that youth with certain vulnerabilities, such as depression, interpersonal victimization, and delinquent tendencies, have more exposure.

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Key Words

Internet, sexually explicit material, pornography, adolescents

Abbreviations

CBCL—Child Behavior Checklist

OR—odds ratio

CI—confidence interval

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THERE HAS BEEN extensive worry about the possible harms to youth of being exposed to online pornography. These worries have been expressed by the medical establishment,¹⁻⁴ psychologists,⁵⁻⁸ the public,⁹ Congress,^{10,11} and even the US Supreme Court.^{12,13} Taken together, these expressions of concern suggest that there is a broad consensus that youth should be shielded from online pornography.

Fueling this concern is knowledge that many youth are exposed to online pornography.¹⁴⁻²¹ Some of this exposure is voluntary. In a 2005 survey, the authors found that 13% of youth Internet users 10 through 17 years of age visited X-rated Web sites on purpose in the past year.¹⁴ However, even more youth (34%) were exposed to online pornography they did not want to see, primarily through (in order of frequency) links to pornography sites that came up in response to searches or misspelled Web addresses or through links within Web sites, pop-up advertisements, and spam e-mail.¹⁴ This degree of unwanted exposure may be a new phenomenon; before development of the Internet, there were few places youth frequented where they might encounter unsought pornography regularly. Although there is evidence that most youth are not particularly upset when they encounter unwanted pornography on the Internet,^{14,17} unwanted exposure could have a greater impact on some youth than voluntary encounters with pornography. Some youth may be psychologically and developmentally unprepared for unwanted exposure, and online images may be more graphic and extreme than pornography available from other sources.^{9,14}

Adding to concerns, unwanted exposure to online pornography has increased, rising to 34% of youth Internet users in 2005 from 25% in 1999 to 2000, with increases among all age groups (10-17 years) and both boys and girls.²² Moreover, Internet use has expanded rapidly since 2000.²³ Eighty-seven percent of youth 12 to 17 years of age used the Internet in 2005, compared with 73% in 2000. These numbers suggest that millions of youth Internet users are exposed to unwanted online pornography each year.¹⁴ However, information about the developmental trajectory of exposure to pornography, in terms of ages of exposure, for boys and girls is lacking.

Given the capabilities of Internet technology for transmitting images²⁴⁻²⁸ and the aggressive marketing of online pornography,⁹ it could be that unwanted exposure has become a hazard of cyberspace, unrelated to the types of Internet use in which youth engage or particular demographic or psychosocial characteristics. Our analysis of data from an similar survey conducted in 1999 to 2000 found that unwanted exposure was related to certain types of Internet use and was greater among youth who suffered from depression and experienced negative life events.¹⁹ However, that analysis included, in the unwanted exposure group, a proportion of youth who

had both unwanted and wanted exposure. Because unwanted exposure was associated with delinquency, substance abuse, and depression,¹⁶ the wanted exposure alone could have accounted for the association. In addition, some characteristics of youth Internet use have changed since the earlier survey,¹⁴ and research has shown that certain youth are more prone to problematic Internet experiences, such as being harassed online and receiving unwanted sexual solicitations.²⁹ Also, recent efforts to prevent exposure to online pornography could be affecting the profile of youth who have such encounters. For example, by 2005, 21% of youth Internet users had attended Internet safety programs hosted by law enforcement agencies and 55% of families had placed some sort of filtering/blocking software on the computer their child used most often to go online.¹⁴

In this study, we used data from the Second Youth Internet Safety Survey, a national survey of youth Internet users conducted in 2005, to look anew at the issue of unwanted and wanted exposure to online pornography. We separated youth into groups with no exposure, unwanted exposure only, or any wanted exposure. We addressed 2 research questions. First, what is the scope of unwanted and wanted exposure to online pornography, on the basis of youth age and gender, among youth Internet users? Second, what demographic, Internet use, prevention, or psychosocial characteristics are related to unwanted and wanted exposure? We discuss how these findings can inform prevention efforts and future research about the impact of exposure to online pornography, particularly unwanted exposure, among youth Internet users.

METHODS

Participants

We used telephone interviews conducted between March and June 2005 to gather information from a national sample of youth Internet users. The research was approved by the University of New Hampshire institutional review board.

Participants were 1500 youth aged 10 to 17 years (mean age: 14.24 years; SD: 2.09 years) who had used the Internet at least once per month for the past 6 months. Sample characteristics are shown in Table 1. Well-educated, prosperous families and white individuals were overrepresented in the sample but approximated the population of youth Internet users at the time of data collection.³⁰

Procedure

The sample was drawn from a national sample of households with telephones, developed through random-digit dialing. Details about the dispositions of the numbers dialed and a more-detailed description of the method can be found in other publications.^{14,29} Short interviews

TABLE 1 Sample Characteristics (n = 1422)

Characteristic	Proportion, %
Age, y	
10	5
11	8
12	10
13	13
14	14
15	16
16	17
17	17
Gender	
Male	51
Female	49
Parent marital status	
Married	76
Living with partner	3
Divorced, separated, or widowed	13
Single, never married	8
Highest household educational level	
No high school diploma	2
High school diploma	20
Some college	23
College graduate	32
Post-college degree	23
Household income, \$	
<20 000	8
20 000–50 000	27
50 001–75 000	24
>75 000	33
Race	
White	76
Black	13
Asian	3
American Indian/Alaskan Native	3
Other	1
Hispanic ethnicity	9
Internet use characteristics	
High level of Internet use	27
Low level of Internet use	22
What youth did online	
Used instant messaging	67
Went to chat rooms	29
Played games	83
Used file-sharing program to download music	37
Used file-sharing program to download images	14
Kept an online journal/blog	15
Talked online with friends	79
Visited online dating sites	1
Talked online with people not known in person	32
Talked online with unknown people about sex	5
Youth reported	
Being harassed online	7
Receiving unwanted online sexual solicitation	11
Had Internet access at	
Home	91
School	90
Friends' homes	68
Cellular phone	16
Computer was in bedroom	14
Prevention efforts	
Used pop-up advertisement or spam e-mail blocker	74
Used other filtering/blocking software	48
Parent talked with youth about online pornography	51
Adult at school talked with youth about online pornography	38

TABLE 1 Continued

Characteristic	Proportion, %
Attended law enforcement Internet safety presentation	21
Psychosocial characteristics	
High parent-child conflict	13
Sexual or physical abuse in past year	3
Peer or other interpersonal victimization in past year	37
CBCL subscales (scored in borderline or clinically significant range)	
Aggressive behavior	6
Attention problems	1
Rule-breaking behavior	6
Social problems	6
Withdrawn/depressed	4

Some categories may not add to 100% because of rounding or missing data.

were conducted with parents, and then youth were interviewed with parental consent. Youth interviews were scheduled at the youth's convenience, when they could talk freely and confidentially. The average interview lasted ~30 minutes.

The response rate, based on standard guidelines promulgated by the American Association for Public Opinion Research, was 45%.³¹ This rate, which is lower than rates typical of surveys in earlier decades, is in line with other recent scientific household surveys,³² which continue to obtain representative samples and to provide accurate data about the views and experiences of US populations, despite lower response rates.³³

Measures

Unwanted Exposure, Online Harassment, and Unwanted Sexual Solicitation

We defined unwanted exposure to online pornography as answering yes to one or both of the following 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?" (2) "In the past year, did you ever open a message or a link in a message that showed you actual pictures of naked people or of people having sex that you did not want?"

We also examined whether exposure to pornography might be related to 2 other problematic Internet experiences that were investigated in the survey, namely, being harassed online and receiving unwanted sexual solicitations. Online harassment was defined as threats or other offensive behavior sent online to the youth or posted online about the youth for others to see. 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, were made by an adult.

Before any incident was counted as unwanted exposure, online harassment, or unwanted sexual sollicita-

tion, youth needed to answer follow-up questions about details of the incidents. These details allowed us to validate youth responses and to collect data about incident characteristics. Because of time constraints, however, follow-up questions were limited to 2 incidents; the algorithm used to choose incidents for follow-up questions gave priority to harassment and sexual solicitation, to ensure sufficient numbers of those cases for analysis. Because of this algorithm, 112 youth who reported unwanted exposures in screener questions did not answer follow-up questions about exposures because they also reported higher-priority harassment and solicitation incidents. Of those 112 youth, 34 also reported wanted exposure and were counted in the wanted exposure group. The remaining 78 youth were excluded from the current analyses, leaving a sample of 1422. We excluded these youth to be consistent with how we handled analyses of data from a similar survey¹⁹ and because we could not validate their responses with incident characteristics. However, we were concerned about the implications of excluding 78 youth who probably did have unwanted exposure episodes. Therefore, we also conducted the analyses with those 78 cases included in the unwanted exposure group (data not shown); the findings were substantially the same as when the cases were excluded. In addition, we controlled for reporting of harassment and sexual solicitations in the multivariate analysis.

Wanted Exposure

Youth who said they had gone to an X-rated site on the Internet on purpose or had downloaded sexual images by using a file-sharing program on purpose in the past year were categorized as having wanted exposure to online pornography. We categorized youth with any wanted exposure in the wanted exposure group, to give a clear picture of the group that reported unwanted exposure only (findings were similar when analyses were conducted with 3 groups, ie, unwanted exposure only, wanted exposure only, and both). Because of time constraints, we did not ask follow-up questions about specific incidents of wanted exposure, although we did ask a few general questions, including whether the youth had looked at X-rated sites on purpose when they were “together with friends or other kids you knew.”

Demographic Characteristics

Parents reported on household education and income, family structure, and youth age and gender. Youth reported on race and ethnicity.

Characteristics of Internet Use

We created a composite variable for high and low Internet use that was based on youth estimations of time spent online and self-ratings of experience with and importance of the Internet. Youth with high Internet use

scored ≥ 1 SD above the mean, and those with low Internet use scored ≥ 1 SD below the mean.

We asked youth whether they used the Internet for instant messaging; to go to chat rooms; to play games; to use file-sharing programs to download music or images (pictures, videos, or movies); to keep an online journal or blog; to talk online with friends; to talk online with people they did not know face to face; and to talk online to unknown people about sex, an indication of sexual curiosity that could be related to exposure to pornography. In addition, we asked where youth used the Internet (home, school, friends' homes, or cellular phone). If they had a computer at home, then we asked where it was located.

Types of Prevention Efforts

We asked youth whether the computer they used most often had software that blocked pop-up advertisements or spam e-mail and whether they had other software that “filters, blocks, or monitors how you use the Internet.” We also asked whether a parent or an adult at school had ever talked to them “about seeing X-rated pictures on the Internet” and whether they had ever “been to a presentation about Internet safety that was led by a police officer or someone else in law enforcement.”

Psychosocial Characteristics

Youth were asked how frequently their main caregiver nagged, yelled, and took away privileges. By using these variables, we created a composite variable measuring parent-child conflict and created a dichotomized variable to compare youth with high conflict (a composite value ≥ 1 SD above the mean) with other youth.

Two measures of offline victimization were included, namely, being abused in the past year (physical and sexual abuse combined) and experiencing other interpersonal victimization (eg, having something stolen or being physically assaulted by peers) in the past year. We assessed borderline or clinically significant behavior problems by using the youth self-report of the Child Behavior Checklist (CBCL), which is validated for youth 11 to 18 years of age.³⁴ The current study includes 5 subscales, measuring aggression, attention problems, rule-breaking, social problems, and withdrawal/depression. Scores were dichotomized to identify those who scored within the borderline or clinically significant range.

Analyses

We used SPSS 14.0 (SPSS, Chicago, IL) for all analyses. First, we used descriptive statistics to examine rates of unwanted and wanted exposure to online pornography in the past year, on the basis of age and gender. Second, we used χ^2 cross-tabulations to determine which demographic, Internet use, prevention, and psychosocial char-

acteristics were associated with unwanted and wanted exposure at the bivariate level. Third, we created a multinomial logistic regression model of the characteristics associated with unwanted or wanted exposure, with likelihood ratio tests for significant contribution to the overall statistical model at the .05 level. The reference category was youth with no exposure. Because we expected age and aspects of Internet use to exert strong influences on the results, we included all variables that were significant at the .25 level in bivariate analyses.³⁵

RESULTS

Unwanted and Wanted Exposure Among Youth Internet Users According to Age and Gender

Forty-two percent ($n = 603$) of youth Internet users had been exposed to online pornography in the past year. Of the exposed youth, 66% ($n = 400$) reported only unwanted exposure and 34% ($n = 203$) reported either wanted exposure only ($n = 91$) or both wanted and unwanted exposure ($n = 112$).

Although only 1% of 10- to 11-year-old boys reported wanted exposure in the past year, the proportion increased to 11% of boys 12 to 13 years of age, 26% of those 14 to 15 years of age, and 38% of those 16 to 17 years of age (Fig 1). Unwanted exposure also increased with age. Seventeen percent of boys 10 to 11 years of age had unwanted exposure in the past year, as did 22% of boys 12 to 13 years of age, 26% of those 14 to 15 years of age, and 30% of those 16 to 17 years of age. These were mutually exclusive categories and, for example, more than one half of male youth Internet users 14 to 15 years of age had been exposed to either unwanted or wanted online pornography in the past year, as had more than two thirds of those 16 to 17 years of age.

Little wanted exposure was reported by girls (Fig 2). Between 2% and 5% of girls 10 to 11 years of age, 12 to 13 years of age, and 14 to 15 years of age said they had gone to X-rated Web sites on purpose in the past year; 8% of girls 16 to 17 years of age had done so. Unwanted exposure in the past year increased with age among girls,

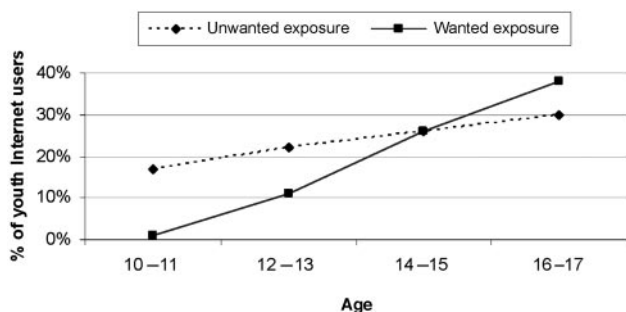


FIGURE 1
Unwanted and wanted exposure to online pornography among boys ($n = 727$). Gender data were missing in 2 cases.

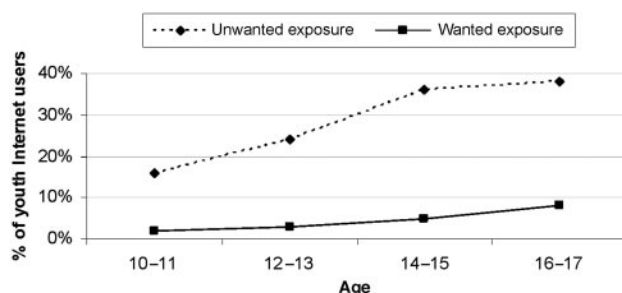


FIGURE 2
Unwanted and wanted exposure to online pornography among girls ($n = 693$). Gender data were missing in 2 cases.

from 16% of those 10 to 11 years of age to 38% of those 16 to 17 years of age.

Bivariate Associations of Unwanted and Wanted Exposure

The majority of youth who reported unwanted exposure were teens, 13 to 17 years of age, as were almost all of those who reported wanted exposure (Table 2). Otherwise, few demographic characteristics were related. However, most of the Internet use, prevention, and psychosocial characteristics measured were significant in bivariate analyses at $\leq .01$.

Multivariate Associations With Unwanted and Wanted Exposure

Compared with the no-exposure group, teenagers (13–17 years of age) were almost twice as likely to report unwanted exposure (odds ratio [OR]: 1.9; 95% confidence interval [CI]: 1.3–2.7), but no other demographic characteristic were related (Table 3). Only 1 characteristic of Internet use was associated with unwanted exposure. Youth who used file-sharing programs to download images from the Internet had almost twice the risk of encountering unwanted pornography (OR: 1.9; 95% CI: 1.3–2.9). However, youth who reported being harassed online (OR: 1.9; 95% CI: 1.1–3.2) or receiving unwanted sexual solicitations (OR: 2.7; 95% CI: 1.7–4.3) also had higher odds of unwanted exposure. Two types of prevention efforts seemed to afford some protection from unwanted exposure; having software (other than pop-up advertisement or spam e-mail blockers) to filter, to block, or to monitor Internet use on the computers youth used most often reduced the likelihood of exposure by 40%, and attending presentations about Internet safety led by law enforcement personnel reduced the likelihood by 30%. However, those who reported being talked to by parents or adults at school about online pornography had higher odds of exposure. Certain psychosocial characteristics were also related. Youth who reported offline interpersonal victimization (OR: 1.4; 95% CI: 1.1–1.8) and those who scored in the borderline or clinically significant range on the CBCL

TABLE 2 Bivariate Comparisons of Characteristics Associated With Unwanted and Wanted Exposure to Online Pornography (n = 1422)

Characteristic	Proportion, %			P
	No Exposure (n = 819)	Unwanted Exposure Only (n = 400)	Any Wanted Exposure (n = 203)	
Demographic characteristics				
Teen (13–17 y of age)	67	85	97	.000
Male	46	46	83	.000
At least some college education	52	59	56	.053
Household income of \$20 000 or less	9	6	9	.215
Household income of more than \$75 000	32	37	31	.231
Lives with both biological parents	63	65	56	.069
White race	75	79	77	.171
Black race	14	11	11	.211
Hispanic ethnicity	8	10	10	>.25
Internet use characteristics				
High level of Internet use	21	31	42	.000
Low level of Internet use	27	17	13	.000
What youth did online				
Used instant messaging	61	75	76	.000
Went to chat rooms	24	31	44	.000
Played games	83	81	86	>.25
Used file-sharing program to download music	29	45	54	.000
Used file-sharing program to download images	8	18	33	.000
Kept an online journal/blog	13	19	16	.028
Talked online with friends	74	85	86	.000
Visited online dating sites	1	>1	3	.005
Talked online with people not known in person	25	36	55	.000
Talked online with unknown people about sex	2	4	16	.000
Youth reported				
Being harassed online	4	9	15	.000
Receiving unwanted online sexual solicitation	6	15	21	.000
Had Internet access at				
Home	89	93	93	.071
School	88	93	94	.017
Friends' homes	61	76	81	.000
Cellular phone	12	20	25	.000
Computer was in bedroom	11	14	23	.000
Prevention efforts				
Used pop-up advertisement or spam e-mail blocker	70	79	79	.000
Used other filtering/ blocking software	51	44	47	.075
Parent talked with youth about online pornography	46	56	59	.000
Adult at school talked with youth about online pornography	35	44	39	.006
Attended law enforcement Internet safety presentation	23	19	20	.192
Psychosocial characteristics				
High parent-child conflict	11	15	20	.000
Sexual or physical abuse in past year	2	2	8	.000
Peer or other interpersonal victimization in past year	31	42	54	.000
CBCL subscales (scored in borderline or clinically significant range)				
Aggressive behavior	3	5	16	.000
Attention problems	1	1	5	.000
Rule-breaking behavior	3	5	19	.000
Social problems	5	5	11	.002
Withdrawn/depressed	3	5	9	.000

Variables with *P* values of .25 or less were included in the multinomial logistic regression model shown in Table 3.

subscale for depression/withdrawal (OR: 2.3; 95% CI: 1.1–4.8) had higher risks of unwanted exposure.

Compared with unexposed youth, youth in the wanted exposure group were almost 9 times as likely to be 13 to 17 years of age (OR: 8.8; 95% CI: 3.8–20.6) and male (OR: 8.6; 95% CI: 5.2–14.3) (Table 3). Youth who used file-sharing programs to download images had higher risk (OR: 2.6; 95% CI: 1.6–4.4), as did those who

were harassed online (OR: 2.6; 95% CI: 1.3–5.2), were solicited online (OR: 3.9; 95% CI: 2.1–7.1), talked online to unknown people about sex (OR: 2.6; 95% CI: 1.1–5.8), and used the Internet at friends' homes (OR: 1.8; 95% CI: 1.1–3.0). Youth who had software (other than pop-up advertisement or spam e-mail blockers) to filter, to block, or to monitor Internet use on the computers they used most often had reduced risk of wanted expo-

TABLE 3 Multinomial Logistic Regression Predicting Unwanted and Wanted Exposure (*n* = 1386)

Characteristic	OR (95% CI)	
	Unwanted Exposure Only (<i>n</i> = 393)	Any Wanted Exposure (<i>n</i> = 199)
Demographic characteristics		
Teen (13–17 y of age)	1.9 (1.3–2.7) ^a	8.8 (3.8–20.6) ^a
Male	NS	8.6 (5.2–14.3) ^a
At least some college education	NS	NS
Household income of \$20 000 or less	NS	NS
Household income of more than \$75 000	NS	NS
Lives with both biological parents	NS	NS
White race	NS	NS
Black race	NS	NS
Internet use characteristics		
High level of Internet use	NS	NS
Low level of Internet use	NS	NS
What youth did online		
Used instant messaging	NS	NS
Went to chat rooms	NS	NS
Used file-sharing program to download music	NS	NS
Used file-sharing program to download images	1.9 (1.3–2.9) ^b	2.6 (1.6–4.4) ^a
Kept an online journal/blog	NS	NS
Talked online with friends	NS	NS
Talked online with unknown people	NS	NS
Talked online with unknown people about sex	NS	2.6 (1.1–5.8) ^c
Youth reported		
Being harassed online	1.9 (1.1–3.2) ^c	2.6 (1.3–5.2) ^b
Receiving unwanted online sexual solicitation	2.7 (1.7–4.3) ^a	3.9 (2.1–7.1) ^a
Had Internet access at		
Home	NS	NS
School	NS	NS
Friends' homes	NS	1.8 (1.1–3.0) ^c
Cellular phone	NS	NS
Computer was in bedroom	NS	NS
Prevention efforts		
Used pop-up advertisement or spam e-mail blocker	NS	NS
Used other filtering/blocking software	0.6 (0.5–0.8) ^a	0.6 (0.4–0.9) ^b
Parent talked with youth about online pornography	1.4 (1.1–1.8) ^c	NS
Adult at school talked with youth about online pornography	1.4 (1.1–1.8) ^c	NS
Attended law enforcement Internet safety presentation	0.7 (0.5–0.9) ^c	NS
Psychosocial characteristics		
High parent-child conflict	NS	NS
Sexual or physical abuse	NS	NS
Other interpersonal victimization	1.4 (1.1–1.8) ^c	1.5 (1.013–2.2) ^c
CBCL subscales (scored in borderline or clinically significant range)		
Aggressive behavior	NS	NS
Attention problems	NS	NS
Rule-breaking behavior	NS	2.5 (1.2–5.4) ^c
Social problems	NS	NS
Withdrawn/depressed	2.3 (1.1–4.8) ^c	2.3 (0.986–5.5) ^d

An additional 36 youth were dropped from this analysis because of missing data for some variables. ORs were calculated by using multinomial logistic regression analysis, controlling for all other variables in the table. NS indicates not significant ($P > .05$). For the model, $-2 \log$ likelihood = 2154.817; model $\chi^2(df) = 490.191(78)$ ($P \leq .001$); R^2 (Cox and Snell) = 0.298; and R^2 (Nagelkerke) = 0.350.

^a $P \leq .001$.

^b $P \leq .01$.

^c $P \leq .05$.

^d NS.

sure (OR: 0.6; 95% CI: 0.4–0.9). Offline interpersonal victimization (OR: 1.5; 95% CI: 1.013–2.2) and scoring in the borderline or clinically significant range on the CBCL subscale for rule-breaking (OR: 2.5; 95% CI: 1.2–5.4) were associated with higher risk of wanted exposure. Youth who scored in the borderline or clinically

significant range on the CBCL subscale for depression were more than twice as likely to report wanted exposure, although this finding fell short of significance (OR: 2.3; 95% CI: 0.986–5.5; $P = .054$). In addition, bivariate analysis showed that, compared with other youth with wanted exposure, those with rule-breaking problems

were more likely to view pornography when they were in groups with peers (63% of rule-breakers, compared with 39% of other youth; OR: 2.7; 95% CI: 1.3–5.6; $P = .006$; data not shown).

DISCUSSION

Unwanted Exposure

Forty-two percent of youth Internet users 10 to 17 years of age saw online pornography in the past year, and two thirds of those reported only unwanted exposure. Teens had higher risks, but preteen boys in particular had considerable unwanted exposure (17% of 10- and 11-year-old boys). No other demographic characteristics were related, however. The amount of Internet use was not related and, with 1 exception, what youth did online was not related. The exception was that youth who used file-sharing programs to download images were at risk for unwanted exposure; ~1 of 5 youth with unwanted exposure had done this. This finding from a national survey confirms other reports that exposure to pornography is related to the use of file-sharing programs to download images.^{6,10} Large volumes of pornography are transmitted through file-sharing, and some file-sharing software does not include filters for sexual material (or the filters are ineffective).

Two types of prevention efforts were associated with lower risks of unwanted exposure. The first was filtering, blocking, or monitoring software. This is consistent with other findings that filtering and blocking software has a modest protective effect on unwanted exposure.¹⁹ The software that seemed to have a preventive effect was distinguished from pop-up advertisement blockers and spam e-mail filters, which suggests that more-comprehensive software is required for effectiveness. However, it is also important to emphasize that the high rate of unwanted exposure to online pornography occurred despite the use of filtering and blocking software by more than one half of families with home Internet access.¹⁴ This suggests that filtering and blocking software alone cannot be relied on for a high level of protection against unwanted exposure and other approaches are needed.

Attending a law enforcement presentation about Internet safety was also associated with reduced odds of unwanted exposure. Since the late 1990s, there has been a concerted effort among certain law enforcement agencies to provide Internet safety information to youth, and specific programs have been developed for this purpose.^{36,37} Some law enforcement programs provide specific information about how pornography is marketed online, how it can get on a person's computer, and how to avoid or to remove it.³⁷ Youth may pay more attention or give more weight to information provided by law enforcement personnel. Also, simple presentations may be particularly effective when aimed at a problem such as unwanted exposure, which may not be an outgrowth

of difficult-to-change youth characteristics or behaviors. However, youth who said they were talked to by parents or adults at school about online pornography had higher odds of exposure. One explanation for this finding is that many conversations between parents and youth happen after incidents of unwanted exposure.

We also found that certain youth seemed to be more vulnerable to unwanted exposure. There were associations between unwanted exposure and offline interpersonal victimization and borderline or clinically significant depression. These findings are similar to previous results showing associations between online harassment or sexual solicitation and offline interpersonal victimization and psychosocial challenge.³⁸ Some common underlying features, such as impulsiveness or compromised judgment, may explain these associations. For example, impulsive youth may have poor judgment or less ability to avoid unwanted online pornography or to make use of prevention information. Depression may put some youth Internet users at risk for similar reasons.

It is important not to overstate the relationship between unwanted exposure and characteristics such as offline interpersonal victimization or depression, however. These associations were not strong. Ours was a general population sample, and most youth with unwanted exposure were not victimized or depressed. Overall, the findings suggest that much unwanted exposure arises from normal Internet use and, except for downloading images with file-sharing programs, is not related strongly to specific behaviors or characteristics that increase risk.

It is also important to note that not all unwanted exposure incidents were unintentional. In 21% of incidents, youth said they knew sites were X-rated before they entered the sites.¹⁴ These episodes were not otherwise distinguishable from other instances of unwanted exposure. Some youth might have been motivated by curiosity and, even in incidents that were entirely unintentional, some degree of curiosity might have been involved. Also, most youth were not upset by the images they saw.¹⁴ Many youth may be somewhat inured to sexual images because of exposure from other sources, such as television, magazines, and R-rated films.

Wanted Exposure to Online Pornography

The great majority of youth with wanted exposure were teenage boys, and rates of wanted exposure increased with age. More than one third (38%) of male Internet users 16 to 17 years of age had visited X-rated sites on purpose in the past year. Interest in sexuality is high in this age group, and it was not surprising that wanted exposure was associated with talking online with unknown people about sex, which could be seen as another form of sexual curiosity.

Like unwanted exposure, wanted exposure was associated with using file-sharing programs to download

images. Youth who used the Internet at friends' homes also had higher risk of wanted exposure. If using the Internet at friends' homes meant using it in pairs or groups, then this might reflect a group dynamic at play among some youth, because 44% of youth with wanted exposure said they had gone to X-rated sites on purpose when they were "with friends or other kids."¹⁴ We also found that filtering and blocking software, other than pop-up advertisement and spam e-mail blockers, reduced the odds of wanted exposure.

Having delinquent tendencies seemed to be a factor in wanted exposure. Youth who scored at the borderline or clinically significant level on the CBCL rule-breaking subscale were more than twice as likely to report wanted exposure. One possible explanation is a link between rule-breaking behavior and an underlying tendency for sensation seeking.^{15,39-41} A possible association between wanted exposure and depression could have a similar explanation, in that some depressed youth might seek the arousal of online pornography as a means of relieving dysphoria.⁴²⁻⁴⁴ Although the association between wanted exposure and depression fell short of significance, the OR indicated a possible relationship.

It is also important not to overstate associations between wanted exposure and delinquency or depression. Sexual curiosity among teenage boys is normal, and many might say that visiting X-rated Web sites is developmentally appropriate behavior. However, some researchers have expressed concern that exposure to online pornography during adolescence may lead to a variety of negative consequences, including undermining of accepted social values and attitudes about sexual behavior, earlier and promiscuous sexual activity, sexual deviancy, sexual offending, and sexually compulsive behavior.^{2-4,6,8,9,44}

It is by no means established that online pornography acts as a trigger for any of these problems in youth or adult viewers. However, if it can promote deviant sexual interests or offending among some youth viewers, then the subgroup of youth Internet users with delinquent tendencies could include the youth most vulnerable to such effects, given the association between juvenile sexual offending and antisocial behavior.⁴⁵ Also, some researchers have found relationships between depression and online sexually compulsive behavior.⁴²⁻⁴⁴ This suggests that the group of depressed youth Internet users could contain some who might be at risk for developing online sexual compulsions, which could interfere with normal sexual development or impair their ability to meet daily obligations and to develop healthy relationships with peers.

Implications

The high rate of exposure to online pornography among youth Internet users merits more attention, as does the fact that most such exposure is unwanted. Surveys have

found high rates of unwanted exposure since the late 1990s, when Internet use became widespread among youth.^{6,14,17-19,21} Exposure to online pornography might have reached a point where it can be characterized as normative among youth Internet users, especially teenage boys. Medical practitioners, educators, other youth workers, and parents should assume that most boys of high school age who use the Internet have some degree of exposure to online pornography, as do many girls. One clear implication is that professionals should not shy away from this topic. Frank direct conversations with youth that address the possible influences of pornography on sexual behavior, attitudes about sex, and relationships are needed.

A focus on the unwanted aspect of much exposure to online pornography is also needed. Despite varying views on restricting adult voluntary access to legal pornography, we think that there is a consensus that youth, using a modicum of care, should be able to use the Internet without coming across pornography they do not want to see. This requires finding ways to restrict the use of aggressive and deceptive tactics to market pornography online. We also need to urge technology companies to make Internet filtering and blocking easier, more built into systems, and less reliant on individual initiative, technologic skill, and financial resources and to promote the use of filtering and blocking software in households with children. In addition, we need to educate youth about the technical details of how unwanted pornography is distributed online and to help them to protect themselves against it.

Methodologically sound empirical research about whether and how exposure to online pornography may be influencing youth is also in order. There is some evidence that youth reactions to sexual material are diverse and complex, especially among older youth,⁷ and many teens may respond thoughtfully and critically to the content of the images they see. However, there has been very little research about the impact on youth of viewing pornography, either wanted or, more relevantly, unwanted. There is no research that sheds light on whether, how, and under what circumstances unwanted exposure to pornography may trigger adverse responses in youth. Clearly, the extent of exposure is great enough that, even if adverse effects occur for only a small fraction of youth, the numbers in absolute terms could be fairly large. Researchers in the field of sexual development do not know whether there are important "primacy effects" related to early exposure of youth to pornography or what the effects of such exposures might be on anxieties, normative standards, or patterns of arousal in some youth.^{1,2}

As this study shows, it is possible to collect data on sensitive topics from youth informants. In addition to research about whether and under what circumstances viewing online pornography affects the sexual behavior

and psychological health of youth, we need information about factors that could influence youth reactions to online pornography, such as family attitudes, psychological attributes, formats and content of pornography, effects of group dynamics among youth, and whether and under what circumstances unwanted exposure may lead to wanted exposure (or vice versa).

Limitations

Research about youth and the Internet is a relatively new undertaking. Procedures for inquiry have not been standardized, and measures have not been validated. The topic of exposure to pornography is a charged one, and there is room for a substantial amount of subjectivity in responses, as well as possibilities of nonresponse and evasive responses. For example, some youth might have characterized exposure incidents as unwanted because they were embarrassed to admit that they sought out such material. The study is hampered also by the limited information it gathered about wanted exposure incidents. In addition, some youth declined or were barred from participating, and their inclusion could have changed the results.

Finally, our numbers are only estimates, and samples may be unusual. For most of our major findings, statistical techniques suggested that estimates were within $\leq 2.5\%$ of the true population percentage for 95 of 100 samples like this one, but there is a small chance that our estimates are farther off than 2.5%.

CONCLUSIONS

This study confirms the high rate of exposure to online pornography among youth Internet users and the fact that the majority of such exposure is unwanted. Both unwanted and wanted exposure is concentrated among teenagers, rather than younger children. Youth who are harassed or receive unwanted sexual solicitations via the Internet, those who experience offline interpersonal victimization, and those who are depressed may have particular difficulty avoiding unwanted exposure. Because youth who are depressed or have delinquent tendencies may be more vulnerable to any negative effects of wanted exposure, research about effects and new approaches to prevention are warranted.

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