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Is Social Status Related to Internet Pornography Use? Evidence from the Early 2000s in the United States

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Abstract While most studies on Internet pornography focus on individual's psychological characteristics, few have explored how social status itself is associated with Internet pornography use. As the Internet is becoming increasingly prevalent, online behaviors may have started to reflect the inequalities of the offline world. This study tested whether lower social status was associated with fewer sexual intercourse opportunities, and whether this led to higher likelihood of using Internet pornography as an alternative means of sexual release. To test the theory, I used the nationally representative sample of the General Social Survey of the U.S. between 2000 and 2004, with missing data handled by chained multiple imputation. The analyses found that lower income, longer working length, being unemployed, or a laborer in the social class strata were associated with fewer sexual intercourse opportunities as measured by three variables: marital status, the number of sex partners, and sex frequency. Lower income, less education, and longer working length were also associated with higher odds of using Internet pornography in the past 30 days, but only income was partially mediated by marital status. Social status was associated with Internet pornography use and sexual intercourse opportunities independently. The comparison of Internet pornography with the traditional X-rated movie found the unique features of Internet pornography use absent for X-rated movie.

Introduction

Internet pornography has become popular among Americans since the high-speed Internet has enabled the convenient and low-cost consumption of virtual sex. Today, a significant proportion of people have used online pornography (Fisher & Barak, 2012); a small proportion that use it excessively could even qualify as needing further investigation for addiction (Greenfield, Orzack, & Cooper, 2002; Griffiths, 2001). Amidst the debate on pornography and sexual deviance, a common perspective has assumed pornography use is largely a voluntary behavior that constitutes an independent variable leading to other deviances (e.g., rape, voyeurism). It also appears as a behavioral consequence of other media consumption (Barak & Fisher, 2002; Cooper, 1998; Stein, Black, Shapira, & Spitzer, 2001).

There are many studies conceptualizing Internet pornography use based on individual psychological dispositions (Paul, 2009; Seto, Maric, & Barbaree, 2001; Stein et al., 2001). But to my knowledge, few have examined how social status can influence pornography use. A recent meta-review by Short, Black, Smith, Wetterneck, and Wells (2012), for example, has highlighted the paucity of research on the social antecedents of Internet pornography consumption.

This study sought to test the hypothesis that social status is associated with Internet pornography consumption in the United States, even after controlling for the effects of basic demographic characteristics, social bonds, and opportunity factors. I used the General Social Survey from the year 2000 and 2004 to answer this research question. The same models for Internet pornography use were also applied to watching X-rated movies in order to compare whether watching Internet

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pornography differs from watching erotic materials via traditional media.

Opportunity to Access the Internet

Many studies found that by the early 2000s in the U.S., a majority of the population already had access to the Internet (Brodie et al., 2000; Cetron & Davies, 2005; Ybarra & Mitchell, 2005), as the gap was rapidly narrowing from the late 1990s (Ono & Tsai, 2008). Even when the digital gap existed, the poor and the well-offs differed in the content of internet use rather than the ubiquitous usage (Brodie et al., 2000; Graham, 2008; Keegan, 2004; Peter & Valkenburg, 2006).

At the same time when the digital divide vanished, the manner of using the Internet differed from traditional media. The advantages in lower price, anonymity, and accessibility have made Internet pornography a convenient and low-cost channel compared with traditional pornographic media such as a theater, magazine, or DVDs. Because of these advantages, its user group spread beyond the self-initiated active users to include many involuntarily users and passive adopters. From national representative samples, scholars found 66 % of who viewed Internet pornography were doing so involuntarily (Wolak, Mitchell, & Finkelhor, 2007), and over 90 % of boys and 60 % of girls were ever exposed to Internet pornography (Sabina, Wolak, & Finkelhor, 2008), indicating the accessibility to Internet pornography is unprecedented in the U.S. The trend was similar in other developed countries as of the early 2000s (Luder et al., 2011). Opportunity factors such as access to the Internet, computer knowledge, and concerns of anonymity thus may affect Internet pornography use differently from using traditional pornographic media.

Social Status

One study summarized that "when the Internet matures, it will increasingly reflect known social, economic and cultural relationships of the offline world, including inequalities" (van Deursen & van Dijk, 2014). As the disparity of accessing the Internet is quickly narrowing or even disappearing in the developed countries like the U.S., I hypothesize that the likelihood of using Internet pornography relies not primarily on the opportunity to access the Internet, but is associated with one's social status even after controlling for internet accessibility and demographic background.

Social status influences the likelihood of having sexual intercourse opportunities, and the lack of them may urge people to seek compensating means of sexual releases such as masturbation and watching pornography. Social exchange theory (Blau, 1964; Sprecher, 1998) conceptualizes sexual intercourse opportunities as structured by the unevenly distributed resources and social positions. Assuming individuals are rational actors and each will maximize the reward/cost ratio, social exchange theory depicts a dynamic process in which the ranks of social status translate into sexual intercourse opportunities. With less available material (money, physical attraction) and symbolic (education, prestige, etc.) resources, a person of lower status is more likely to fail the competition for a sexual partner and will either retreat entirely or repeat the competition with a lower status target and expect a better fit. Even when such person does win a sexual partner of much higher status, his/her cost of maintaining this sexual opportunity may gradually exceed the reward, and consequentially becomes more likely to repeat another round of selection from the lower status targets (Edwards, 1969; Lawrance & Byers, 1995). It is well known that people with more resources and power are better able to negotiate for sexual opportunities (Buss, 1989; Feingold, 1992; Wiederman, 1993). Moreover, people of lower status are not just likely to fail a game for sexual opportunities, often they consequently pair up with less-desired mates, who also tend to provide less sexual reward (Lawrance & Byers, 1995). This explains how the social exchange process distributes favorable sexual intercourse opportunities to the higher-ranking individuals, even among animals. Scientists found that social ranking reflected by grooming order, strength, body shape, and leadership determines a primate's chance of mating and passing genes (Berard, Nurnberg, Epplen, & Schmidtke, 1994; Sapolsky, 2005; Soltis, Thomsen, & Takenaka, 2001). Lower ranking primates were more likely to masturbate, and comparably more frequent when they do so, according to several observations (Dubuc, Coyne, & Maestripieri, 2013; Hanby, Robertson, & Phoenix, 1971; Thomsen & Soltis, 2004). Scientists have also recorded cases of quasi-pornographic presentations among the non-human primates of lower ranking: primates masturbating to the sight of caged females (Seelye, 1966; Thomsen & Soltis, 2004).

Being less competitive in the conventional sex market, some may turn to Internet pornography because it involves lower exchange costs while still providing sexual release. Therefore, people with lower social status, according to the social exchange theory, were more likely to resort to alternatives such as Internet pornography to compensate the lack of sexual intercourse opportunity or having a mate with lower desirability (and thus lower reward) (Guttentag & Secord, 1983; South, 1991). Young (2008) has identified that the anonymous and accessible nature of cybersex, pornography included, had attracted people with low self-esteem, poor social skills, and limited interpersonal communication experiences to seek compensation from the virtual sex. Zimbardo and Ducan (2012) refered to the reliance on pornography for arousal and lack of social skills with women among the contemporary men as "the demise of guy." Clinicians have reported a growing number of Japanese youth who avoid intimate relationships but seek a variety of digital sexual activities (Haworth, 2013).

Social Bonds

The social control theory hypotheses that social bonds to conventional institutions reduce deviance from traditional norms such as the sanction against pornography use (Hirschi, 1969). For example, people who are religious are more likely to internalize the condemnation message on pornography and use pornography less (Hayes, 1995; Stark & Bainbridge, 1997). Yoder, Virden, and Amin (2005) reported the association between loneliness and Internet pornography use. Ybarra and Mitchell (2005) found that adolescents who deliberately seek X-rated materials are less emotionally connected to their parents. Others have similarly found that frequent pornography users have fewer ties to important social institutions, especially family, marriage, and religion (Mesch, 2009; Stack, Wasserman, & Kern, 2004).

At the same time, social bonds and social status are two closely related factors. Higher status may come as a consequence of building relationships with people who hold power in conventional institutions; on the other hand, social status can serve as a doorknocker for entering socially bonding scenarios (Lin, 2002; Wuthnow, 2002). Therefore, it is essential to control for the effects of social bonds when social status is under scrutiny.

The Current Study

I hypothesize that there is a negative relationship between social status and Internet pornography use even after controlling for social bonds and internet use opportunities. Because Internet pornography may be utilized as a compensation for the lack of sexual intercourse opportunity, the relationship between Internet pornography use and social status is mediated by the chance of having sexual intercourse. Social bonds are often contingent on social status. Therefore, this study also tests whether the associations between various social status indicators (i.e., income, education, subjective and objective class locus, work length) and Internet pornography use would become less significant or smaller in magnitude after controlling for the social bonding effects (religious attendance, attitude to pornography law, fundamental beliefs, and conservatism).

The mechanism for Internet pornography to serve as an alternative of sexual release for people with lower social status relies upon the assumption that opportunity factors (anonymity, cost, Internet prevalence) do not impede people with lower social status from consuming Internet pornography. Such opportunity factors may be unique to online behaviors but not so for offline conducts (e.g., to purchase an X-film), as the latter involves a different level of cost, technology competency, and anonymity. To compare Internet pornography use and the use via traditional media (X-rated movies), this study applies the same set of models to both dependent variables.

Method

Subjects

This study utilized the General Social Survey (GSS) of the U.S. from year 2000 to 2004 as the resource of testing our hypotheses. The GSS is the largest nationally representative full-probability survey conducted in the U.S every two years, which surveys non-institutionalized adults in the U.S. through face-to-face interviews by an equal-probability sampling process clustered by state and county (Davis, Smith, & Marsden, 2007). The GSS is known for its comprehensive measurement of social and attitudinal variables of various types, and its reliable representativeness of the larger U.S. society achieved by a well-designed interview procedure. The GSS team had collected the dependent variable of main interest—Internet pornography use—during years 2000, 2002, and 2004, but not in subsequent surveys. The dependent variable for the comparison model, watching X-rated movies, is also available for the same survey years.

I employed multiple imputation to handle missing data for independent variables, and analyze the section of sample where complete data for the outcome variables is available. The dataset was imputed on complete outcome variables because the inference will be biased when imputing the missing in dependent variable to predict independent variables (Allison, 2000). Fortunately, the rotation design of the GSS has randomized the respondents with a ballot-split method for each year-limited rotation section, which also includes the needed dependent variables: Internet pornography watch and X-rated movie watch (NORC, 2012). For each survey year, respondents recruited to answer these specific questions were randomly assigned and chosen from the entire pool of respondents; thus, the sample left out from answering these questions should be statistically indistinguishable to those who did. Therefore, we can safely treat the missing values in the dependent variables as missing completely at random and use the sub-sample for dependent variables in all analyses subsequent to multiple imputation.

Measures

The measurement for the outcome variable, Internet pornography use, was collected by the GSS through two steps. It first asks, "in the past 30 days how often have you visited a website for." Then, with a list of different types of websites, one can choose from "never, 1–2 times, 3–5 times, above 5 times" under the "sexually explicit website" category. People that chose "never" are dichotomized as 0 while all others as 1. Earlier studies used the GSS to study Internet pornography also adopted this measurement (Stack et al., 2004; Wright & Randall, 2012). A dichotomous question used to compare traditional pornography with Internet pornography came from a GSS question

asking whether the respondent has seen an X-rated movie in the last year. This question was adopted by some scholars to study pornography use in its generic form (Wright, 2011).

Social status is a more complex notion. We should follow contemporary sociologists' operation of social class as an aggregate dimension based on achievement, power, and ownership (Grusky, 2007; Petev, 2013). Five variables were used to represent social status: education and income, which are shown in many cases as the most salient expression of high status (Grusky, 2007); a subjective class identity (including lower class, working class, middle class, and upper class) which depicts how people perceive themselves in a social ladder in comparison to others, it is an important notion for class consciousness (Jackman, 1979); an objective social class variable created by a combination of GSS questions regarding ownership and labor-capital relationship, which complements the subjectivity in the self-described class identity: retired or in school, the unemployed, laborers, managers, self-employed artisans, or bourgeoisie (Wright, 1980); another variable "weeks worked last year" reflects the labor autonomy and laboriousness that confound total income (Petev, 2013; Veblen, 1899/2005).

Social bonds refer to the attachment and commitment to conventional institutions and beliefs (Hirschi, 1969). The measurement for social bonds in this study included religious attendance, fundamentalism (self-identified as fundamental versus moderate and liberal), attitude to porn law (dichotomized as "there should be law against pornography distribution whatever the age" versus otherwise), and a seven-point scale for liberalism–conservatism (1 designates extremely liberal, 7 designates extremely conservative).

Three GSS questions measured sexual intercourse opportunities: marriage status, frequency of sex, and the number of sex partners. The GSS asked the respondents' marital status on all surveys, and "how often did you have sex during the last 12 months" and "how many sex partners have you had in the last 12 months" since 1988. This study recoded marital status to "never married, currently married, divorce/widow/separated" and the number of sex partners to "zero, one, two and more," while keeps sex frequency as a continuous variable.

There are three variables measuring the opportunity to access the Internet: (1) the presence of teenagers at home; (2) a five-point Likert scale of internet knowledge created by summing three GSS variables: the ability to download a file, transfer a file, and understand computer virus; (3) whether the respondent possesses a computer. The presence of teenager used as an opportunity factor is advised by previous studies on pornography that argued children may serve as "whistle blower" to deter the adult from watching pornography (Akers & Sellers, 2000), or compete for the time to use computer (Stack et al., 2004). Demographic controls were selected with the advice of a meta-analysis on Internet pornography use (Paul, 2009), including race, age, gender, rural residence, and the U.S. geography areas.

Statistical Analyses

Before performing the main analyses, multiple imputation was conducted to handle the missing data by creating five additional samples for a completed dataset based on the chained multiple imputation method, which is preferred in large sample with missing values across several variables of different types (Azur, Stuart, Frangakis, & Leaf, 2011). For imputing binary or ordinal variable with less than five levels, the link function assumed the form of logit; for interval variables, the link function was predictive mean matching, a similar method to regression except that it takes donor values from the closest predicted value for the missing ones. The "mi estimate" applied the weighting and combination rules to analyze the imputed full samples in all subsequent models that would be otherwise biased due to sample inflation. This method allows the estimation of parameters as the average of coefficients from the imputed datasets, and calculates standard errors based on the degree to which the coefficient estimates vary across the imputations (Rubin, 1996; UCLA: Statistical Consulting Group, 2006). While the "mi estimate" command results in the final estimates of the entire imputed dataset, it does not show information from each imputed dataset. To calculate McFadden's Pseudo-R-squared based on the same Rubin's combination rule and obtain other information such as residuals and predicted probabilities, the "mi xeq" command in Stata was also executed when such information is desired.

Sample characteristics were described for each variable by mean or proportion, and the range of values. Logistic regression was used to estimate the association between the independent and dependent variables reporting odds ratio as effect size and the 95 % confidence intervals for the odds ratios; a p value of 0.05 was to determine the statistical significance of each coefficient reported. To test whether higher social status is related to higher sexual release opportunities, multinomial logistic regression and OLS (ordinary least squares) models with dependent variables (marriage/sex frequency/number of sex partner) regressing on the social status variables were conducted with the control variables. The next step introduced three models to test: (1) the baseline association of social status and Internet pornography when only controlling for demographic background; (2) the association after introducing social bonds and the Internet access opportunities; and (3) to finalize the association after introducing sexual intercourse opportunities. If social status influences Internet pornography use through sexual intercourse opportunities, the coefficients for social status variables would drop in the final step (a partial mediation) or cease to be significant (full mediation) (Yang, Kelly, & Yang, 2014). All models included the same set of control variables to compare the effects meaningfully.

The same set of models also compared traditional pornographic consumption using another dependent variable "watching X-rated movie" for the rationale stated in the introduction part

of this study. All models had the demographic controls consistently present. When each model yields a McFadden's R^2, Harel's transformation of R to Z was manually computed—where Z is the inverse tangent of R—as a method to adjust for the central tendency (Harel, 2009).

Results

Before testing the relationships between the data, I have presented descriptive statistics in Table 1 to help understand the sample characteristics. Out of all respondents recruited between 2000 and 2005 for the survey section containing Internet pornography use, 12.3 % reported having watched Internet pornography during the past 30 days, but only 3.8 % claimed "there should be no laws prohibiting pornography." Twenty-four percent of respondents who answered the question on X-rated movie reported having watched it in the past year. For sexual intercourse opportunities, almost half of all people were married at the time of the surveys. More than 64.6 % reported a sex partner, 21.0 % reported no sex partners, while the rest have more than one sex partners. The mean value on the scale of sex frequency falls approximately on the level of "2 or 3 times a month"; its one standard deviation from the average would be "once or twice a year" or "2 or 3 times a week." The demographic distribution of races, sex, rural residency, and region mostly affirms the representativeness of this sample to the U.S. National Census. Education, average age, and racial composition correspond to the Census figures. The family income of the GSS sample averages around $30,000, and its median category of $35,000–$40,000 is close to but lower than the 2004 National Census median of $44,000 (DeNavas-Walt, Proctor, & Lee, 2005). Working length averages at 34.3 weeks/year, but the deviation is high. If only counting the ever employed, the average working weeks will be 46.7 weeks (not shown here) and approximates the 44 weeks in National Census that used the same criterion (U.S. Census Bureau, 2005).

In order to test the hypothesis that Internet pornography use is triggered by the lack of sexual intercourse opportunities, regression models in Table 2 estimate the associations between social status and sexual intercourse opportunities. The analyses of three independent regression models on sexual intercourse opportunity variables in Table 2 shows most indicators of higher social status point to more sexual intercourse opportunities, with an exception of education. Each additional year of education is associated with higher likelihood of never being married, having no sex partner, and less frequent sexual activities. Higher income is significantly ($p < .0001$ for all cases) associated with higher probability of being married or having a sex partner. One unit increase in income level corresponds to a change of odds ratio to 0.77 for being never married as opposed to being married. A person is 14 % less likely to have no sex partner when income level increases by one, and the increase of sex frequency is 0.08 for each income level, net of the

effects of all other variables. Even within the same (i.e., controlling for) social class and income and education level, longer working length leads to higher likelihood of being never married (OR = 1.01, $p < .0001$) and divorce/widow/separated (OR = 1.02, $p < .0001$). Note that although the odds ratio for working length seems small, the additive effect can be strong because the scale of working length is large as 52 units. The subjective class identity does not significantly influence sexual intercourse opportunities, save that the working class are less likely to be never married. For objective social class, when artisan/bourgeoisie is the reference group, the unemployed people are almost twice as likely to be never married as opposed to currently married, and 1.51 times more likely to have no sex partner. The labors are 1.54 times more likely to have no sex partner, or their sexual activity is less frequent. All the associations have controlled for demographic background and social bonds.

Table 3 displays the association coefficients and other statistics of the three logistic regression models predicting Internet pornography use. The baseline model regresses Internet pornography use on social status while controlling for the impact of demographic backgrounds at the same time, to ensure the association between Internet pornography use and social status clearly exists even if controlling for racial, age, gender, and residential differences. For one unit increase of income out of the 23 total levels, the odd of using Internet pornography is down by a factor of 0.94 ($p < .001$). In the same manner, the model estimates that each additional year of education reduces the odds ratio by a factor of 0.95 ($p < .05$). Working weeks and subjective class identity are not significantly associated with Internet pornography use, but the odds ratio of using Internet pornography among retired or at school persons was only 0.50 ($p < .05$) when compared with the bourgeoisie class. As for demographic controls, age and gender prove to be two significant factors, with male far more likely to report consuming Internet pornography than female. This baseline model explains a total of 16 % of the dependent variable's variance, according to both McFadden's pseudo R^2 and Harel's Z transformation.

The next model adds three Internet use opportunity variables and four social bonding variables. This model tests whether the opportunity to use the Internet and technological competency will bias against some potential pornography users with less internet accessibility. It also evaluates the influences of bonding to traditional beliefs and institutes on watching Internet pornography. Model 2 in Table 3 shows that knowledge about the Internet is not associated with online pornography use in a statistically significant manner, neither among computer-possessors nor among non-possessors. However, people reported having teenager at home are only 0.54 times as likely ($p < .05$) to use pornography online in last 30 days. Among the indicators of social bonds, one higher category of religious attendance decreases the likelihood of reporting watching Internet pornography by a factor of 0.54 ($p < .05$). Social status variables remain similar to the previous

Table 1 Descriptive characteristics of the sample

	Percentage (%)	Mean (SD)	Range
Used internet pornography last 30 days	12.34		0,1
Watched X-rated movie in last year	24.5		0,1
Income level		15.9 (5.45)	1–23
Education (years)		13.44 (2.92)	0–20
Working weeks per year		34.3 (22.33)	0–52
Subjective class identity			0,1
Lower class	5.99		
Working class	44.61		
Middle class	44.97		
Upper class	4.43		
Objective class location			0,1
Labor	41.9		
Unemployed	5.6		
Retire or at school	30.9		
Manager	13.3		
Artisan/Bourgeoisie	8.33		
Internet knowledge		1.24 (0.39)	0–2
Computer possession	66.4		0,1
Presence of teenagers at home		0.17 (0.48)	0–7
Marriage			0,1
Married	47.97		
Widow/divorce/separated	27.74		
Never married	24.29		
Number of sex partners			0,1
Zero	20.98		
One	64.63		
Two and more	14.39		
Sex frequency		2.87 (1.98)	0–6
Attitude to porn law	3.76		0,1
Religious attendance		3.66 (2.72)	0–8
Fundamentalism	30.2		0,1
Liberalism–Conservatism		4.13 (1.41)	1–7
Race			0,1
White	79.04		
Black	14.49		
Others	6.47		
Age		46.09 (17.18)	18–89
Male	44.52		0,1
Rural resident	11.22		0,1
Region			0,1
New England	4.36		
Mid Atlantic	14.62		
North Central	24.63		
South Atlantic	19.14		
South Central	17.15		
Mountain	6.55		
Pacific	13.53		

Table 2 Multiple regression models on sexual intercourse opportunities with multiple imputation ($n = 5215$, $m = 5$)

Dependent variables	Marriage status (base = married)		Number of sex partners (base = 1)		Frequency of sex
	Divorce/widow/separated	Never married	0	2 and more	
Social status					
Income	.76***	.77***	.86***	.92***	0.08***
Education	1.5*	1.1***	1.07**	–	−0.05***
Working weeks	1.02***	1.01***	–	–	–
Subjective class (base = high class)	–		–	–	–
Lower class					
Working class		.59*			
Middle class					
Objective class (base = bourgeoisie)				–	
Labor			1.54*		−0.20*
Unemployed		1.84**	1.51†		
Retired or at school	.61*				
Manager					
Internet use opportunity					
Internet knowledge*computer possession			–	–	–
Possession-no	–	1.93*			
Possession-yes	1.58*	1.79*			
Presence of teenager at home	–	.64***	.72***	–	0.21***
Social bonds					
Religious attendance	.88***	.88***	1.08**	.88***	−0.06***
Attitude to porn law	–	–	–	–	–
Fundamentalism	–	1.25*	–	–	–
Liberalism–Conservatism	1.1*	.87***	–	.88**	–
Demographics					
Race (base = White)					
Black	1.31*	2.11***	.57***	1.68***	0.36***
Others	.65*	–	.54**	–	0.21*
Age	1.03***	.93***	1.04***	.94***	−0.04***
Male (=1)	.72***	1.2*	–	2.02***	0.23***
Rural residency (=1)	.53***	.54***	.57**	–	0.32***
Regions	–	–	–	–	–

* $p < .05$, ** $p < .01$, *** $p < .0001$, $^{\dagger} p < .06$ (two-tailed test), omission indicates non-significance; coefficients for marriage status and number of sex partners are odds ratios from logistic regressions, for sex frequency are unstandardized coefficients from an OLS

model, with an addition that longer working length is now associated with using Internet pornography (OR = 1.02, $p < .05$). In this model, social status remains significantly related to Internet pornography use in the hypothesized direction even when controlling for all other factors.

The third model of Table 3 finally introduces the sexual intercourse opportunity measures that seen in Table 2 as outcome variables. This model is the final model of particular interest because it estimates whether social status still constitutes a significant factor of Internet pornography use and whether its impact goes via sexual intercourse opportunities. Here, a never married person is 1.6 times ($p < .05$) more likely to watch Internet

pornography in the last 30 days than his/her married counterpart, but having two and more sex partners is associated with higher Internet pornography use by a factor of 1.92 ($p < .01$). Sex frequency is not a significant factor after controlling for marital status, the number of sex partners, and demographic backgrounds. Social status variables remain significant in this model: people with more income (OR = 0.95, $p < .05$), higher education (OR = 0.92, $p < .05$), and shorter working length (OR = 1.02, $p < .01$) have lower likelihood to use Internet pornography, even when controlling for sexual intercourse opportunities. The odds ratio for income drops from 0.93 to 0.95 from model 2, and the significant α drops from 0.01 to

Table 3 Logistic regression models on internet porn use, with multiple imputation ($n = 1727$, $m = 5$)

	Model 1: social status		Model 2: social status, internet use opportunity, social bonds		Model 3: full model including sexual intercourse	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
Social status						
Income	0.94***	0.91, 0.97	0.93**	0.89, 0.97	0.95*	0.91, 0.99
Education	0.95*	0.89, 0.99	0.92*	0.86, 0.99	0.92*	0.85, 0.98
Working weeks	1.00	0.99, 1.02	1.02*	1.00, 1.04	1.02**	1.01, 1.04
Subjective class (.=high class)						
Lower class	1.46	0.49, 4.34	1.81	0.49, 6.75	2.12	0.46, 7.97
Working class	0.93	0.41, 2.15	1.02	0.40, 2.59	1.08	0.42, 2.80
Middle class	0.98	0.44, 2.18	1.03	0.42, 2.53	1.11	0.44, 2.81
Objective class (.=bourgeoisie)						
Labor	0.78	0.51, 1.22	0.71	0.48, 1.15	0.69	0.42, 1.12
Unemployed	1.01	0.49, 2.07	0.80	0.34, 1.88	0.75	0.31, 1.79
Retired or at school	0.50*	0.26, 0.96	0.46	0.19, 1.07	0.41†	0.17, 1.01
Manager	0.79	0.47, 1.34	0.69	0.39, 1.23	0.66	0.37, 1.17
Internet use opportunity						
Internet knowledge*computer possession			ns		ns	
No possession						
Possession						
Presence of teenagers at home			0.54*	0.34, 0.87	0.59*	0.37, 0.95
Sexual intercourse						
Marriage (.=married)						
Widow/divorce/separated					1.46	0.89, 2.39
Never married					1.60*	1.01, 2.54
Number of sex partner (.=1)						
0					0.77	0.39, 1.51
2 and more					1.92**	1.24, 2.95
Sex frequency					0.93	0.83, 1.05
Attitude to porn law			1.17	0.39, 3.54	1.14	0.38, 3.41
Religious attendance			0.54*	0.34, 0.87	0.89***	0.81, 0.96
Fundamentalism			1.39	0.97, 2.00	1.39	0.97, 2.01
Liberalism–Conservatism			0.93	0.80, 1.07	0.96	0.82, 1.12
Race (.=white)						
Black	0.63	0.37, 1.05	0.57*	0.33, 0.98	0.76	0.42, 1.40
Others	0.94	0.57, 1.55	0.99	0.60, 1.66	1.19	0.67, 2.12
Age	0.97***	0.96, 0.99	0.98***	0.97, 0.99	0.98*	0.97, 1.00
Male (=1)	7.99***	5.63, 11.3	8.23***	5.75, 11.8	7.88***	5.22, 11.88
Rural residency	ns		ns		ns	
Regions	ns		ns		ns	
		R^2: 0.16		R^2: 0.20		R^2: 0.23
		Harel Z: 0.16		Harel Z: 0.20		Harel Z: 0.22
		RVI: 0.0002		RVI: 0.06		RVI: 0.06

Harel's Z is the sum of inverse tangent of R^2 divided by the times of imputation. RVI (relative variance inflation) shows the average proportion of variance possibly inflated due to missing data

ns non-significance

* $p < .05$, ** $p < .01$, *** $p < .0001$, † $p < .06$ (two-tailed test)

0.05, indicating a partial mediation on income by sexual intercourse opportunities. Note that although a 0.02 drop of odds ratio may appear minimal, the scale of income is large enough to make a noticeable difference: in model 2, the highest earning person are only 0.18 (=0.92^{23}) as likely to watch Internet porn; after sexual intercourse opportunities enter the model, this likelihood is

alleviated to 0.31 (=0.95^{23}). McFadden's R^2 and Harel's Z suggest the final model explains 22–23 % of the total variances; the RVI estimates that missing data addressed by the multiple imputation has inflated 6 % of the variances, which is a relatively low risk concern. Figure 1 summarizes the associations between the proposed concepts. For the sake of minimizing visual burden, it shows only two categories for marital status (never married vs. married) and the number of sex partners (0 vs. 1).

When comparing Internet pornography with traditional media (in this case watching an X-rated movie), the model designed to explain Internet pornography does not perform as well. Table 4 displays this information. Social status is not related to watching X-rated movie in the last year, and of course neither are Internet use opportunities. Among the sexual intercourse opportunities, watching X-rated movie is only associated with having two and more sex partners (OR = 1.84, $p < .01$). Although one should note that the coefficients in Tables 3 and 4 are not outwardly comparable due to different sample sizes and variable timespans, they nevertheless provide a contrast showing different pathways leading to X-rated movie watching and Internet pornography watching.

Discussion

This study has tried to advance our understanding of Internet pornography use among adults in the U.S. during the early 2000s. Earlier works on Internet pornography mostly aimed at clinical utility or individual characteristics, while this study particularly investigates whether lower social status may lead to more Internet pornography use, and whether such association is caused by the lack of sexual intercourse opportunities among the lower status individuals.

The first highlight is that lower social status does lead to the lack of sexual intercourse opportunities by all three measures, even after controlling for social bonds and demographic backgrounds. People who earn less income and work longer weeks are less likely to be currently married or have a sex partner, and their frequency of sex are lower too. Compared with artisan/bourgeoisie, who occupy an independent/dominant labor-capital relationship, laborers are more likely to have no sex partners and have less frequent sex. The unemployed also tend to be never married and have no sex partners. The only exception to the study's hypotheses is education, which is negatively associated with all sexual intercourse measures. It is well known that higher education has the impact of delaying initial marriage, and this may be the reason why education as a social status indicator is negatively related to sexual intercourse opportunities.

The third set of models indicate people with lower social status again displayed higher odds ratio of using Internet pornography, even after controlling for social bonds, opportunities to access the Internet, and demographic background. People who earn less income, work longer weeks, and received less education showed a higher likelihood of using Internet pornography. With an exception of income, the associations between social status variables and Internet pornography use were robust even after sexual intercourse opportunities were entered as mediators, suggesting these social status variables independently influence Internet pornography use. Income indeed was partially mediated by marital status, echoing the hypothesis that people with more income are less likely to watch Internet pornography, partly because they already have the sexual intercourse opportunity brought by being married. However, having more than one sex partner is strongly associated with watching Internet pornography. If watching Internet pornography is only a means of compensating the lack of sexual intercourse opportunities as anticipated by the
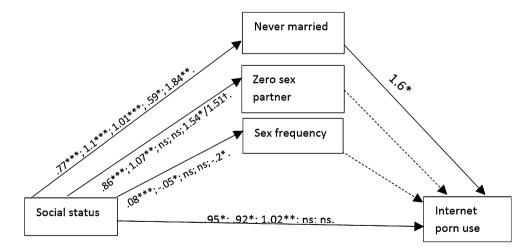

Fig. 1 Relationships between social status, sexual intercourse opportunities, and internet pornography use. Odds ratios of social status on sexual release opportunities are from Table 2, effects of social status and sexual intercourse opportunities on internet pornography use are from Table 3, and all models are controlled for the same set of variables. Odds ratios of social status ordered by income, education, weeks worked, subjective class identity, and objective class; never married is compared against currently married, and zero sex partner is compared against one partner. *<.05, **<.01, ***<.001. *Dotted line* indicates coefficient not significant at α = .05

Table 4 Logistic regression models on X-movie watch, with multiple imputation ($n = 2320$, $m = 5$)

	Model 1: social status		Model 2: social status, internet use opportunity		Model 3: full model including sexual intercourse	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
Social status						
Income	ns		ns		ns	
Education	ns		ns		ns	
Working weeks	ns		ns		ns	
Subjective class (.=high class)	ns		ns		ns	
Lower class						
Working class						
Middle class						
Objective class (.=bourgeoisie)	ns		ns		ns	
Labor						
Unemployed						
Retired or at school						
Manager						
Internet use opportunity						
Internet knowledge*computer possession			ns		ns	
No possession						
Possession						
Presence of teenagers at home			ns		ns	
Sexual intercourse						
Marriage (.=married)						
Widow/divorce/separated					1.32[†]	0.98, 1.78
Never married					1.14	0.84, 1.53
Number of sex partner (.=1)						
0					0.77	0.48, 1.22
2 and more					1.84**	1.38, 2.45
Sex frequency					0.93	0.83, 1.05
Attitude to porn law			ns		ns	
Religious attendance			0.84***	0.80, 0.89	0.86***	0.81, 0.91
Fundamentalism			ns		ns	
Liberalism–Conservatism			0.87***	0.81, 0.94	0.88**	0.81, 0.95
Race (.=white)						
Black	1.16	0.89, 1.51	1.37*	1.01, 1.88	1.23	0.95, 1.69
Others	0.98	0.71, 1,35	1.08	0.74, 1.58	1.05	0.72, 1.54
Age	0.95***	0.95, 0.96	0.95***	0.95, 0.96	0.96***	0.95, 0.97
Male (=1)	2.91***	2.43, 3.48	2.91***	2.34, 3.59	2.77***	2.23, 3.44
Rural residency	ns		ns		ns	
Regions	ns		ns		ns	
		R^2: 0.13		R^2: 0.14		R^2: 0.16
		Harel Z: 0.13		Harel Z: 0.14		Harel Z: 0.16
		RVI: 0.0005		RVI: 0.03		RVI: 0.04

Harel's Z is the sum of inverse tangent of R^2 divided by the times of imputation. RVI (relative variance inflation) shows the average proportion of variance possibly inflated due to missing data

ns non-significance

* $p < .05$, ** $p < .01$, *** $p < .0001$, [†] $p < .06$ (two-tailed test)

hypothesis and also partly supported by the mediation of marital status on income, people with more sex partners would be less likely to watch Internet pornography (or X-rated movies as well).

The answer to this dilemma extends beyond the aim of this study, but potential explanations exist. It is possible that only stable and committed relationships such as marriage provide

stable and consistent means of sexual intercourse. Some studies have found that better sexual satisfaction is associated with stable relationships, which in contemporary society still mostly refer to long-term monogamous pairing (Costa & Brody, 2012; Sprecher, 1998, 2002). Another plausible explanation lies in the subcultural characteristics circulated among certain Internet pornography users, for whom consuming pornography is a natural extension of a specific set of offline behaviors (Peter & Valkenburg, 2007). Therefore, the "rich get richer" Matthew effect exists for people who already have the sexual release but are nevertheless encouraged by a sexualized subculture to pursue richer experiences.

Third, when comparing Internet pornography use with watching X-rated movie, this study has found that social status affects watching Internet pornography, but not the traditional medium of X-rated movies. The explanation lies in line with our proposed hypothesis: people with lower social status may utilize Internet pornography because it is easily accessible, cheaper, and anonymous, which came from the narrowing digital gap. Traditional erotic media do no offer these advantages, thus may further interfere with social status and render the statistical associations noisy. Therefore, this study suggests the distinct relationship between social status and Internet pornography indeed comes from the features pertain to online behaviors.

Lastly, during the coming of the 21st century, many have realized the phenomenon of an ubiquitous use of the Internet in the developed world, but others argue that social and cultural positions will still determine how people use the Internet and what content they utilize thereof (Graham, 2008; Peter & Valkenburg, 2006). In this context, if one decides to watch Internet pornography, internet knowledge and possession are not the primary concern, but such decision itself rests upon external social factors. This study indicates that internet knowledge and computer possession do not determine Internet pornography use, but social status does. Having teenagers at home is still negatively related to Internet pornography use, confirming the opportunity theory that contends teenagers can act as surveillance and "whistle blowers" (Akers & Sellers, 2000). Among all social bonds, religious attendance is negatively associated with Internet pornography use, but the attitude to pornography law and political views failed to exert significant influence.

Limitations

Albeit the merits discussed above, this study admits a few limitations caused by survey design, sampling, and the choice of measurement. First, due to the rotation design of the GSS, certain variables of immense interest are simply unavailable for the survey period between 2000 and 2004, when Internet pornography use was asked. Such variables including "viewing X-rated movie via theatre and VCR" could have more accurately captured the nature of traditional pornographic materials. The time frame for comparing Internet pornography use and traditional pornographic media is not identical because the measurement for Internet pornography counts at monthly unit while that for X-movie measures at yearly unit, thus making their comparison less straightforward.

Second, there are a few more candidates for sexual intercourse opportunity measurement, including "had pick-up sex last year," "sex with a neighbor last year," and "sex with a friend last year." Using these variables may yield certain interesting results. However, the current study has not included these variables because they were only asked after "the number of sex partner" question. The number of sex partner can sufficiently measure the variance, and it has less missing data for easier multiple imputation.

Third, readers should bear in mind that this study explores the Internet pornography use during the first half of the 2000s. The access to the Internet is quickly expanding in the United States, it might have reached a point since 2004 where technological opportunity to watch pornography no longer consists of having a computer and understanding internet knowledge, which are the indicators in this study, but more about which online platform users adopt to search and circulate information. Newer cohorts tend to distance themselves intentionally from older cohorts' online behaviors (Lenhart, Purcell, Smith, & Zickuhr, 2010). In the similar manner that younger generation do not share news by sending emails, the newer cohort of netizens may use Internet pornography for cultural distinctions as well. Future research should definitely explore this untrodden area.

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