

Online Sexual Activity Experiences Among College Students: A Four-Country Comparison

Nicola Döring¹ · Kristian Daneback² · Krystelle Shaughnessy³ · Christian Grov⁴ · E. Sandra Byers⁵

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Abstract The purpose of this study was to compare male and female college students in four countries (Canada, Germany, Sweden, and the U.S.) on their lifetime experiences (prevalence) and frequency of recent experiences with six types of online sexual activities (OSA): sexual information, sexual entertainment, sexual contacts, sexual minority communities, sexual products, and sex work. Participants ($N = 2690$; M age, 24.65 years; 53.4 % women, 46.6 % men) were recruited from a university in each of the countries to complete an online survey that included background and demographic questions, and questions about OSA. Most participants reported experience with accessing sexual information (89.8 %) and sexual entertainment (76.5 %) online. Almost half (48.5 %) reported browsing for sexual products, and a substantial minority reported having engaged in cybersex (30.8 %). Very few participants (1.1 %) paid for online sexual services or received payment (0.5 %). In general, partici-

pants showed relatively infrequent experience with all types of OSA within the last 3 months. Men showed both higher prevalence and frequency of use of sexually stimulating material online than did women. However, this gender gap was smaller than in previous studies. Country and gender by country effects were (with one exception) either very small or non-existent, suggesting that, overall, students in the four countries were similar in their OSA experiences. Results are discussed in light of an emerging global net generation and globalized sexual culture.

Keywords College students · Cybersex · Internet · Online sexual activity · Sexual experience

Introduction

Using the Internet for sexual purposes has become popular in the Western world over the last two decades (Döring, 2012). Online sexual activities (OSA) describe Internet-based activities, materials, and behaviors that are sexual in nature (Döring, 2009, 2012; Grov, Breslow, Newcomb, Rosenberger, & Baermeister, 2014). However, most researchers have included only one type or a few selected types of OSA in their studies; thus, we do not have a clear understanding of people's global experiences with the full range of OSA. In the current study, we examined the prevalence and frequency with which college students from four Western countries (Canada, Germany, Sweden, and the U.S.) have engaged in a broad range of sexual activities available on the Internet. We chose to study college students because this young and well-educated demographic—a subgroup of the so-called “net generation” and part of a “global youth culture” (Griffin, 2001)—typically report both high Internet affinity and high interest in sexual exploration (Shaughnessy, Byers, & Walsh, 2011). Although college students are not unique in using the Internet, they are a particularly relevant demographic

✉ Nicola Döring
nicola.doering@tu-ilmenau.de

¹ Institute of Media and Communication Science, Ilmenau University of Technology, Ehrenbergstraße 29, 98693 Ilmenau, Germany

² Department of Social Work, University of Gothenburg, Göteborg, Sweden

³ School of Psychology, University of Ottawa, Ottawa, ON, Canada

⁴ Brooklyn College and the Graduate Center of CUNY, The Center for HIV/AIDS Educational Studies and Training, New York, NY, USA

⁵ Department of Psychology, University of New Brunswick, Fredericton, NB, Canada

group for OSA research because they differ from other demographics in the frequency and range of their online activities (both non-sexual and sexual).

Types of OSA Experience

The wide range of OSA available can be separated into six categories that parallel offline sexual activity: (1) sexual information, (2) sexual entertainment, (3) sexual contact, (4) sexual minority communities, (5) sexual products, and (6) sex work. First, OSA include the online exchange of sexual information such as websites or discussion forums on safer sex, sexually transmitted infections, sexual pleasure, or sexual dysfunctions (Buhi et al., 2010; Daneback, Månsson, Ross, & Markham, 2012; Mustanski, Newcomb, Du Bois, Garcia, & Grov, 2011; Simon & Daneback, 2013). Second, they include the dissemination and consumption of sexual entertainment such as erotic stories and pornographic pictures and videos (Boies, 2002; Byers, Menzies, & O'Grady, 2004; Goodson, McCormick, & Evans, 2001; Shaughnessy et al., 2011). Third, OSA can involve the search for and participation in sexual contact including both online sexual encounters (e.g., text- or webcam-based cybersex; Döring, 2009; Shaughnessy & Byers, 2013, 2014) and offline sexual encounters (e.g., online dating or sex-seeking between consenting adults; Daneback, Cooper, & Månsson, 2005; Daneback, Månsson, & Ross, 2007; Lever, Grov, Royce, & Gillespie, 2008). Fourth, OSA comprise engaging with marginalized or specialized sexuality-related online communities such as lesbian, gay, bisexual, and transgender (LGBT) or kink/fetish communities (e.g., Grov et al., 2014; Hillier & Harrison, 2007; Nip, 2004). In this article, we use sexual minority communities as an umbrella term for all of these communities. Fifth, OSA include buying and selling sexual products on the Internet such as sex toys or condoms (Daneback, Månsson, & Ross, 2011). Last and sixth, OSA can involve using and offering commercial sexual services (i.e., sex work) both in the form of online sex work such as professional paid cybersex over webcam (Podlas, 2000) and the online marketing of offline sex work (Cunningham & Kendall, 2011; Minichiello, Scott, & Callander, 2013; Smith & Grov, 2011). Although there has been extensive research on experience with sexual information and sexual entertainment online, college students' online involvement with sexual minority communities, sexual products, and sex work have received considerably less attention (Döring, 2012).

Research suggests that there are large differences in how often people engage in each of these forms of OSA. Indeed, some specific categories of OSA are so common they can be considered normative; others are quite uncommon. For example, researchers have consistently found that over 70% of study participants have used the Internet for sexual entertainment (Albright, 2008; Shaughnessy, Byers, Clowater, & Kalinowski, 2014; Shaughnessy et al., 2011), whereas about one quarter to one-third report having experienced cybersex or seeking offline

sexual partners online (Albright, 2008; Daneback et al., 2007; Shaughnessy et al., 2011). Similarly, the frequency with which people engage in various OSA appears to differ from one activity to the other (Shaughnessy & Byers, 2014; Shaughnessy et al., 2011, 2013). However, these conclusions are based on comparisons across studies that differ in sample characteristics that may influence the results. Therefore, to gain a better understanding of people's experience with a comprehensive range of OSA, it is important to directly compare the prevalence and frequency of various types of OSA within the same sample.

Cross-National and Gender Effects on OSA Experience

Internet sexuality is a global phenomenon shaped by both gender and local cultures. Most studies examining OSA have been limited to one specific country including Canada (Boies, 2002; Shaughnessy et al., 2011), the U.S. (Carroll et al., 2008; Cooper, Morahan-Martin, Mathy, & Maheu, 2002), Sweden (Cooper, Månsson, Daneback, Tikkanen, & Ross, 2003), Nigeria (Kunnuji, 2011), China (Zheng & Zheng, 2014), and Spain (Ballester-Arnal, Castro-Calvo, Gil-Llario, & Giménez-García, 2013). In addition, there are few cross-national studies in which researchers compared people's OSA experiences. Yet, national differences may be important for understanding the role that OSA plays in adults' lives. For example, Velez-moro, Negy, and Livia (2012) compared college students in the U.S. and Peru and found that—unexpectedly—the more traditional Catholic Peruvian participants engaged in OSA more frequently than the U.S. participants. This finding may indicate that people use OSA to compensate for real-life sexual restrictions that exist in one country but not in another: college students in Catholic Peru mostly lived off-campus with their parents, thus restricting their sexual life offline. In the current study, we directly compared college students from four Western countries that differ in their geographic location (North America and Western Europe) and their value orientation.

Values differ across countries and societies. According to the World Values Survey (2015)—a nationally representative, longitudinal survey conducted by a network of social scientists from almost 100 countries in the world—countries vary in their values along two broad dimensions: traditional versus secular-rational and survival versus self-expression (Inglehart & Welzel, 2005). Each of these value dimensions represents a range of specific beliefs and attitudes within a given culture. For example, traditional values emphasize religion, parent–child ties, deference to authority, and less sexual liberalism, whereas secular-rational values place less emphasis on these values and include greater sexual liberalism. Thus, the traditional/secular-rational value dimension is pertinent for examining cultural and country differences regarding sexuality. Therefore, we focused on this value dimension in this study. Based on results from the World Values Survey and the Inglehart Index on value orientation,

the four selected countries can be ranked according to their degree of traditional value orientation in the following order (lowest to highest traditional values = highest to lowest sexual liberalism): Sweden, Germany, Canada, and the U.S. (Esmer & Pettersson, 2007; Inglehart & Baker, 2000; for an in-depth sociological comparison between Sweden and the U.S. in terms of sexual liberalism, see Schneider, 2005).

Researchers have not examined the associations between a country's value orientation and its population's OSA experience. These associations are expected to be complex. For example, in a society with more liberal sexual values, attitudes toward OSA would likely be more positive. Because sexual attitudes and sexual behaviors are linked (Wells & Twenge, 2005), more positive attitudes would likely result in greater experience with OSA, which we would expect to find in cultures with more liberal sexual values than in cultures with more conservative sexual values. However, it is possible that in more sexually conservative cultures, people (especially young people) rely more on OSA to compensate for real-life sexual restrictions (e.g., Velez-moro et al., 2012). If so, we would expect people from more conservative cultures to have greater OSA experience. Yet, there may also be differences in how value orientation of the four countries impacts each type of OSA. Therefore, we compared people's experience with each of the six types of OSA across the four countries.

On average, men tend to have more permissive and liberal attitudes toward sexuality in general as well as toward the use of sexually explicit materials (Baumeister, Catanese, & Vohs, 2001; Carroll et al., 2008; Petersen & Hyde, 2010). Men also are more likely than women to report engaging in arousal-oriented OSA (Döring, 2009; Shaughnessy et al., 2011). These findings are consistent with gender role socialization regarding sexuality, which tends to be more sexually permissive toward male than toward female sexuality (Byers, 1996; Wiederman, 2005). They are also consistent with gender role socialization regarding use of new technologies (Helsper, 2010). However, researchers have shown that men and women do not differ in their attitudes and experiences with all types of OSA. For example, Byers and Shaughnessy (2014) found that men had more positive attitudes toward arousal-oriented OSA but not toward non-arousal or informational OSA. Similarly, Shaughnessy et al. (2011) found that more men than women reported experiences with arousal-oriented OSA, and that men reported engaging in these activities more frequently. However, there were no significant gender differences in experience with or frequency of non-arousal OSA, such as seeking sexual information and education online. Recently, researchers have suggested that women's use of OSA for sexual entertainment is increasing (Mondin, 2014; Schauer, 2005). Nonetheless, we expected that men would report greater experience with many, but not all, of the six types of OSA compared to women.

It may be that gender differences in OSA experiences are not uniform across countries. Theoretically, we expected that

countries with more secular-rational value orientations would have smaller differences in expectations for male and female sexuality. This relatively smaller difference would result in smaller gender differences in OSA experiences. Therefore, we also examined the extent to which gender differences in OSA experience were different across the four countries.

In sum, we addressed the following research questions in this study guided by the aforementioned expectations:

Question 1: What are the prevalence and frequency of the six types of OSA experience (sexual information, sexual entertainment, online/offline sexual contacts, sexual minority communities, sexual products, online/offline sex work) for college students?

Question 2: Do gender and values orientation of the country affect the prevalence of college students' OSA experiences?

Question 3: Do gender and values orientation of the country affect the frequency of college students' OSA experiences?

Method

Participants and Procedure

In 2012, students at four institutions for higher education (one each in Sweden, Germany, Canada, and the United States) completed an online survey about their OSA. The U.S. institution was situated in the Northeastern U.S. in a major metropolitan area; the Canadian institution was situated in Eastern Canada; the Swedish institution was located in West Sweden; and the German institution in Central Germany.

Participants were recruited in a number of ways, including the use of mailing lists, flyers, undergraduate study research pools, and requesting departments/faculty to inform their students about the survey. Because we used multiple methods of recruitment, a response rate was not available. Recruitment materials indicated that the study was about a range of online behaviors, including online dating, chatting, cybersex, and pornography. Recruitment materials, study information, and the survey were translated into the appropriate language of the respective country. Translations were verified independently for accuracy.

In order to be eligible, participants had to be over the age of 18 years and attend one of the four aforementioned universities. Interested participants were directed to an anonymous online survey. The links to the survey were created such that we could track which participants came from which university/country. First, participants were directed to an informed consent page. After providing informed consent, they were directed to the anonymous survey. The survey took approximately 10–15 min to complete. Upon completion, participants were redirected to a webpage containing debriefing information. Participation was anonymous and no compensation was offered. Participants were invited to provide their email address at the end of the survey if they wanted to be informed of study results. The

study was approved by the Institutional Review Board/Research Ethics Board at the U.S. and Canadian institutions participating in the study. Given different international regulations regarding the use of human subjects, separate approval was not required for the German and Swedish locations.

The online questionnaire was clicked 4012 times, resulting in 2720 completed questionnaires for part A (OSA experiences), of which about two-thirds (1686) subsequently filled in part B (OSA outcomes, not reported in this paper). An additional 944 empty questionnaires, 133 partially completed questionnaires, 205 questionnaires by individuals not studying at the selected institutions, and 10 questionnaires completed by minors were eliminated from the sample. Because of small sample sizes, transgender participants ($n = 18$) and those selecting “other” gender ($n = 12$) were excluded from this study. Thus, the final sample for this study included 2690 participants: 874 from Sweden; 1021 from Germany; 516 from Canada; and 279 from the U.S. Gender distribution was almost equal with 53.4 % women and 46.6 % men in the overall sample. On average, participants were 24.65 years old ($SD = 5.99$). Most participants identified as heterosexual (83.3 %) and were in a romantic relationship (63.3 %). Full sample demographic and background characteristics for each country are shown in Table 1.

Measures

The survey was developed by the authors based primarily on items used in previous research (Byers & Shaughnessy, 2014; Daneback et al., 2005; Grov, Gillespie, Royce, & Lever, 2011; Shaughnessy & Byers, 2014; Shaughnessy et al., 2011, 2013). It was then pretested in all four countries and revised for clarification across languages where necessary. We used skip patterns to reduce the length of the survey depending on specific responses.

Sociodemographics and Internet Use

Participants responded to questions regarding their sociodemographic characteristics including gender, country, age (in years), sexual orientation, and relationship status (married/domestic partnership, committed relationship and living together, committed relationship and not living together, single, other). Response options for sexual orientation and relationship status were collapsed into dichotomous variables (heterosexual vs. sexual minority, and single and not dating vs. in a relationship, respectively). In addition, participants responded to a number of background questions related to their general Internet use (e.g., hours of use per day, which devices they used to get online), sexual history (e.g., “With how many different partners have you had ‘real life’ (i.e., offline) sex within the past 12 months?”), and how frequently they masturbated.

Value Orientation

Participants also completed a 5-item Inglehart Index on value orientation (www.worldvaluessurvey.org/WVSDocumentation/WV5.jsp), $\alpha = .72$. The Inglehart Index is a measure of participants’ traditional versus secular-rational values. Questions included: (1) God is very important in my life; (2) It is more important for a child to learn obedience and religious faith than independence and determination; (3) Abortion is never justifiable; (4) I am very proud of my nation; and (5) Greater respect for authority would be a good thing in our society, and were rated on a 5-point Likert scale, ranging from totally disagree (1) to totally agree (5).

OSA Experiences

Participants responded to 24 items assessing the prevalence and frequency of the six types of OSA and their subtypes. Participants first reported whether or not they had ever used the Internet for the specified OSA (prevalence) followed by how frequently they engaged in that OSA in the previous 3 months ranging from never (0) to daily (6). We included an operational definition of each type or subtype of OSA at the beginning of each item (see “Appendix” for the definitions and items).

Most of these single-item measures were derivations of items used in previous studies. The first type of OSA was sexual information, and participants reported if and how often they used the Internet to get sexuality-related factual information (similar items were used by Boies, 2002; Goodson et al., 2001; Velezmoro et al., 2012). The second type of OSA was sexual entertainment, subdivided into using the Internet to access sexually stimulating material (similar items used by Boies, 2002; Goodson et al., 2001; Velezmoro et al., 2012) and to post do-it-yourself (DIY) sexual material (this item was constructed to address the sexuality-related use of social media and the phenomenon of user-generated sexual content). The third type of OSA was sexual contacts measured with two subtypes: using the Internet to find cybersex partners (similar items were used by Daneback et al., 2005; Shaughnessy & Byers, 2014) and to find offline sex partners (Daneback et al., 2007). The fourth type of OSA was sexual minority communities. Participants reported if and how often they participated in marginalized or specialized sexuality-related online communities (this item was developed based on the literature on sexuality-related online communities; e.g., Döring, 2012; Hillier & Harrison, 2007). The fifth type of OSA was sexual products with the subtypes of browsing for and buying sexual products online (similar items were used by Daneback et al., 2012; Goodson et al., 2001). The sixth and last type of OSA was sex work with two subtypes addressing commercial online sex (i.e., paying for and being paid for online sexual services) and addressing the online marketing of commercial offline sex (i.e., purchasing and offering offline sexual services). Items were constructed based on previous research

Table 1 Background and demographic characteristics for Sweden, Germany, Canada, and the U.S. samples

	Sweden (<i>n</i> = 874) Group A	Germany (<i>n</i> = 1021) Group B	Canada (<i>n</i> = 516) Group C	U.S. (<i>n</i> = 279) Group D	Total (<i>n</i> = 2690)	<i>F</i> / χ^2	<i>p</i>	post hoc
Sociodemographics								
Gender (%)								
Female	66.0	33.9	61.0	71.3	53.4	260.29	<.001	B (% women) < A, C, D
Male	34.0	66.1	39.0	28.7	46.6			
Age (<i>M</i> , <i>SD</i>)								
	26.65 (6.43)	23.72 (4.86)	22.31 (5.35)	26.10 (6.99)	24.65 (5.99)	74.47	<.001	C < B < D, A
Relationship status (%)								
Single and not dating	36.4	47.7	25.8	27.0	37.7	89.69	<.001	C, D, A (% single) < B
In a relationship	63.6	52.3	74.2	73.0	62.3			
Sexual orientation (%)								
Heterosexual	79.9	89.2	83.2	72.1	83.3	40.41	<.001	D, A (% heterosexual)
Sexual minority	20.1	10.9	16.8	27.9	16.7			<B
Value orientation								
Value orientation according to Inglehart Index (<i>M</i> , <i>SD</i>)	2.21 (.75)	2.33 (.68)	— ^a	2.75 (.91)	2.35 (.76)	36.67	<.001	A, B < D
Internet use								
Internet use per day in hours (<i>M</i> , <i>SD</i>)	3.80 (2.74)	4.36 (2.92)	4.28 (2.86)	4.33 (2.89)	4.16 (2.86)	6.90	<.001	A < B
Internet access through private computer nobody else uses (%)	77.6	88.8	83.1	69.5	82.1	71.35	<.001	D (% private pc) < C, B
Internet access through mobile device like smartphone, table (%)	74.6	57.2	76.0	81.0	69.0	106.31	<.001	B (% mobile device) < A, C, D
Internet browsing without traces (private mode, deleted history) (%)	58.1	75.0	66.8	64.9	66.8	59.29	<.001	A (% without traces) < B
Sexual behavior								
Number of sex partners within past 12 months (<i>M</i> , <i>SD</i>)	1.66 (1.72)	1.38 (1.39)	1.87 (1.94)	1.58 (1.83)	1.59 (1.67)	8.04	<.001	B < C
Masturbation frequency (<i>M</i> , <i>SD</i>) ^b	3.28 (1.96)	4.06 (1.75)	3.50 (2.05)	3.35 (2.06)	3.62 (1.94)	19.97	<.001	A, C, D < B
Oral, vaginal, anal intercourse frequency (<i>M</i> , <i>SD</i>) ^b	3.11 (1.83)	3.05 (1.99)	3.16 (1.95)	2.52 (1.98)	3.04 (1.94)	5.24	.001	D < A, B, C

^a Not enough valid cases (*n* = 29), other countries *n* > 180

^b Frequency measured as: 0 = never to 6 = daily

about the Internet's role in sex work (Cunningham & Kendall, 2011; Podlas, 2000).

Data Analysis

All statistical analyses were performed using SPSS 21. To explore whether the country samples differed on key sociodemographic and background variables, we conducted one-way analyses of variance (ANOVA) and χ^2 tests (both with Bonferroni post hoc comparisons, MacDonald & Gardner, 2000). Next, we examined frequency distributions, means, and *SD* to

examine descriptive information regarding the popularity ranking of different types of OSA (Question 1). We conducted two separate 2 (Gender: male/female) \times 4 (Country: Sweden, German, Canada, and the U.S.) multivariate analyses of covariance (MANCOVA) to examine between-group differences in prevalence (Question 2) and frequency (Question 3) of OSA separately while controlling for the effects of age, sexual orientation, and relationship status (for using analysis of variance with dichotomous variables, see Lunney, 1970). MANCOVAs were followed by ANCOVAs and Bonferroni post hoc comparisons. Effect sizes were estimated in terms of explained variance with partial eta squared coefficients. Given our large sample size, we

used a significance level of $p < .01$ to avoid Type I errors along with an effect size of partial $\eta^2 > .02$ to determine which differences to interpret.

Results

Description of the Sample

As shown in Table 1, participants were active Internet users spending, on average, more than four hours online per day ($M = 4.16$, $SD = 2.86$). The vast majority of participants accessed the Internet via a personal computer nobody else used (82.1 %) and/or reported mobile Internet access via smart phone or tablet device (69.0 %). Most participants (66.8 %) reported Internet browsing without traces (e.g., private mode, deleted history). In terms of sexual history and behavior, on average, participants reported more than one sexual partner within the past 12 months ($M = 1.59$, $SD = 1.67$). They had, on average, both solo sex and partner sex several times per month (see Table 1).

Regarding the value orientation, as expected, participants from Sweden reported the lowest traditional values ($M = 2.21$, $SD = .75$), followed by Germany ($M = 2.33$, $SD = 0.68$), and then the U.S. ($M = 2.75$, $SD = 0.91$) (due to a technological glitch in the online survey, little data from Canada were collected: $n = 29$). Bonferroni post hoc tests following an ANOVA revealed that participants from Sweden and Germany differed significantly from the U.S. participants in their value orientation (see Table 1).

Prevalence and Frequency of the Six Types of OSA

The lifetime prevalence of the OSA, as well as their relative rankings, is shown in Table 2 (Question 1). The two most prevalent lifetime OSA were endorsed by the majority of participants: accessing sexual information (89.8 %) and accessing sexually stimulating material (76.5 %). Almost half (48.5 %) of the participants reported browsing for sexual products and a substantial minority reported having engaged in cybersex (30.8 %) or buying sex products online (27.4 %). The least prevalent OSA were those involving sex work (i.e., monetary transactions for sexual services), including paying for online sexual services (1.1 %) or purchasing offline sexual services online (1.0 %).

Means and SD for the frequency of each subtype of OSA in the previous 3 months are shown in Table 2. Two types of frequencies are provided: (1) frequency among experienced users only (i.e., those who had experienced the particular type of OSA at least once), and (2) frequency in the total sample (i.e., including participants with no lifetime experience who received a frequency score of never = 0). Overall, the most frequent OSA were getting sexually stimulating material, in which experienced users reported having engaged in several times a month on average ($M = 3.22$) and all users about once a month ($M =$

2.44). The next most frequent OSA were different for experienced users and the total sample: In the total sample, getting sexual information ($M = 1.48$) and browsing for sexual products ($M = 0.46$) were the second and third most frequent OSA (less than once a month); experienced users, on average, engaged most often in online communities for sexual minorities ($n = 360$; $M = 2.76$, i.e., about several times a month) and in paying for sexual online services ($n = 24$; $M = 1.75$; i.e., about once a month).

Cross-National and Gender Comparison in Lifetime Prevalence of OSA

The overall MANCOVA to examine country, gender, and gender by country differences in OSA lifetime prevalence (Question 2) revealed a main effect for country, $F(36, 5364) = 7.00$, $p < .001$, $\eta^2 = .037$ and a main effect for gender, $F(12, 1786) = 23.60$, $p < .001$, $\eta^2 = .133$ (see Table 3). The gender by country interaction was negligibly small, $F(36, 5364) = 1.75$, $p = .004$, $\eta^2 = .012$.

We conducted follow-up ANCOVAs to examine which of the 12 dependent variables contributed to the MANCOVA main effects. Participants in the four countries differed significantly on two of the variables: browsing for and buying sexual products online: Bonferroni pairwise comparisons revealed that significantly more German students reported browsing for (56.0 %) and buying (37.2 %) sexual products online compared to Swedish students (46.0 and 26.2 %, respectively), American students (44.1 and 23.3 %, respectively), and Canadian students (41.0 and 13.4 %, respectively). Additionally, significantly more Swedish students reported buying sexual products online compared to Canadian students. The male and female participants differed on two variables: getting sexually stimulating materials and finding offline sex partners (see Table 3): Overall, the men reported significantly higher lifetime prevalence for both getting sexually stimulating materials (95.6 and 61.1 %, respectively) and finding offline sex partners (20.2 and 9.0 %).

Cross-National and Gender Comparison in OSA Frequency

The overall MANCOVA for frequency of OSA experience in the total sample (Question 3) revealed significant main effects for country and gender, $F(27, 5334) = 5.22$, $p < .01$, $\eta^2 = .026$; $F(9, 1776) = 91.66$, $p < .01$, $\eta^2 = .317$, respectively), but no gender by country interaction, $F(27, 5334) = 1.52$, $p = .042$, $\eta^2 = .008$ (see Table 4). The main effect for country was very small, though (only slightly above 2 %). Follow-up ANCOVAs showed that none of the dependent variables contributed significantly and with effect sizes above 2 % to the country main effect in OSA frequency (see Table 4).

Table 2 Prevalence, frequency, and ranking of OSA

Type of OSA	Subtype of Online Sexual Activity	Lifetime prevalence % (total sample)	Rank	Last 3 months frequency (experienced users only) <i>M</i> (<i>SD</i>) ^a <i>N</i>	Rank	Last 3 months frequency (total sample) <i>M</i> (<i>SD</i>) ^a	Rank
1. Sexual information	Getting sexuality information	89.8	1	1.64 (1.51) 2291	4	1.48 (1.52)	2
2. Sexual entertainment	Getting sexually stimulating material	76.5	2	3.22 (2.03) 1820	1	2.44 (2.34)	1
	Posting DIY sexual material	6.8	8	1.21 (1.86) 159	7	0.08 (0.56)	8
3. Sexual contacts	Having cybersex	30.8	4	0.81 (1.41) 735	9	0.25 (0.86)	5
	Finding offline sex partners	14.1	7	1.27 (1.84) 330	6	0.17 (0.80)	6
4. Sexual minority communities	Participating in online communities for sexual minorities	14.2	6	2.76 (2.25) 360	2	0.39 (1.27)	4
5. Sexual products	Browsing for sexual products	48.5	3	0.94 (1.16) 1136	8	0.46 (0.949)	3
	Buying sexual products	27.4	5	0.51 (0.89) 642	10	0.14 (0.51)	7
6. Sex work	Paying for online sexual services	1.1	9	1.75 (2.38) 24	3	0.02 (0.28)	9
	Being paid for online sexual services	0.5	12	1.57 (2.40) 21	5	0.01 (0.24)	10
	Purchasing offline sexual services ^b	1.0	10	–	–	–	–
	Advertising offline sexual services ^b	0.9	11	–	–	–	–

Bold numbers represent the top five ranked activities. $N = 2690$

^a Frequency scale: 0 = never to 6 = daily

^b Because of technical problems with skip patterns in the survey, no frequency data were obtained for this item

The gender main effect in OSA frequency was larger than the country effect (above 30 % of explained variance), and follow-up ANCOVAs revealed that three dependent variables contributed significantly to it: finding offline sex partners (2.1 % of explained variance), participating in online communities for sexual minorities (2.7 % of explained variance) and—most importantly—getting sexually stimulating material (30 % of explained variance): Men reported getting sexually stimulating material more than three times more often than did the women ($M = 4.08$, $SD = 1.79$ and $M = 1.21$, $SD = 1.63$, respectively).

Discussion

In this study, we extended previous research on OSA by comparing male and female college students' OSA experiences in four countries: the U.S., Canada, Germany, and Sweden. In spite

of the historical and cultural differences in these countries (including differences in values, religious beliefs, and sexual education), we found little differences regarding students' participation in online sexual activities (e.g., country effect sizes for all types of OSA prevalence and frequency were below 2 %, except for the prevalence of browsing for and buying sexual products online). One explanation for this result could be the development of a new globalized “net generation” that appropriates the Internet in similar ways regardless of their national cultures. To explore this possibility further, it would be important to include more countries from different parts of the world in future research. In particular, there is little or no OSA experience data from African, Asian, and Arabic countries, in which cultural values substantially differ from Western values. An examination of university students' OSA experience could be compelling evidence for or against the hypothesized net generation. Additionally, future research should include qualitative analyses

Table 3 Effects sizes for the influence of the country, gender, and gender \times country interaction effects on lifetime prevalence of OSA

Type of OSA	Subtype of OSA	Country partial eta squared	Gender partial eta squared	Gender by country partial eta squared
1. Sexual information	Getting sexuality information	.006	.000	.000
2. Sexual entertainment	Getting sexually stimulating material	.010*	.087*	.002
	Posting DIY sexual material	.008*	.004*	.004
3. Sexual contacts	Having cybersex	.011*	.005*	.003
	Finding offline sex partners	.011*	.041*	.007
4. Sexual minority communities	Participating in online communities for sexual minorities	.002	.016*	.002
5. Sexual products	Browsing for sexual products	.028*	.001	.002
	Buying sexual products	.044*	.004*	.001
6. Sex work	Paying for online sexual services	.001	.001	.002
	Being paid for online sexual services	.001	.001	.001
	Purchasing offline sexual services	.003	.005*	.006
	Advertising offline sexual services	.001	.001	.004
	Total	.037*	.133*	.012*

MANCOVA, independent variables: country, gender; dependent variables: OSA lifetime prevalence; control variables: age, sexual orientation (heterosexual/sexual minority), and relationship status (single/in a relationship). $N = 1807$. Numbers in bold are significant and represent an effect size greater than 2%. * $p < .01$

Table 4 Effects sizes for the influence of the country, gender, and gender \times country interaction effects on the frequency of OSA

Type of OSA	Subtype of OSA	Country partial eta squared	Gender partial eta squared	Gender \times country partial eta squared
Sexual information	Getting sexuality information	.016*	.010	.001
Sexual entertainment	Getting sexually stimulating material	.011*	.300*	.003
	Posting DIY sexual material	.003	.003	.001
Sexual contacts	Having cybersex	.018*	.009	.001
	Finding offline sex partners	.015*	.021*	.004
Sexual minority communities	Participating in online communities for sexual minorities	.000	.027*	.003
Sexual products	Browsing for sexual products	.012*	.002	.002
	Buying sexual products	.017*	.001	.004
Sex work	Paying for online sexual services ^c	–	–	–
	Being paid for online sexual services ^c	.002	.000	.001
	Purchasing offline sexual services ^c	–	–	–
	Advertising offline sexual services ^c	–	–	–
	Total	.026*	.317*	.008

MANCOVA, independent variables: country, gender; dependent variables: OSA frequency; control variables: age, sexual orientation (heterosexual/sexual minority), and relationship status (single/in a relationship). $N = 1795$. Numbers in bold are significant and represent an effect size greater than 2%. * $p < .01$

that provide a closer examination of the contents of the online materials that students consumed and produced. For example, our findings suggest that university students who have grown up in cultures with very different sexual values and sexual education, such as Sweden compared to the U.S., do not differ in how often they use the Internet to get factual information about sexuality. However, they might differ in the types of information they are searching for.

We also found few differences between men and women's participation in OSA. Specifically, women in all four countries reported using the Internet to get factual sexual information, to browse for sexual products, or to have cybersex in similar prevalence and frequency to the men. These findings are consistent with research suggesting that the gender gaps in sexual behavior have been closing in general (Petersen & Hyde, 2010). We also see this trend in the field of OSA; our study was consistent with

other recent research findings that suggest men and women differ in few of their OSA experiences (e.g., Shaughnessy & Byers, 2014; Shaughnessy et al., 2011, 2013). Indeed, only one type of online sexual activity—the use of sexually stimulating material on the Internet—was strongly related to gender, with 30 % of the variance in OSA frequency explained by participant gender. This specific gender effect (i.e., men reporting more frequent experience with sexually explicit online material) was consistent with, and arguably well-established in, the literature (e.g., for a recent meta-analysis in sexuality-related gender differences, see Petersen & Hyde, 2010). Researchers often explain this gender difference by pointing to men’s more frequent masturbation patterns compared to women (Döring, 2009). Additionally, male-oriented pornography is more widespread and more visible on the Internet and porn-use is more gender role conforming for men than women. However, about 40 % of female students in our sample had used the Internet to get sexually stimulating material and, those who did, accessed such material about once a month on average. In future studies, researchers should explore what types of sexually stimulating material female Internet users search for as well as how they might incorporate this material in their solo-sex activities.

The results of our study suggest that online sexual activities among university students are quite widespread, especially the free consumption of sexual information and entertainment. Paid services were not commonly used, possibly because college students tend to be on restricted budgets, and also because of the “gratis mentality” of the Internet—that is, people expect to use the Internet and access materials for free, and much of what is on the Internet is already available for free. OSA that demand active participation and communication (e.g., joining sexuality-related online communities; engaging in cybersex) were less common than consumptive behaviors. Although the Internet (and especially current Web 2.0, user-driven social media platforms) makes it possible for users to easily get in touch with like-minded people—to communicate openly and pseudonymously about sexual issues, and to publish self-produced sexually explicit content—our findings suggest that only a minority of people were actively involved in these subtypes of OSA.

Limitations

The strengths of this study should be understood in light of its limitations. First, we used non-random convenience samples from four universities. Therefore, the extent to which results can be generalized to the university student populations of the four countries is unknown. For example, the U.S. sample was recruited from a relatively liberal Northeastern area, which may not be representative of more conservative American areas such as Mid-Western or Southern states. Second, to keep the questionnaire reasonably short, we used single-item measures instead of multi-item measures, which can be problematic for assessing sexual behaviors (e.g., see Shaughnessy & Byers, 2013). At

present, there are few psychometrically sound and no comprehensive measures of OSA experience (for a review of OSA measures, see Eleuteri, Tripodi, Petruccioli, Rossi, & Simonelli, 2014). Although all of the single-item measures included clear conceptual definitions of the behaviors addressed and were carefully pretested, their psychometric properties could not be examined. Third, the study was based on three language versions of the questionnaire. We used translation and back-translation to ensure that the language versions of the survey were identical. However, there might still be minor inconsistencies in meaning between the translated items. Fourth, unforeseen technical problems occurred with the online questionnaire leading to missing data for some variables. Fifth, gender was globally measured with one self-categorization item. To further explore gender aspects of OSA, it would be helpful to use more differentiated gender role measures and include more subjects that self-identify outside of the gender binary.

Recruitment for sexuality studies has the potential to produce samples biased toward those who are more sexually experienced and have more liberal attitudes toward sexuality (Wiederman, 1999). Our recruitment materials indicated that part of this study assessed online sexual behaviors; thus, it is possible that our sample over-represents students with OSA experience and/or liberal sexual attitudes. In addition, our study included an online survey, which introduces a potential bias toward self-selection of more technologically savvy users. Further, the culture of participation in and recruitment for research studies differed between the institutions. These recruitment limitations may have led to differences in sample sizes between the countries, notably the comparatively smaller U.S. sample. Finally, we acknowledge that cultural influences on sexual behaviors and activities were only partially covered by the Inglehart index. More studies are needed to further explore the effects of value orientation, religious beliefs, and social norms on different types of OSA.

Conclusion

In spite of these limitations, the study had multiple strengths and contributed toward an improved understanding of people’s use of the Internet for sexual activities. We conducted identical surveys with fairly large samples from four countries in the Western world, covering a wide range of OSA. We found that several types of OSA were fairly common in these samples. These prevalence rates highlight the growing social acceptance of using the Internet for sexual purposes. In an early study, only 5 % of U.S. college students had reported purchasing sexual merchandise online and 44 % accessing sexuality information online (Goodson et al., 2001); more than a decade later, we found 23 % of U.S. students reported buying sex products on the Internet and 72 % accessing sex information online. Similarly, in another early study, 8 % of Canadian college students had reported using the Internet to search for online sex partners

and 52 % to search for sexuality information (Boies, 2002), whereas we found 50 % of the Canadian college students in our sample reported using the Internet to engage in cybersex and 79 % use the Internet as a source for sexuality-related information. Further, in spite of geographic, cultural, historical, and political differences across the four selected countries, there were surprisingly few differences with regard to OSA among college students. Thus, the findings of the study contribute unique information to the growing body of research on OSA and provide evidence that Internet use may foster the development of a globalized sexual culture—at least in the Western world.

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Appendix

See Table 5.

Table 5 Items and operational definitions of the online sexual activity (OSA) prevalence and frequency measure

Type of OSA	Subtype of OSA	Definition provided to participants
1. Sexual information	Getting sexuality information	Some people use the Internet to get factual information about sexual matters, for example, information on contraception, sexual health, sexual techniques, sexual problems, etc.
2. Sexual entertainment	Getting sexually stimulating material	Some people use the Internet to get sexually stimulating material, for example erotic or sexually explicit photos, videos, stories, etc.
	Posting DIY sexual material	Some people use the Internet to post sexually stimulation material, for example, erotic or sexually explicit self-produced photos, videos, stories, etc.
3. Sexual contacts	Having cybersex	Some people use the Internet to have cybersex (chat sex, cam sex) with another person. Cybersex is a real-time communication with another person that occurs through a device (e.g., computer, smart phone) connected with the Internet in which one or both of you describe or share in other ways sexual activities, behaviors, fantasies, or desires. Cybersex may lead to feelings of sexual pleasure or physical intimacy. You and/or your partner may or may not be stimulating yourself/himself/herself sexually during this conversation
	Finding offline sex partners	Some people use the Internet to find new sex partners for offline sexual activity
4. Sexual minority communities	Participating in online communities for sexual minorities	Some people use the Internet to participate in online communities for sexual and/or gender diverse people, for example, fetishes, BDSM, transgender, queer, lesbian, gay, etc.
5. Sexual products	Browsing for sexual products	Some people use the Internet to browse online sex shops for sexual products like condoms, lubricants, dildos, vibrators, DVDs, etc.
	Buying sexual products	Some people use the Internet to buy sexual products like condoms, lubricants, dildos, vibrators, DVDs, etc.
6. Sex work	Paying for online sexual services	Some people use the Internet to pay for online sexual services, for example commercial cybersex, camsex, or commercial online chat sex
	Being paid for online sexual services	Some people use the Internet to offer online sexual services that they get paid for, for example offer commercial cybersex, camsex or commercial online chat sex
	Purchasing offline sexual services ^a	Some people use the Internet to purchase offline sexual services, for example, to book strippers, escorts, prostitutes, etc.
	Advertising offline sexual services ^a	Some people use the Internet to advertise offline sexual services, for example, advertise themselves as strippers, escorts, prostitutes, etc.

Instruction: The following questions deal with different types of online sexual activities and your personal experiences with them

After each definition, participants were asked: *Have you ever used the Internet to...* (Yes/No: prevalence measure). Participants who responded Yes were subsequently asked *In the last three months, how often have you use the Internet to...* and reported their responses on the 7-point frequency scale described in the methods section (frequency measure)

^a Participants only reported their prevalence of experience

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