THE EXPOSURE OF YOUTH TO UNWANTED SEXUAL MATERIAL ON THE INTERNET
A National Survey of Risk, Impact, and Prevention

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This national survey of youth, ages 10 to 17, and their caretakers has several implications for the current debate about young people and Internet pornography. Twenty-five percent of youth had unwanted exposure to sexual pictures on the Internet in the past year, challenging the prevalent assumption that the problem is primarily about young people motivated to actively seek out pornography. Most youth had no negative reactions to their unwanted exposure, but one quarter said they were very or extremely upset, suggesting a priority need for more research on and interventions directed toward such negative effects. The use of filtering and blocking software was associated with a modest reduction in unwanted exposure, suggesting that it may help but is far from foolproof. Various forms of parental supervision were not associated with any reduction in exposure. The authors urge that social scientific research be undertaken to inform this highly contentious public policy controversy.

Keywords: *pornography; victimization; Internet; adolescence*

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A large and acrimonious public debate is in progress about pornography, children, and the Internet. In its public policy dimension, the debate concerns how much and in what forms, if any, governmental, commercial, and even private regulation should be imposed on sexual materials available over the Internet to protect children from exposure.

The debate has led, among other things, to several pieces of federal legislation, including the 1996 Communications Decency Act (CDA), which was struck down by the Supreme Court in June 1997; the 1998 Child Online Protection Act (COPA), provisions of which have been voided by Appeals Courts (U.S. Court of Appeals—3rd. Cir., 2000); and the 2000 Children's Internet Protection Act (CIPA), which was partially struck down by the Supreme Court in April 2002. There has also been state legislation on the issue (Noack, 2000a, 2000b), as well as two Congressionally mandated panels, the COPA commission (http:// www.copacommission.org) and the National Academy of Sciences ("Tools and Strategies for Protecting Kids From Pornography and Their Applicability to Other Inappropriate Internet Content"—http://www.nas.edu/).

The points of view in the debate are complex. There does appear to be some polarization around the dimension of the protection of children versus the protection of free speech, with the child protectors arguing for more government regulation and the civil libertarians arguing for less. But in arguments around the utility of specific proposals, the points of view are not always predictable. Although some of the debate is philosophical and some is about technological issues, many social scientific issues amenable to empirical investigation do underlie considerable portions of the debate. Unfortunately, little information has been available to test assumptions made about these social and behavioral issues. Here are some of the empirical issues that may be implicit in the discussions.

How much exposure do children and youth actually have to sexual materials on the Internet? Some have portrayed the Internet as awash in sexual material and contact with it virtually unavoidable (Elmer-DeWitt, 1995). Others portray the sexual material as less endemic or fairly confined to certain domains. For example, citing a finding of fact agreed to by the United States Justice Department in its defense of

the 1996 Communications Decency Act, the U.S. Supreme Court asserted, "Users seldom encounter such content [sexually explicit material] accidentally" (U.S. Supreme Court, 1997).

A very acrimonious debate took place in 1995 about how much of the World Wide Web was devoted to sexually explicit sites. An article in *Time* magazine cited research concluding that 83.5% of Usenet images were pornographic (Elmer-DeWitt, 1995; Rimm, 1995). Other claims have been made that as many as 100,000 pornographic Web sites exist (Rice Hughes, 1998). Although these research claims have been extensively critiqued, none of the research addressed the underlying question of interest to many parents and policy makers of whether children and youth were getting exposed.

Under what conditions are youth exposed? Most of the debate has proceeded around the assumption that exposure of children to pornography is a problem of parent-child conflict. Young people are presumed to be interested in pornography, but some parents object to the way in which the Internet facilitates this access and makes it hard or impossible to enforce parental wishes. To the extent it is framed in this way, the problem may be seen as primarily involving that group of parents who wish to foil their children's sexual curiosity, and a matter of how much assistance government and public policy should give parents in a historically long-standing intrafamilial tug-of-war.

But searching for pornography is not the only avenue by which children can be exposed; they can encounter it involuntarily as well. Increasingly, information has circulated about sites that intentionally try to trick people into entry by using keywords that will capture surfers searching on nonsexually related topics (e.g., "sports") or capitalizing on common addressing mistakes (the infamous "whitehouse.com" or "disnie.com"). One of the major historical changes introduced by the Internet may not be how many children get exposed to sexual materials (youth access to at least some pornography may have already reached close to saturation with the erotic publishing revolution of the 1960s and 1970s) but how many get exposed involuntarily.

This issue relates to the question of how to conceptualize the Internet medium as a content provider. Regulatory policies in the United States have taken a very different stance toward television than they have toward book stores, for example, at least in part because

consumers are deemed to have less voluntary control over television content, which is simply beamed into the home and affects whoever happens to be watching once the set is turned on. Many have considered the Internet more along the lines of a bookstore, in which consumers actively search out and bring home content that they choose. The Supreme Court alluded to this distinction in its CDA opinion when it wrote, "The receipt of information on the Internet requires a series of affirmative steps more deliberate and directed than merely turning a dial" (U.S. Supreme Court, 1997). But if, in fact, a great deal of sexual material is being viewed by individuals who are not taking "affirmative steps" to receive it, then the medium takes on more of the character of the television model. Whether or not the television model is an appropriate one to guide regulatory policies concerning the Internet, there is nonetheless a very important difference for public policy if the problem is conceived as, at least in part, helping consumers and children avoid intrusive exposures they do not want as opposed to helping parents restrain children from exposures actively sought out.

Is exposure to sexual material harmful to children? Those advocating for greater regulation of sexual material on the Internet clearly believe that exposure is harmful to some or all children. Harm to children is one of the key concepts explicitly motivating and justifying COPA (1998). The free speech advocates, although they do not typically dismiss harmfulness, could in most cases be characterized as less convinced about the severity or inevitability of harm caused by simple exposure to sexual materials. General public opinion, although clearly divided on this issue, probably leans more toward the belief that there is some harm, but unfortunately there is little scientific evidence on the matter.

There is a hotly debated area of literature concerning the impact of pornography in general. The available studies are most often, but not always, interpreted as suggesting that nonviolent pornography exposure has few clearly demonstrated effects, except to promote more permissive sexual attitudes among those repeatedly exposed (Davis & Bauserman, 1993), whereas violent pornography may reinforce aggressive behavior and negative attitudes toward women, particularly among those with some aggressive predisposition (Allen & D'Allessio, 1995; Koop, 1987). But the research informing these conclusions is

almost entirely based on college students and other adults. None of it concerns children, certainly not children younger than age 14. Moreover, the existing social science research is all about voluntary and anticipated exposure. No research on children or adults exists about the impact of exposure that is unwanted or unexpected. There are a priori reasons to think such exposure might have some negative effects that voluntary exposure would not.

In the absence of evidence about the negative psychological effects of children's exposure to general pornography that could be used to justify regulation, antipornography activists have tended to cite other research about pornography: that it is used by child molesters in the seduction of children and that its consumption is sometimes a factor in the developmental histories of the child molesters themselves (e.g., Carter, Prentky, Knight, Vanderveer, & Boucher, 1987). But unfortunately, despite its plausibility from anecdotal accounts, there is little research confirming a regular or causal role for pornography in child molestation. That is, it has not been shown that pornography results in the abuse of children who would not have otherwise been abused or the creation of molesters who would not have otherwise molested. The pornography could have been incidental in pathways to abuse that were already set in motion. But even more important, the argument that pornography can create molesters or facilitate the molestation of children is not really germane to the question of regulating children's access to sexual material on the Internet. Rather, it is about the availability of pornography to adults. The harm-to-children issue is really about whether exposure to sexual materials causes psychological, moral, or developmental harm to children as a result of the viewing, and this is an eminently empirical issue on which virtually no research has been done. This study will not address whether unwanted exposure to pornography is related to long-term harm but will examine the question of immediate harm from the youth perspective.

How useful and effective is filtering and blocking software? A key argument from those opposed to governmental and any other centralized form of regulation is that another, less onerous, option is available to deal with the problem, so that regulatory measures are not warranted. The alternative option is filtering and blocking software in-

stalled by users on individual computers or by activation through a network or an Internet service provider. This software operates in two ways: (a) by filtering out the sending or receipt of messages, text, or images containing certain language or terms or (b) by blocking access to a list of unacceptable sites (or conversely only allowing access to lists of acceptable sites). Advocates argue that filtering and blocking software can do the job and also deal with problems that regulatory solutions cannot solve, such as the international scope of the Internet.

Most advice to families about Internet safety for children, including that coming from advocates of more regulation, endorses the use of filtering and blocking software. But regulatory advocates are more likely to cite the limitations of filtering and blocking software. The main empirical work on the software to date involves studies that look at the issue of whether, in artificially designed trial situations, filtering and blocking software performs as advertised, whether it blocks all the offensive sites and/or filters out all the offensive text, while allowing full access to benign sites and benign text. A small-scale study, for example, showed that the software programs in largest circulation failed to block 25% of the objectionable sites, while blocking about 21% of nonobjectionable test sites (Hunter, 2000). Likewise, *Consumer Reports* ("Digital Chaperones for Kids," 2001) evaluated the effectiveness of six specific filtering software programs in blocking inappropriate material while allowing legitimate material to come through. All but one, America Online (AOL) Young Teen control, failed to block more than 20% of objectionable sites. Software also varied widely in the amount of legitimate content blocked, ranging from only a few appropriate sites to 63% with AOL Young Teen control. A study conducted for the Kaiser Family Foundation found that Internet filters can effectively block pornography while not excessively blocking health information, but only if the most restrictive block setting is not used (Richardson et al., 2002). Here, when put at a moderate setting, the filters blocked an average of 5% of the health information and 90% of the pornography. The most restrictive block setting blocked an average of 24% of the health information and 91% of the pornography. Although such studies show possible weaknesses in the software approach, they do not address the question of how the programs work in the real world. Are they associated with a reduction in exposure to sex-

ual materials in families that activate them? What percentage of children get exposed despite the operation of the software? This study includes some information about the efficacy of filtering and blocking software, although the study was not designed to fully assess its use.

The foregoing illustrates the kinds of important empirical issues that underlie policy debates about children, pornography, and the Internet. This study was undertaken to provide some initial data that could be both grist for this debate and evidence of how empirical evidence might temper the acrimony and rhetoric and focus policy makers on facts as they try to make decisions in this contentious arena.

METHOD

PARTICIPANTS

This national sample of Internet-using youth consisted of 1,501 young people between the ages of 10 and 17 (796 boys and 705 girls). The mean age for youth was 14.14 years ($SD = 1.96$). The majority of youth were non-Hispanic White (73%) with 10% Black or African American and 8% from other races including American Indian, Alaska Native, Asian, and Hispanic White. Twenty percent of youth lived in a single-parent household. Nearly half (46%) lived in households with an annual income of more than $50,000 (see Finkelhor, Mitchell, & Wolak, 2000, for more detailed demographic information about this sample).

This is a representative sample of Internet-using youth but it's not representative of all youth within the United States because Internet use is not evenly distributed among the population. Yet, the sample for the Youth Internet Safety Survey generally matches other representative samples of youth Internet users. For example, Internet users tend to have higher incomes and more education than non-Internet users, and among lower income groups, Internet users are more likely to be White (National Public Radio, 2000). The large percentage of White youth living in high income households found in this sample parallels these findings.

PROCEDURE

The Youth Internet Safety Survey used telephone interviews to gather information from a national sample of regular Internet-using youth (Finkelhor et al., 2000; Mitchell, Finkelhor, & Wolak, 2001). Regular Internet use was defined as using the Internet at least once a month for the past 6 months, on a computer at home, school, a library, someone else's home, or some other place. Households with children in the target age group were identified through another large, nationally representative, household survey, the Second National Incidence Study of Missing, Abducted, Runaway, and Thrownaway Children (NISMART 2), which was conducted by the Institute of Survey Research at Temple University between February and December 1999. NISMART 2 interviewers screened more than 180,000 telephone numbers, using random digit dialing, to identify 16,513 households with children aged 18 and younger. Telephone numbers for households including young people aged 9 through 17 ($n = 6,594$) were forwarded to and dialed by interviewers for the Youth Internet Safety Survey (see Mitchell et al., 2001; Finkelhor et al., 2000, for more methodological details about this study).

VARIABLES

Unwanted exposure to sexual material was defined as, without seeking or expecting sexual material, being exposed to pictures of naked people or people having sex when doing online searches, surfing the Web, and opening e-mail or e-mail links. The incidence rate for unwanted exposure was estimated based on three screener questions:

- "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*?"
- "In the past year, did you ever receive e-mail or Instant Messages *that you did not want* with advertisements for or links to x-rated Web sites?"
- "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*?"[1]

Follow-up questions were limited because of time constraints. An algorithm was used to choose incidents for follow-up with the following criteria: harassment incidents chosen first (based on their low endorsement rates), sexual solicitation incidents second, and unwanted exposure incidents third. So if a youth reported one harassment incident, one sexual solicitation incident, and one unwanted exposure incident, the harassment and sexual solicitation incidents would be chosen for follow-up. Consequently, some unwanted exposure incidents reported by young people were not the subject of follow-up questions, and these incidents could not be included in the incidence rates. Further, when a selection had to be made among episodes within the same category for purposes of follow-up (e.g., a youth reported three unwanted exposure incidents), the "most bothersome" incident was chosen or, if none was "most bothersome," the most recent incident was chosen. The limits on follow-up questions probably led to some undercounting of incidents. Based on the algorithm used to select follow-up incidents, there were 78 youth who reported an unwanted exposure incident and didn't get counted, therefore these youth were completely excluded from the analyses for this article.

Among the exposures reported by youth, we also sought to identify a particular subgroup that included those that were considered very or extremely distressing to the youth. These, termed *distressing exposures*, were unwanted exposures where youth rated themselves as very or extremely upset as a result of the incident. It is important to note that this survey only addresses youths' more immediate reactions to unwanted exposure. It is not designed to assess any long-term reactions or long-term feelings of distress.

Constructed variables. There were several constructed variables included in the analyses. *High delinquency* is a composite that includes a factor analysis loading of variables from a delinquency scale (beating up someone on purpose, being picked up by the police, banging up something that didn't belong to you on purpose, and/or taking something that didn't belong to you) and from a substance use scale (using alcohol four or more times per week and/or using illicit drugs). To tap into youth reporting particularly high levels of these characteristics, those with a composite value two standard deviations above the

mean and higher were coded as having this characteristic whereas the rest were coded as zero.

Troubled is a composite that includes a factor analysis loading of items from a negative life event scale (death in the family, moving to a new home, parents being divorced or separated, and/or a parent losing a job), from the physical and sexual assault items on a victimization scale, and from a depression scale (five or more depression symptoms in the past month). Those with a composite value one standard deviation above the mean or higher were coded as having this characteristic, whereas the rest were coded as zero.

High and low Internet use are two constructed variables derived from a factor analysis loading of several items: high experience with the Internet (4 or 5 on a scale of 1 to 5), high importance of Internet in child's life (4 or 5 on a scale of 1 to 5), spending 4 or more days online in a typical week, and spending two or more hours online in a typical day. Youth with a composite value one standard deviation above the mean or higher were considered high Internet users, whereas those with a value of zero on the composite were low Internet users.

High online risk behavior variable is a composite derived from a factor analysis loading of the following dichotomous variables pertaining to behavior online: posting personal information, making rude or nasty comments, playing a joke on or annoying someone, harassing or embarrassing someone, talking about sex with someone the youth never met in person, and going to x-rated sites on purpose. Youth with a composite value two standard deviations above the mean or higher were considered high online risk takers.

High positive parent-child relationship is a composite developed from a factor analysis loading of the following items from a parent-child relationship scale: how well the parent and child get along, how often the parent and child have fun together, how often the child discusses sadness or being troubled with the parent, and how often the child thinks the parent trusts her or him. Those scores with a composite value one standard deviation above the mean or higher were coded as having this characteristic, whereas the rest were coded as zero.

High conflict parent-child relationship is a composite developed from a factor analysis loading of the following items from a parent-child relationship scale: how often the parent nags the child, how often

the parent takes away the child's privileges, and how often the parent yells at the child. Those scores with a composite value one standard deviation above the mean or higher were coded as having this characteristic, whereas the rest were coded as zero.

STATISTICS

Bivariate. A series of Pearson chi-square tests and relative risk estimates was used to compare exposed youth with nonexposed youth, as well as distressed and nondistressed youth, on several characteristics. To control the familywise error, the criteria for significance was set at .01. Variables significant at the bivariate level were included in the multivariate analysis.

Multivariate. Logistic regression variables were entered in a stepwise fashion beginning with demographic variables in the first step followed by variables associated with youth offline behavior, youth online use behavior, online risk-taking behavior, and parental supervision (when appropriate) of Internet use variables in subsequent steps.

RESULTS

INCIDENCE AND EPISODE CHARACTERISTICS

One quarter (25%) of the youth who used the Internet regularly had one or more unwanted exposures to sexual pictures while online in the past year. Seventy-three percent of these exposures occurred while the youth was searching or surfing the Internet, and 27% happened while opening e-mail or clicking on links in e-mail or Instant Messages (see Table 1). Most of the unwanted exposures (67%) happened while the youth was using the Internet at home, but 15% happened at school, and 3% happened in libraries. The remainder occurred at other homes and other locations.

Most of the imagery was simply of naked persons, but 32% showed people having sex, and 7% involved violence in addition to the nudity and sex. It would have been valuable to know how many of the exposures contained child pornography (of which transmission is illegal),

TABLE 1
Characteristics of Unwanted Exposure Incidents

	% All Exposures
Incident characteristics	*n* = 376
Type of sexual material	
Naked person(s)	83
People having sex	32
Violent sexual pictures	7
How exposure happened	
Surfing	73
E-mail	27
Location youth was using Internet when incident occurred	
Home	67
School	15
Someone else's home	13
Library	3
Disclosure	
Friend and/or sibling	30
Parent	39
Other adult	2
Teacher or other school person	3
Internet service provider or Cyber Tipline	4
Police or other authority	—
Someone else	1
No one	43
Knew site was x-rated before entering	13
Very/extremely upset about exposure	24
Very/extremely embarrassed about exposure	21
Stress symptoms (more than a little or all the time)	
At least one of the following	19
Stayed away from Internet	17
Thought about it and couldn't stop	6
Felt jumpy or irritable	1
Lost interest in things	1
Surfing exposures	*n* = 273
How Web site came up	
Link came up as a result of search	47
Misspelled Web address	17
Clicked on link while in other site	17
Other	15
Don't know	4
Returned to Web site	2
Taken to another x-rated site when trying to exit the first one	26
E-mail exposures	*n* = 103
Youth received e-mail at personal address	62
E-mail sender unknown	92

but we had concluded that the youth participants could not be reliable informants about the ages of individuals appearing in the pictures they viewed.

For the youth who encountered the pictorial material while surfing, the most common route to exposure was as a result of searches (47%), conducted either with a search engine or as a result of directly typing in a term, such as, in one case, www.fun.com. Another 17% came upon the sexual material by clicking on links in Web sites that brought them to the sexual material. Still another 17% said they had reached the link as a result of misspelling an address, such as, in one case, "teeen" instead of "teen."

Explicit sex sites are also sometimes programmed to make them difficult to exit, referred to as "mousetrapping." In fact, in some sites the exit buttons take a viewer into other sexually explicit sites. Indeed, in 26% of the surfing incidents, youth reported they were brought to another sex site when they tried to exit the site they were in. This happened in one third of distressing incidents.

Youth who encountered the material through e-mail, rather than while surfing, did so mostly by opening messages coming from senders unknown to the youth (92%), not friends or acquaintances. The messages were sent predominantly to addresses used exclusively by the youth (62%), but more than one third came to addresses shared by the youth with others.

In 13% of incidents (surfing and e-mail combined), the youth said they did know the site was x-rated before entering. (These were all encounters they had described earlier as unwanted or unexpected.) This group of at least partly anticipated exposures was not distinguishable in any fashion from the other 87% of episodes, including the likelihood of being distressing. Almost half of these incidents (39%) were disclosed to parents. It is not clear to what extent it was some curiosity or just navigational naiveté that resulted in the opening of the sites in spite of the prior knowledge.

YOUTH MOST LIKELY TO HAVE EXPOSURE

More boys than girls encountered these unwanted sexual materials (57% to 42%). Older youth had more exposure than younger youth. In fact, more than 60% of the unwanted exposures occurred to youth age

15 or older. Only 7% of the unwanted exposures were to 11- and 12-year-old youth, and none of the 10-year-olds reported unwanted exposures. It is interesting that more affluent youth (those whose family incomes exceeded $50,000) also had more exposure.

A variety of individual characteristics and patterns of Internet use was also associated with exposure at a bivariate level (see Table 2). Because some of these might have been spurious correlates of gender, age, or social class, only those that were significant in the logistic regressions are discussed below (see Table 3). Youth were more likely to have unwanted exposure if they used the Internet a great deal, used it at other households, participated in chat rooms, and used the Internet for e-mail. These are all indicators of more extensive, more exploratory, and perhaps more independent Internet activity. Youth were also more likely to have exposure if they talked to strangers online and if they engaged in what we labeled "online risk behavior," a list of activities that included playing jokes on or harassing someone online, or going to x-rated sites intentionally. Personal characteristics also predicted exposure. Youth who were troubled and those who reported physical or sexual abuse or depression, among other things, had more exposure. Younger youth were also less likely to be exposed.

Overall, it appears that more intensive, more exploratory, and more risky Internet activities increase the chance of exposure to unwanted sexual materials. Troubled youth also are more likely to get exposed. But this should not leave the impression that exposure is confined to such youth. For example, 45% of the exposures occurred to youth who were not troubled and who were not high or risky Internet users. This is a reflection of the fact that the explanatory power of the variables associated with exposure is rather weak. Most of the exposure is fairly arbitrary or explained by factors other than ones identified here.

YOUTH RESPONSE TO EXPOSURE

In the wake of their exposure, only slightly more than half the youth disclosed it to anyone (57%). In 43% of the episodes, youth disclosed to no one. Parents were told or found out in 39% of the episodes. Youth disclosed to a friend or sibling in 30% of episodes (see Table 1). Few youth or their families notified authorities about these episodes, and when they were notified, most frequently the authority was a teacher

TABLE 2
Characteristics of Youth Who Did or Did Not Report Unwanted Exposure to Sexual Material

Variable	*% Exposed Youth (n = 376)*	*% Nonexposed Youth (n = 1,047)*	*Relative Risk Estimate*	*95% Confidence Interval*
Demographic characteristics				
Youth is age 10 to 13[a]	21	44	0.4**	0.3-0.5
Youth is female	42	49	0.8	0.6-1.0
Youth is of White race	77	75	1.1	0.9-1.5
Youth has disability	14	14	1.0	0.7-1.4
Youth lives in single-parent household	20	20	1.0	0.7-1.3
Annual household income more than $50,000	60	52	1.4*	1.1-1.7
Household adult holds college degree or higher	57	53	1.2	0.9-1.5
Resides in urban community	18	14	1.3	1.0-1.9
Offline characteristics				
Youth likes a lot/loves school	38	47	0.7*	0.5-0.9
Youth is an above average student	47	41	1.3	1.0-1.6
Spends time with friends more than 2/3 times a week	40	31	1.5**	1.2-1.9
High delinquency	11	3	3.3**	2.1-5.3
Troubled	21	12	1.9**	1.4-2.6
High positive child-parent relationship	10	17	0.5**	0.3-0.7
High conflict child-parent relationship	26	16	1.8**	1.4-2.5
Online usage characteristics				
Low Internet usage[a]	29	48	0.6**	0.5-0.7
High Internet usage[a]	40	21	1.9**	1.7-2.2
Goes to Web sites	97	93	2.1*	1.1-3.8
Uses e-mail[a]	88	70	1.3**	1.2-1.3
Goes to chatrooms[a]	73	47	1.5**	1.4-1.7
Uses Instant Messages[a]	70	48	1.5**	1.3-1.6
Uses Internet at home	82	71	1.8**	1.4-2.5
Uses Internet at school	75	72	1.2	0.9-1.5
Uses Internet at other households[a]	83	62	1.3**	1.3-1.4
Online behavior characteristics				
Talks with strangers online[a]	74	47	1.6**	1.4-1.7
High online risky behavior	12	2	7.0**	4.1-12.0
Supervision characteristics				
Parent reported current use of home filtering/blocking software	23	23	1.0	0.8-1.4
Parent uses AOL Parental Controls at home	6	9	0.7	0.4-1.1
Youth reported current use of home filtering/blocking software	17	24	0.7*	0.5-0.9
Has to ask permission to go online	27	32	0.8	0.6-1.1
Rule about the number of hours spent online	25	27	0.9	0.7-1.2
Rule about things not supposed to do online	83	80	1.2	0.9-1.6

(continued)

TABLE 2 (continued)

Variable	*% Exposed Youth (n = 376)*	*% Nonexposed Youth (n = 1,047)*	*Relative Risk Estimate*	*95% Confidence Interval*
Parent/guardian has asked what youth does online	82	76	1.5*	1.1-2.0
Parent/guardian has checked screen while youth was online	72	64	1.4*	1.1-1.8
Parent/guardian has checked history function	51	40	1.5**	1.2-1.9
Parent/guardian has checked files or diskettes	36	31	1.3	1.0-1.6

a. Odds ratios were corrected to approximate risks ratios (Zhang & Yu, 1998).
* $p < .01$. ** $p < .001$.

TABLE 3
Logistic Regression of Youth Risk for Unwanted Exposure to Sexual Material

Variable	*Unwanted Exposure Risk*	
	Odds Ratio	*95% Confidence Interval*
Youth age 10 to 13[a]	0.5**	0.4-0.7
Troubled	1.8**	1.3-2.6
High Internet use	1.5*	1.1-2.0
E-mail use	2.0**	1.3-2.9
Chatroom use	1.6*	1.1-2.1
Uses Internet at other households	1.9**	1.3-2.6
Talks with strangers online	1.5*	1.1-2.0
Online risk behavior[a]	3.1**	1.7-5.4
–2 log likelihood	1409.13	
Chi-square (*df*)	231.59 (8)**	
R^2 (Cox & Snell)	.15	
R^2 (Nagelkerke)	.22	

a. Odds ratios were corrected to approximate risks ratios (Zhang & Yu, 1998).
* $p < .01$. ** $p < .001$.

or school official (3% of incidents) and Internet service providers (4%). None of these incidents were reported to police. Only 2% of youth with unwanted exposure incidents while surfing a Web site said they returned later to the site of the exposure. None of the youth with distressing exposures returned. The fact that so many youth did not mention their exposure to anyone, even a friend, even to talk about it as

anecdote or an adventure, is noteworthy. It probably reflects some degree of guilt on the part of many youth.

In response to questions about their emotional reactions to the episode, 24% of youth said they were very or extremely upset by the exposure. This amounts to 6% of regular Internet users. Twenty-one percent of youth also said they were very or extremely embarrassed. Given a list of stress symptoms (feeling jumpy, irritable, or having a hard time falling asleep; losing interest in things you usually care about; staying away from the Internet; and thinking about what happened so much you couldn't stop), 19% reported at least one symptom of stress at the level of more than a little or all the time during the days right after the incident happened.

In another series of bivariate analyses, few of the characteristics of the youth, their patterns of Internet usage, or the features of their actual exposure actually helped to explain why some youth experienced distress. There was a nonsignificant trend for younger youth, those younger than age 14, to be more distressed than those age 14 to 17. On the other hand, girls were not any more distressed than boys. Moreover, encountering sexual acts, violence, or getting trapped in the site did not necessarily increase the distress. A distressed reaction appears to be a not uncommon, but still fairly idiosyncratic, response or at least not explained by any of the factors one might initially expect.

PREVENTION MEASURES

Parents in the survey displayed a high level of concern about the possibility of their children being exposed to sexual material. The majority of parents (84%) said adults should be extremely concerned about youth being exposed to sexual material on the Internet. In light of this concern, they indicated that they engaged in a number of activities to supervise or protect children against exposure (see Table 2). Parents had rules about things youth were not supposed to do online, the number of hours spent online, and having to ask permission before going online. Many had asked what the child does online, checked the screen while the child was online, checked the history function to see where the child had been, and checked files and diskettes. Some of these endorsements seem suspiciously high, such as the percentage who say they check the history function, which may reflect parents'

efforts to appear responsible to their interviewer or a misunderstanding of what exactly was being asked.

A prevention measure that is being particularly promoted by law enforcement, public officials, the Internet industry, and private commercial concerns is blocking and filtering software. Thirty-eight percent of the parents with home Internet access indicated that they had installed such software in the past year, although 5% had discontinued its use so that only 33% were currently employing it. The survey also asked the youth themselves about whether filtering and blocking software was installed on their computer and 31% of those with home access indicated that it was, although parents and youth were not always concordant about the usage of such devices represented by a correlation of .43 between parent and youth reports.

We examined the survey results to explore the question of whether filtering and blocking software or any other parental supervision activity was associated with less unwanted youth exposure to sexual materials. The software usage and supervision variables (listed in Table 2) were added to the previous analyzed logistic regression model. A serious limitation to this exercise, however, is the study's lack of any information about the temporal sequencing of the exposures with respect to the prevention activities. Thus, we only know if prevention software or activities were in effect at all during the past year, not whether they were in place for the whole year or prior to any exposure episodes. Exposure experiences might have actually precipitated the acquisition of software or the institution of more supervision.

With this caveat, it does appear that when youth reported that filtering or blocking software was in use in their household, they were 40% less likely to have unwanted exposure to sexual materials (see Table 4). Curiously, though, the parent reports (as opposed to the youth reports) about the employment of filtering and blocking software did not predict exposure. Youth knowledge about the software may have been more accurate or more specific to the computer the youth used. Or it may be that unless the youth knows about the software, the youth is not engaging in activities or deterred from activities that would create a risk for exposure.

Beyond the software, other parental supervision activities were not associated with any reductions in exposure. A few supervision activities (checking the history function, asking what the youth does while

TABLE 4
Relation of Filtering/Blocking Software and Risk of Unwanted Exposure to Sexual Material

Variable	*Odds Ratio*	*95% Confidence Interval*
Parent-home use of filtering/blocking software	*ns*	*ns*
Parent-use of AOL Parental Controls	*ns*	*ns*
Youth-knowledge of home use of filtering/blocking software	0.6*	0.4-0.8
–2 log likelihood	1398.63	
Chi-square (*df*)	242.09 (9)**	
R^2 (Cox & Snell)	.16	
R^2 (Nagelkerke)	.23	

NOTE: The regression shown in this table also included all the variables in Table 3.
* $p < .01$.

online, and checking the screen while the youth is online) appeared to be associated with a greater likelihood of exposure to sexual materials. A possible explanation of this finding is that youth whose parents check their history function may be engaging in the kind of more risky activities that may lead to exposure. Another explanation is that when youth have exposure, parents may be prompted to increase supervision by checking the history function. This finding, consistent with a reverse causal sequence, gives emphasis to the caveat cited earlier. If some increased supervision is occurring as a result of exposures, it could be that some filtering and blocking software is also being acquired after exposures. This post-hoc acquisition would have the effect of reducing the size of the protective effect of filtering and blocking in these data.

DISCUSSION

Findings from this national survey of youth who use the Internet do seem to address issues in the debate over children, pornography, and the Internet. We will take up some of these issues in turn.

Do young people have extensive exposure to sexual materials over the Internet? The finding that one in four youth who regularly use the Internet encounters unwanted sexual pictures every year does seem

like a considerable level of exposure. At this annual rate, the rate of all those exposed over the 5- to 10-year period of their childhood Internet use is likely to be quite a bit higher. Unfortunately, we do not know what are comparable rates of exposure for other environments. For example, unwanted exposure may occur from cable TV in homes or other locales that have adult channels, such as videos and movies in which rating information was ignored or misunderstood, from book or magazine displays, or from friends or schoolmates. Still, 25% annual exposure rate is a level of offensive exposure that is higher than most adults would expect.

To what extent are young people's exposures voluntary or involuntary? The study found ostensibly more involuntary than voluntary exposure. Only 8% of the sample admitted going to x-rated sites on the Internet on purpose, in contrast to the 25% who were exposed to unwanted material. However, it seems probable that the figure for voluntary exposure is an underestimate, because such behavior may be more embarrassing to disclose and also because we asked only about going to x-rated sites and not (as we did with unwanted exposure) about opening x-rated e-mail as well.

The important point, however, is not that involuntary exposure is necessarily more common, but only that it is quite common and that it accounts for a considerable portion of total exposure. Much of the debate on Internet pornography has presumed that to see sexual materials, someone has to go looking for them. "The 'odds are slim' that a user would enter a sexually explicit site by accident . . . the receipt of information on the Internet requires a series of affirmative steps," according to the Supreme Court opinion in the CDA. Even if we were to exclude the youth in the study who could be described as troubled, online risk takers, and high volume Internet users, we would still be left with nearly half (45%) of the exposures to youth who had no such characteristics. Their rate of unwanted exposure was 18% with 4% experiencing distress. These did not appear to be youth taking "affirmative steps" or making themselves vulnerable to pornography exposure.

In the policy debate about the Internet, the question about the voluntary or involuntary nature of exposure could have considerable importance, and studies looking at exposure need to make such distinctions, as a recent National Public Radio/Henry Kaiser Foundation

(2000) survey (which found 31% lifetime Internet pornography exposure for 10- to 17-year-olds) did not. For example, policy makers have been willing to consider and accept more regulation of an information medium like television, where the audience, once tuned to a channel, has to involuntarily accept whatever is broadcast, to a greater extent than a medium like a bookstore, where the audience can choose what to look at, what to buy, and what to read. Choice is a key dimension with people more willing to restrict intrusion than choice. All systems that provide content have dimensions of both choice and intrusion. Policy makers might find that there is consensus around regulatory steps that inhibit involuntary and intrusive exposure on the Internet, including penalties against or consumer remedies for those who try to trick or entrap or who send spam (mass-mailed and unrequested e-mail) with sexual content.

Does exposure cause any kind of harm? The results of the study can be read as supportive of different contentions about harm, depending on the emphasis one chooses to give them. On one hand, it is clear from their reactions that the majority of youth regard their personal unwanted exposures as not particularly distressful, little more than nuisances, litter on their information superhighway. So in the immediate short-term sense, not knowing much about its possible long-term effects on attitudes, it could be said that the exposure to sexual material was typically not harmful.

On the other hand, there are findings from the study that do bolster concern about harm: the ones showing that one quarter of those exposed said they were very or extremely upset and one fifth had some apparent stress symptoms that they connected to the episode. This does contravene some people's ideas that pornography exposure is generally appreciated or dismissed by all but a small minority of perhaps prudish youngsters. However, these findings are somewhat hard to interpret without any comparative perspective. We do not know whether the levels of upset here are comparable to those experienced by common youthful events, like getting a bad grade, or represent a more serious level of trauma, like a minor assault or automobile accident. Given the large number of exposures, though, even a small percentage with seriously upsetting reactions does represent a potentially large number of children—in this case, the distressed 6% of the total

sample could represent more than a million children, and even if the seriously distressed group were 1%, it would be more than 200,000 (see Finkelhor et al., 2000, for details about how this national estimate was derived).

The possibility that thousands of children get immediately upset does suggest a different dimension to harm than what is probably the most common sense of harm in the pornography debate—the idea that exposure has some long-term corrosive effect on moral development. That may or may not be true, but there are also a variety of other negative effects that are worth considering. Such exposure, particularly unwanted exposure, may affect attitudes about sex, attitudes about the Internet, and young people's sense of safety and community. It may also have effects by creating family conflicts and generational tensions, if, for example, some of the distress may be due to guilt feelings and a belief among children that revelation of these incidents would prompt parents to curtail their Internet privileges. It also does suggest that the assessment of distress and harm as a result of such exposures should be something that is treated as perhaps more central in the policy debate. If we understood specifically what was distressing and harmful to even a minority of young people, policy might be crafted to minimize such conditions or provide education or even interventions that could prevent or minimize such reactions. Studies designed to assess the long-term impact of unwanted exposure would contribute important information toward this debate.

It is also interesting to note that in spite of so many youth being personally unfazed by their encounters with sexual materials, the young people did not see public concern about this problem as unwarranted and overly paternalistic. Although they were a bit less agitated about this issue than their parents, fully 74% said they thought adults should be very or extremely concerned about the problem of young people being exposed to sexual material on the Internet. This suggests that it is not just adults who see a public policy problem that needs to be addressed. It is interesting that youth who had not been exposed tended to see the problem as somewhat more concerning than those who had (76% of the nonexposed vs. 65% of the exposed). This suggests that concern may be more based on preconceived notions rather than real experiences. But youth do not appear to be disagreeing with the perspective of parents and policy makers.

Is exposure confined to or specific to certain kinds of youth? One piece of good news from the survey is that exposure is relatively infrequent for the youngest youth. No 10-year-olds and just a few 11-year-olds reported exposure. The priority to prevent younger children's exposure is bolstered by findings that they were a group more likely to be distressed in its wake. In part, younger children are protected because they do much less independent exploring on the Internet. But Internet usage by younger children is increasing rapidly (Richardson, 1999; Jupiter Communications, 1999), so this age group may become relatively more vulnerable to exposure over time. They are certainly not immune.

By contrast, the finding that troubled youth (i.e., those who have experienced a negative life event, experienced sexual or physical assault, and/or had several symptoms of depression) have more exposures is likely to be read by some parents as a sign that less troubled youngsters are protected from this peril. Yet, as previously mentioned, youth who weren't troubled or high online risk takers or high Internet users experienced unwanted exposure. So although it would certainly seem that being a troubled youth can increase risk somewhat, the rates were still sufficiently high for kids without any risk factor that it would be hard for parents to take much comfort from having a child they believed to be well-adjusted.

It is also important to note that there were no significant gender differences in the likelihood of exposure. In the debate about children and pornography, the assumption, based on the youth curiosity model, has been that boys were the primary culprits. Although boys were almost six times more likely to admit to voluntary exposure, the involuntary exposure happened to both genders equally. It is not clear whether the image of girls being involuntarily exposed in large numbers changes the terms of the debate, but public policy has historically been more willing to protect girls than to control boys.

Is exposure specific to certain kinds of activities? Youth do seem to increase their risk for exposure by the things that they do on the Internet. Using the Internet a lot, taking risks online, going to chat rooms, and using the computer in other people's homes all were among the most predictive behaviors. This certainly suggests, as one might expect,

that a highly exploratory or somewhat reckless orientation to the Internet is partly to blame when youth have involuntary exposures. What is hard to say is which of these behaviors is the online equivalent of drunk driving (almost inviting an accident) and which the equivalent of talking on a cell phone while driving (simply being inattentive while navigating). However, none of the behaviors had an extremely high odds ratio, suggesting that it might be a mistake to try to blame the exposure on the Internet habits. On the other hand, the findings do suggest that some obvious precautions may at least somewhat reduce the chances that a youth may get exposed. Once again, however, it is important to emphasize that there was plenty of exposure among those youth who did not engage in risky activities. So parents and policy makers probably cannot count on sensible behavior to dramatically reduce these kinds of offensive experiences.

Does filtering and blocking appear effective? The study findings about filtering and blocking software appear both encouraging and at the same time cautionary. The good news is the suggestion from the multivariate analysis that youth were less likely to have exposure to sexual materials when the family computer or Internet portal was outfitted with such software. This would imply that the software accomplishes one of its stated goals in the real world. (We can only say that the evidence is suggestive because the study is not suitably designed to confirm a causal relationship.)

On the other hand, one of the cautionary findings is that despite its ability to decrease exposure, the software seems far from foolproof. At least 18% of the children who said their families used filtering and blocking software got exposed on a computer in their household. Here again, however, the interpretation is problematic because some of the installations may have occurred after or as a result of the youth's exposure. So the failure rate may have been considerably lower than 18%. (The failure rate was 9% among those youth who did not tell their parents about their exposure, that is, families where the software was not likely to have been installed as a result of the exposure. But even here the exposure might have preceded the software installation.) Clearly, if families want to rely on filtering and blocking software, we need to know what the real world failure rate really is.

Another problem identified by the survey is the relatively low level of filtering and blocking software adoption. A little more than a third of the families with regular Internet-using youth had installed the software during the year, and of those, 5% had discontinued its use. Given the high level of concern that parents express over the problem (93% say they are very or extremely concerned), it seems hard to attribute the low level of software adoption simply to ignorance or passivity. More likely, people are skeptical about the effectiveness of the software or they do not find it suitable to their own computer skill level or the family dynamics. In particular, parents may feel that imposing such software would negatively affect their relationship with their teenage children.

Taken all together, the data from the survey reinforce other research suggesting that filtering and blocking software has problems, at the current moment, as a strategy for protecting youth from even unwanted pornography exposure. Such problems may or may not be amenable to solution.

Does parental supervision make any difference? Family guides to children's Internet safety typically recommend a variety of other measures parents can take to protect children—like having rules, checking the screen, or checking the computer's history function. Unfortunately, this study does not give a great deal of encouragement that measures beyond filtering and blocking software have much of a preventive impact at least for unwanted exposure. Such practices were not associated with any lower level of exposure. But again, the study was not ideally designed to evaluate the effects of such measures. One particular problem in this study, suggested by the high rates we found, is that parents may have exaggerated the level of supervision and monitoring they engage in, to appear to be responsible parents. Nonetheless, it is probably important to ascertain whether parental supervision is of more than marginal utility, because current policy does put a large measure of responsibility for prevention in the hands of parents. We strongly recommend experimentally designed studies that test the efficacy of parental education and supervision as well as the adoption of filtering and blocking software under real world conditions.

LIMITATIONS OF THE STUDY

Being the first of its kind, this study is very instructive about the broad range of empirical issues that might be amenable to research and provide some useful information to the debate about children and Internet pornography. At the same time, the study has a variety of limitations that need to be kept in mind in interpreting the findings. Research about the Internet, and even more so, children and the Internet, is a very new undertaking. Procedures for inquiring about this realm of activity have not been standardized or validated, and this study did not use measures that had been evaluated or validated in other research and, thus, may be flawed by as yet unrecognized problems. The particular topic in question, exposure to sexual materials, is a highly charged one, and there is room for a substantial amount of subjectivity in the response—for example, on such a key issue as whether the exposure was unwanted or whether the picture contained sex or nudity. Systematically biased reports on these matters could undermine the study's conclusions. Further research aiming to validate some of these measures is an important next step in studying youth and the Internet.

The possibilities of nonresponses and evasive responses in the study are also substantial, if young people did not want to disclose potentially embarrassing encounters. Some youth declined or were barred from participating, and we do not know whether their inclusion could have changed the results. More research testing alternate techniques, such as experimental designs, in-person interviews, vignettes, and qualitative designs, will help inform the field as to the best methods for gathering these data.

The study also is hampered by the limited information it gathered about potentially important matters, such as the characteristics of the exposures. We know little about what exactly the youth saw or what precise sequence of activities led to the exposure. Knowledge about these details might temper or change the implications of the findings. Some of the measures in the study are rather crude by standards in the social science literature. The measures of distress, for example, are very limited, compared to standard trauma measures, and the measure of delinquency, likewise so. Another problem, already mentioned, is the inability of the study to specify the temporal ordering among pre-

ventive measures (such as the adoption of filtering and blocking software) and incidents of exposure. Longitudinal and qualitative research, along with the use of standardized measures, will be useful to tap into these details and help separate sequences of events.

Finally, there is some bias in the sample selection. In 25% of the households with two or more Internet-using youth, the interviewed youth was not chosen at random but was the one who used the Internet most often. This could introduce some bias in the findings toward youth who are heavier Internet users. Still, the definition of *regular use* was broad enough (at least once a month for the past 6 months) in that it allowed us to study youth with a broad range of Internet-use behaviors, from very low to very high rates of use. For example, 58% of youth said they used the Internet no more than 3 days a week and 61% said they were online 1 hour or less on a usual day when they used the Internet.

CONCLUSION

Given the passions that swirl around the issue of the Internet, children, and pornography, it is unlikely that one or even several social scientific studies will resolve the debate. Nonetheless, it is interesting that on a topic of such a public policy controversy, social science has up until now had so little to offer. One barrier has certainly been the ethical problems that attend to studies concerning sex and children. Another barrier is probably the concern that anything in this area is at risk of being misused.

We think that this study illustrates the utility and urgency of more social science evidence to inform policy in this area. If the main finding of this study is confirmed—that the problem of children and sexual material on the Internet is to a much greater extent than recognized a problem of unwanted exposure—this is important. This fact could alter elements of the debate. But perhaps even more important, we hope that this study persuades many that the debates concerning the well-being and autonomy of youth deserve to be informed by social scientific fact that can be made available through scientific inquiry.

NOTE

1. Only youth responding positively to this subquestion (i.e., those who actually opened and viewed a sexual image) are included in incidence rates.

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