Overcoming Methodological Concerns in the Investigation of Online Sexual Activities

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ABSTRACT

Online Sexual Activity (OSA) is an important and growing phenomenon. Prior research in this area has been criticized on methodological grounds. This study examines the reliability of Internet research regarding online sexual activities by comparing a selected random sample to a convenience sample. Participation in the selected random sample was limited to every 1,000th visitor to the MSNBC website in June 2000. Participation in the convenience sample was available to anyone with access to the Internet during the same time period. Most differences between these samples indicated that, relative to a selected random sample, a significantly greater proportion of Internet users in the convenience sample had a heavier involvement with OSA, including online sexual difficulties. We discuss the methodological and clinical implications of this finding.

INTRODUCTION

The investigation of online behavioral phenomena is a growing and important domain of psychological research. The number of people gaining access to the Internet is increasing exponentially.1 Sexuality has been an important dimension of the Internet from its earliest days,2 and sex continues to be one of the most frequently searched topics.3-6 Approximately 20% of all Internet users engage in some kind of online sexual activity (OSA).7 These activities include, but are not limited to, seeking information or advice about sexual health, romance and relationships, online chatting with a sexual focus, viewing erotic acts, buying erotic materials, or arranging for erotic encounters offline. Internet sexuality is of keen interest to sex researchers because of its relatively sudden appearance and rapid expansion in the social consciousness.

Traditional research methodologies were not designed for the Internet. According to an eminent social science methodologist, "You’re clearly in uncharted waters" with this kind of research.8 Scholarly rigor demands that we “apply old research techniques—randomized, controlled, double blind studies and other current paradigms to this new technology”9 to ascertain its usefulness for social science research in general and studies of online behaviors in particular. One in a series, this paper examines the reliability of Internet research and the implications for studying online sexual activities.

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Advantages and disadvantages of Internet research

The Internet, as an object of and medium for study, offers both possibilities and limitations. One advantage for conducting sexuality research online is that the Internet, like any community in ethnographic study, is itself the site of the behaviors under study. Most OSA studies to date have utilized the Internet to find subjects and explore questions about OSA. In addition, conducting research online has several advantages over traditional, offline survey research. Online research is fast, relatively inexpensive, and a way to reach large numbers of diverse potential subjects unconstrained by geography and time of day. The Internet offers a sense of anonymity, freedom from the discomfort of face-to-face questioning or other negative social cues that discourage sexually explicit communications, and increase socially desirable responses. The resulting disinhibiting effects encourage participants to be more honest and self-disclosing when answering questions on the computer than on other, more traditional methods of obtaining data, such as face to face, pencil and paper, and telephone interviews.

However, methodological reservations about Internet research abound. First, reliability is an issue. Respondents may represent fantasy personae rather than true identities and thereby compromise the integrity of sample demographics. Second, questions of generalizability are being raised. Some have argued that the ephemeral and anonymous nature of the Internet makes it "unfeasible to get a truly randomized, unbiased study population for research." Still others point out that the demographic composition of Internet users does not reflect the general population of the United States. Third, the heterogeneity of Internet users in varying time zones and even different seasons raises valid questions about this medium as an important tool with which to recruit a diversity of respondents when one is limited to convenience samples. Fourth, there are questions about the impact of self-selection in Internet research. There is concern that carefully selected respondents and self-motivated volunteers may differ in important ways.

It is becoming increasingly evident that there is a need to better understand Internet users, especially those engaged in OSA. Questions pertaining to reliability, representativeness, heterogeneity, and selective versus convenience sampling remain largely unanswered and in need of empirical investigation. Criticism and critical inquiry are part of the scientific dialogue regarding new research ideas. For example, when originally published, the Kinsey Reports were criticized by a variety of researchers for failing to survey a sample representative of the nation at large. The Kinsey Reports are nonetheless frequently cited and highly regarded for their comprehensiveness. Subjects can certainly misrepresent personal characteristics in telephone and pencil-and-paper surveys as well as online. Self-selection is a concern in many offline survey studies. Internet researchers are not the only ones who confront issues of generalizability. Azar contends that even social science laboratory research is plagued by difficulties in finding representative samples, none of which utilize random samples.

We chose to conduct our study on the Internet primarily because online sexual behavior occurs in this medium. In an attempt to meet as many standards of academic rigor as possible, we designed the study to address the methodological challenges mentioned above. We incorporated several strategies to address challenges of reliability concerning subjects' responses. For instance, it is very difficult to tell if the same person is making multiple submissions by logging on from the same or different terminals. As a precaution, computers from which surveys were submitted were sent an electronic "cookie," that identifies the user's
online sexual activities

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computer to the web host. We also coded each submission with a Global User Identification Number (GUID), an advanced hexadecimal code that blocks repeated survey access by individuals using the same usernames and Internet Service Provider. Because a sense of anonymity affords Internet users opportunity to deliberately misrepresent their demographic characteristics, we interspersed throughout the survey a series of improbable items that served as validity scales (similar to that used by the MMPI). To address the challenge of representativeness, we posted the study on the MSNBC web site, a major news portal known to be of interest to a large and diverse segment of the general population. We addressed concerns about randomization by utilizing some of the unique properties of Internet technology. Most subjects found their way to the survey through their own initiative. In a separate sample, every 1000th visitor to the site was selectively presented with a pop-up menu that specifically invited their participation in the study. The self-motivated group of participants is a convenience sample (i.e., sampling as usual). Those who were invited to participate via the pop-up menu invitations comprised a selected random sample. The two samples were mutually exclusive. We are careful to note that the population of interest in this study is Internet users who accessed the MSNBC web site, but in breadth and scope the generalizability is substantially greater than studies using college undergraduates (e.g., age). Although inferential sampling techniques (i.e., selected random sampling) can be generalized to the population from which a sample was drawn, a convenience sample cannot be generalized to any group beyond the respondents in the sample.26,27 We wanted to know whether using a sampling design that enables us to generalize findings back to the population from which our sample was drawn would provide different results than one limited to a convenience sample of self-motivated respondents. Theoretically, at least, inferential sampling methodologies and convenience samples yield different results. However, we hypothesized that the increased heterogeneity of the Internet would provide an inherent quasi-randomness that could negate many of the differences between (a) self-motivated respondents and (b) those who choose to reply to a systematically administered random invitation to participate. However, we hypothesized that sampling on the dependent variable (particular interest in OSA) would yield a significantly greater proportion of individuals with these concerns in an online convenience sample than in a systematic sampling methodology. More specifically, we hypothesized that relative to the selected random sample, which limited potential respondents, the self-motivated nature of the convenience sample would yield a higher proportion of individuals with a particular interest in OSA (including those with online sexual difficulties). To test this, we used the convenience sample as a control group and the selected random sample as an experimental group.

Methods

Participants

Participants either volunteered for the convenience sample \( (n = 33,391) \) or were invited \( (n = 7,544) \). Methods of recruitment for the convenience sample included news reports and word of mouth. In the selected random sample, participation was offered to every 1,000th unique visitor to the MSNBC web site. Convenience sample respondents (81.5% male) had a mean age of 34.93 (SD = 11.16), and selected random sample participants (84.0% male) had a mean age of 33.13 (SD = 10.59). The disproportionately large number of male respondents is typical in Internet research.

Instrument

The questionnaire used in this study was a 76-item version expanded and elaborated from the 59-item questionnaire used in a previous online survey of OSA.10 The questionnaire consisted of two parts, the first of which assessed demographic variables. The second part examined respondents’ behaviors. Ten items were included to screen out unreliable respondents. These items were grouped in three subscales dispersed throughout the questionnaire in order to identify unreliable respondents. Two of the subscales included four items regarding
negative and positive social self-attributions. Affirmative answers to these items indicated that respondents were making unrealistically positive or negative social self-attributions. These items are listed in Table 1. Respondents who scored four out of four on each of these scales were considered to be unreliably high or low on social self-attributions. Therefore, they were not included in the final analyses. Inter-item correlations between items on the unrealistically low or high social self-attribution scales ranged from 0.07 to 0.26. The alpha coefficients for the high and low social self-attribution scales were 0.34 and 0.37, respectively.

The third scale contained two additional items used to identify excessive carelessness or overt misrepresentation by the respondent. These items included, “I have spent more than 5,000 hours engaged in online sexual activity this year” (which would imply a use rate of 13.7 hours per day, every day of the year), and, “I have spent more than 8,000 hours engaged in online sexual activity this year” (which would imply a daily use rate of 22.0 hours). Respondents who answered these questions affirmatively were eliminated from the study. Respondents over age 80 were eliminated because of the tapering distribution between respondents age 80 and younger and a suspiciously elevated frequency distribution above age 80. Respondents with five or more unanswered responses also were eliminated from the study.

Notably, identical proportions of respondents were removed from both the convenience (C) and selected random (SR) samples. Overall, 6.5% of the potential convenience sample respondents and 6.8% of the selected random sample participants were ejected from the data set. Thus, the a priori exclusion criteria resulted in a difference of less than 0.3% between C and SR samples. A Z-approximation (difference of proportions) test for this between-samples difference was insignificant.

Respondents were asked 16 questions concerning general demographic variables. Next, respondents were asked 59 questions pertaining to their use of the Internet for sexual pursuits.

**Procedure**

Participation in both samples was voluntary, and participants’ identities remained anonymous to the researchers. Ascertaining a respondents’ identity would have required voluntary disclosure of an E-mail address and subsequent response to a specifically articulated inquiry about identity. To maintain anonymity, researchers were therefore kept blind to voluntarily disclosed E-mail addresses. The E-mail addresses were kept in a separate database that was unavailable to the researchers. Only the senior statistician and chief methodologist of the project (third author) had access to this information, and at no time was it accessed or utilized during this study.

Prior to beginning the questionnaire, respondents were asked for their informed consent to participate. All respondents had to acknowledge they were age 18 years or older in order to participate. Those who chose to participate in the study had access to the questionnaire via their computers through an interactive MSNBC web page containing the questionnaire items. The survey was conducted for one month, from June 1 to June 30, 2000.

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Table 1. Items Comprising the Two Validity Subscales

<table>
<thead>
<tr>
<th>Unreliably high social self-attributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I always get whatever sexual partner I want.</td>
</tr>
<tr>
<td>My partners always tell me that I am the best sexual partner they have ever had.</td>
</tr>
<tr>
<td>I am much more intelligent than anyone else.</td>
</tr>
<tr>
<td>I am the most physically attractive person I know.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Unreliably low social self-attributions subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to going online I did not know what oral sex (fellatio) was.</td>
</tr>
<tr>
<td>Prior to the Internet I never masturbated in my life.</td>
</tr>
<tr>
<td>It is wrong to think of anyone but your spouse in a sexual way.</td>
</tr>
<tr>
<td>Finding out about online sexuality is the worst thing that has ever happened in my life.</td>
</tr>
</tbody>
</table>
By utilizing GUIDs (global user identification numbers) and cookies, we ensured that participation in the samples was mutually exclusive. The MSNBC server assigned a GUID to each participant, tracking the computer, Internet service provider (ISP), and username of the participant with a hexadecimal coding system. This procedure enabled the host computer to block participation in both the convenience and selected random samples. The response rate for the selected random sample was 25%, similar to the typical response rate obtained for surveys utilizing random-digit dialing.\textsuperscript{28}

Precisely because the response rate was low and sampling was done without replacement, we must limit inferential generalizations to a smaller group than all MSNBC users in June 2000. Specifically, inferences can be made only to those June 2000 MSNBC users who are willing to respond to invitations to participate in a study of this kind. Therefore, we do not claim that we have a sample representative of all MSNBC users, Internet users, or the general population. Nonetheless, theoretically we would expect that relative to the selected random sample, the convenience sample would have a larger proportion of respondents who have a particular interest in OSA (including those with past difficulties with online sexual problems). The key issue, then, is whether a systematically administered online survey can effectively limit the involvement of individuals with online problems without excluding individuals who do not. If so, we would expect to find marked similarities between a convenience sample and a selected random sample on items unrelated to online problems, but statistically significant between-sample differences on items related to online problems.

The large sample sizes increased statistical power of between-sample tests. This increased the risk that trivial differences would be detected as statistically significant (i.e., a type II statistical error). Therefore, an alpha level of 0.001 was used for all statistical tests. (It should be noted these are standard procedures and criteria for large, health-based research samples). In addition, Cohen's $d$ was computed for each $t$ test to afford a context for between-sample differences independent of sample size.

**FINDINGS**

**Elimination criteria**

Two-way contingency table analyses were conducted to determine whether the sampling methodology affected elimination of unreliable cases. The two variables were sampling method as a dichotomous nominal variable (convenience sample versus selected random sample) and data retention as a dichotomous nominal variable (included versus excluded data). Data retention was assessed along three axes of exclusion. First, in criterion I, data were excluded if respondents reported they were older than age 80 or if they reported separately that they had spent 5,000 or 8,000 or more hours of the previous year engaged in online sexual activities (OSA). Second, in criterion II, data were excluded if respondents scored 4 out of 4 on scales of social self-attribution (unrealistically high or unrealistically low). Third, in criterion III, data were excluded if respondents left five or more questions unanswered.

Sampling method and data retention for criterion I (age, 5,000 OSA hours, and 8,000 OSA hours) were not found to be significantly related, Pearson $r^2$ ($2, N = 40,935$) = 0.513, $p$ = 0.474. Sampling method and data retention for criterion II (unrealistically high and unrealistically low social self-attributions) also were not significantly related, Pearson $r^2$ ($2, N = 40,935$) = 2.704, $p$ = 0.100. Finally, sampling method and data retention for criterion III (incomplete surveys) were not found to be significantly related, Pearson $r^2$ ($2, N = 40,935$) = 2.089, $p$ = 0.148. In sum, convenience (C) sampling and selected random (SR) sampling were not found to be significantly associated with inclusion or exclusion of unreliable data.

**Demography**

$Z$-approximation tests (difference of proportions) were conducted to determine whether the C and SR samples evidenced significantly different proportions among corresponding nominal categories of demographic variables. Demographic variables assessed include gender, sexual orientation, relationship status, country of residence, size of population, occupation, and age. Cohen's $d$ was computed to
evaluate effect sizes. All Cohen's $d$ tests revealed only small effect sizes (i.e., $<0.3$) for all demographic variables.

Gender was assessed with three categories (male, female, and transgender). The proportion of male respondents in the SR sample (0.840) was significantly greater ($Z = 11.40, p < 0.001$) than that of the C sample (0.812). However, the proportion of female respondents in the C sample (0.185) was significantly greater ($Z = 5.28, p < 0.001$) than the corresponding proportion in the SR sample (0.158). Notably, the C sample was slightly more representative of the proportion of females than was the SR sample. The MSNBC usage statistics for June 2000 indicated females made up 47.48% of its unique user audience (i.e., visitors per total visits). Interestingly, the proportion of transgender respondents was identical with both sampling methods (0.002).

Self-identification of sexual orientation was assessed with four response categories (heterosexual or straight, gay or lesbian, bisexual, and none of the above). The proportion of respondents who identified as heterosexual or straight was significantly greater in the SR sample than in the C sample ($Z = 14.54, p < 0.001$). However, there was no significant difference in the proportion of respondents in the C and SR samples who identified as gay or lesbian (0.072 and 0.060, respectively), bisexual (0.065 and 0.049, respectively), or who chose "none of the above" (0.013 and 0.010, respectively). Notably, the C sample obtained a larger proportion of nonheterosexual respondents.

Relationship status was assessed with six categories ("married," "married but also having additional secret romantic/sexual relations," "in a committed relationship," "in a committed relationship but also having additional secret romantic/sexual relations," "single & dating," and "single & not dating."). Although the proportion of married respondents engaging in extramarital relations was significantly greater ($p < 0.001$) in the C than in the SR sample (0.061 and 0.041, respectively), there were no significant between-sample differences among those who claimed other relationship statuses. Overall, five of the six relationship statuses (83.3%) did not differ by sampling methodology.

Country of residence was assessed with a list of more than 20 countries and "other." Nations in all continents except Antarctica were represented among the selection choices. No significant differences in proportion of respondents residing in any single nation were evident between C and SR samples. In the C sample, 95.4% of respondents indicated they were from the United States or Canada, whereas 95.5% of the SR sample did so. The difference of proportions in residents from any nation differed by no more than 0.2% between the C and SR samples. Thus, national representativeness of the C or SR samples was not affected by respondents' country of residence. Overall, however, both the C and SR samples primarily consisted of North American respondents. This is to be expected, as the major source for subjects was through the MSNBC news organization, a major media outlet for the United States.

Size of population of the respondents' local community was assessed with three categories, including "urban (50,001 or more people)," "suburban (10,001 to 50,000 people)," and "rural (10,000 or fewer people)," consistent with population parameters defined by the U.S. Census Bureau. Size of population in which respondents reside differed significantly between C and SR samples. The proportion of respondents from urban areas was significantly greater ($Z = 5.91, p < 0.001$) in the SR sample than in the C sample (0.628 and 0.607, respectively), whereas the proportion of respondents from rural areas was significantly greater ($Z = 3.38, p = 0.001$) in the C than in the SR sample (0.119 and 0.101, respectively). However, there was not a significant difference in the proportions of each sample reporting they reside in suburban areas (population sizes of 10,001 to 50,000). Overall, these findings indicate the C sample obtained a higher proportion of rural residents, who are usually under-represented in social science research.

Occupation was assessed with 16 categories of occupations, including (but not limited to) "homemaker," "student," "other," and "unemployed." Significant differences between the C and SR samples were found only in two occupational categories. The proportion of professionals was significantly greater ($Z = 4.50, p < 0.001$) in the C than in the SR sample (0.184 and 0.161, respectively), whereas the proportion of
students was significantly greater ($Z = 5.00, p < 0.001$) in the SR than in the C sample. The proportion of respondents in computer occupations neared significance at $Z = 3.32, p = 0.002$, with a slightly larger proportion in the SR relative to the C sample. Overall, 87.5% of the occupational categories did not differ by sampling methodology.

Age was assessed as a discrete, whole-number variable bounded by a lower limit of 18 years and an upper limit of 80 years. The bounds were determined by a priori inclusion criteria (age 18) and post hoc reliability analyses (age 80). An independent-samples $t$ test was conducted to determine whether, overall, respondents’ ages differed between the C and SR samples. The test was significant, $t (10,881) = 12.71, p < 0.001$, Cohen’s $d = 0.17$. (Because of the significant differences in sampling methodologies and sample sizes, equal variances were not assumed in our C versus SR analyses.) Respondents in the C sample were slightly but significantly older ($M = 34.93, SD = 11.16$) than those in the SR sample ($M = 33.13, SD = 10.59$). However, the respondents in the C sample had a median age of 33, with age 26 bounding the lower quartile and an age of 42 at the upper quartile. In the SR sample, the median age was 31, with ages 25 and 40 bounding the lower and upper quartiles, respectively. Thus, despite the statistically significant difference in mean ages between the C and SR samples, analyses of median ages revealed both groups were relatively young compared to an MSNBC unique user median age in the 35–49 age group.

**Compulsive behaviors**

**History of problems.** Independent-samples $t$ tests were conducted to test the hypothesis that C sample respondents were more likely than their SR counterparts to have a history of difficulties with compulsive behaviors, including alcohol, drugs, gambling, food, sex, work, and spending. No statistically significant differences between C and SR sample participants were found (see Table 2).

**Internet usage.** Online sexual compulsivity was assessed with six variables. These included responses to, “The total amount of time I go online for sexual pursuits” in hours (time online), as well as the following five-point anchored

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>C sample</th>
<th>SR sample</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>0.18</td>
<td>0.38</td>
<td>0.38</td>
<td>0.06</td>
<td>0.57</td>
<td>10526</td>
</tr>
<tr>
<td>Drugs</td>
<td>0.10</td>
<td>0.30</td>
<td>0.11</td>
<td>0.32</td>
<td>-2.22</td>
<td>10220</td>
</tr>
<tr>
<td>Gambling</td>
<td>0.03</td>
<td>0.17</td>
<td>0.32</td>
<td>0.18</td>
<td>-1.37</td>
<td>10135</td>
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<tr>
<td>Food</td>
<td>0.16</td>
<td>0.57</td>
<td>0.16</td>
<td>0.57</td>
<td>0.12</td>
<td>10491</td>
</tr>
<tr>
<td>Sex</td>
<td>0.15</td>
<td>0.36</td>
<td>0.14</td>
<td>0.34</td>
<td>2.48</td>
<td>10728</td>
</tr>
<tr>
<td>Work</td>
<td>0.15</td>
<td>0.35</td>
<td>0.15</td>
<td>0.36</td>
<td>-0.98</td>
<td>10389</td>
</tr>
<tr>
<td>Spending</td>
<td>0.18</td>
<td>0.39</td>
<td>0.20</td>
<td>0.40</td>
<td>-2.45</td>
<td>10298</td>
</tr>
<tr>
<td>Any of above</td>
<td>0.52</td>
<td>0.50</td>
<td>0.52</td>
<td>0.50</td>
<td>0.16</td>
<td>10480</td>
</tr>
</tbody>
</table>

| Internet usage              |          |           |      |     |       |      |
| Time online                 | 3.04     | 5.57      | 2.62 | 5.58| 5.72  | 10466| 0.000 | 0.075|
| OSA problem                 | 0.42     | 0.77      | 0.38 | 0.73| 4.12  | 10837| 0.000 | 0.053|
| OSA complaints              | 0.23     | 0.59      | 0.20 | 0.57| 3.47  | 10787| 0.001 | 0.052|
| OSA uncontrolled            | 0.37     | 0.75      | 0.33 | 0.72| 4.11  | 10868| 0.000 | 0.054|
| General net use             | 0.48     | 0.77      | 0.47 | 0.75| 0.49  | 10681| 0.624 | 0.013|
| Net uncontrolled            | 0.39     | 0.72      | 0.38 | 0.71| 1.08  | 10570| 0.282 | 0.013|

*Convenience sample (N = 31,153).

bSelected random sample (N = 7,051).

ccohen’s $d$, assessing effect sizes, where (generally) 0.3 is small, 0.5 is medium, and 0.8 is large.

$dp < 0.001$. 

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**TABLE 2. PAST COMPULSIVE DIFFICULTIES BY TYPE OF SAMPLE**

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Likert-scale items (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = all the time): “my time online for sexual activities has been a problem in my life” (OSA problem); “others in my life have complained about my involvement with online sexual activities” (OSA complaints); my online sexual activities feel out of control” (OSA uncontrolled); my involvement with Internet activities in general has been a problem in my life” (general net use); and, “my Internet activities in general feel out of control” (net uncontrolled). Independent-samples t tests were conducted to test the hypothesis that C sample respondents were, on average, more likely than their SR counterparts to report more difficulties with each of these items. As indicated in Table 2, four of the six tests were significant. Relative to SR sample participants, C sample respondents reported they spent significantly more time online for sexual pursuits. On average, C sample participants also reported more problems than SR sample respondents with regard to the amount of time online for sexual activities (time online), considering time online for sexual activities a problem (OSA problem), acknowledging others’ complaints about online sexual activities (OSA complaints), and feeling online sexual activities are out of control (OSA uncontrolled). However, C and SR sample participants did not differentially endorse involvement with the Internet as generally a problem (general net use) or that its use generally feels out of control (net uncontrolled). Cohen’s d (<0.1) for these six variables indicated a very small effect size for these tests.

Independent-samples t tests were performed to determine whether months of prior Internet use or hours per week spent online differed between samples. Both tests were significant. SR sample participants had significantly more months of Internet use (M = 50.05, SD = 24.44) than C participants (M = 48.52, SD = 24.66). The SR sample participants also spent more hours per week online (M = 23.80, SD = 24.56) than C sample participants (M = 22.31, SD = 22.53).

DISCUSSION

The Internet is a new, exciting, and challenging medium for conducting research. It is difficult to control human variables in a laboratory setting, let alone the online environment, and significant efforts are needed to examine and control many of the known and unknown confounding variables in either setting. Because sexuality research conducted online has the distinct advantages of being able to quickly mount a study; access a large number of potential subjects; and efficiently and economically collect, manage, analyze and store data have significant benefits, it warrants the effort to integrate traditional methodologies with Internet technology. The four major problems we addressed were the reliability of subjects’ responses, obtaining a heterogeneous sample, generalizability of findings, and obtaining parity in control or comparison groups.

Reliability

Even in face-to-face interviews, there are few guarantees that subjects will be forthcoming or honest about their age, gender, or sexual activities and preferences. Skilled researchers also incorporate nonverbal cues. Although a perception of anonymity may give some subjects leave to misrepresent themselves, it can also have a disinhibiting effect that can increase subjects’ willingness to participate in studies and respond with greater openness and honesty.

The use of GUIDs and electronic cookies limited respondents to participation in either the convenience sample or the selected random sample. We wanted to know whether respondents in the convenience sample were more unreliable than those in the selected random sample. To test this, we compared the three criteria for exclusion of unreliable cases: (a) number of hours per year engaged in OSA, (b) unrealistically high or low self-attribution, and (c) incomplete surveys. Between-sample differences for all of these items were statistically insignificant at p < 0.001. Thus, participants in the convenience sample were not more unreliable than those in the selected random sample. This suggests that individuals who are self-motivated to participate in a study are not less reliable than those who elect to respond to a systematically administered request to participate in a study. Further research is needed to determine whether individuals who respond to...
systematically administered requests to participate in online research are less reliable than those who decline these invitations.

**Heterogeneity**

With each passing year, the Internet is more closely approximating the demographics of the general population. The Internet attracts huge numbers of persons of every age, nationality, socioeconomic status, as well as a broad range of sexual interests and behaviors. As with offline research, a study's location affects respondents' participation. Thus, posting the survey on the MSNBC website has some limitations with regard to computer literacy. However, unlike research conducted with introductory psychology students, prospective online respondents are not bound by the three-dimensional time, place, and resource constraints that traditionally limit researchers. Prospective respondents can be literally time zones and seasons apart and may not have much in common beyond, for example, a desire to check the news. The potential respondent pool is neither circumscribed by geography nor a subscription to a periodical and thus there is the potential to achieve a high degree of heterogeneity. Alternatively, the Internet allows the recruitment of populations otherwise difficult to study, such as sexually disenfranchised minorities or those experiencing problems with their online sexuality activities.

We examined between-sample differences regarding gender, sexual orientation, relationship status, country of residence, size of community, occupation, and age. The C sample obtained about 2.5% more females than did the SRS, whereas the SRS obtained about 2.5% more males than did the C. Although a relatively small difference, the results enabled us to reject the null hypothesis that the two samples were identical with regard to gender. Further research is needed to determine whether this small but statistically significant difference is related to a greater reluctance by females than males to participate in a systematically administered survey of OSA, whether women in the C group had a stronger interest in OSA than the SRS (possibly related to partners' difficulties with these issues), or some other factor. Neither the C nor SR sample was more likely to exclude sexual minority respondents. Although there were significantly more married respondents engaging in extramarital relations in the C than in the SR sample, this difference might reflect the somewhat greater likelihood that the Internet has become a popular means of finding extramarital partners. We also found no between-sample differences in respondents' nationalities. However, at \( p < 0.001 \) we were compelled to reject the hypothesis that the proportion of urban and rural residents are identical in the two samples. There was a slightly but significantly greater percentage (about 2%) of rural residents in the C sample, whereas there was a correspondingly larger percentage of urban participants in the SRS sample. Mathy and Ahlquist argued that the Internet has become a viable way for rural residents to initiate and maintain interpersonal relationships beyond their relatively small communities. The slightly greater percentage of rural residents in the C than in the SR sample may support this assertion. Without the limitations of a systematically administered survey, a slightly but significantly larger percentage of rural residents are able to participate in a convenience sample. This has important implications for conducting research with hard-to-reach populations (particularly for sexually disenfranchised persons).

We also found about a 2% difference in the number of professionals and students who participated in the two samples. Professionals were more likely to participate in the C than in the SR sample, whereas the converse was true for students. Again, although this difference is relatively small, we were testing the null hypothesis that the two samples were identical. It is notable that at \( p < 0.001 \), we found there were differences in only two of 16 occupational categories. The reasons for this difference are unclear.

**Generalizability**

There are concerns about whether sexuality research conducted online is representative of the general population. Very few studies can be generalized to the entire population of the United States (or any other country), and those
that do are usually conducted by government agencies or very large federally funded grants. Most researchers simply do not have the resources to apply for these grants. Unfortunately, one consequence of this is that many questions sex researchers have remain unanswered, in part because the many leading-edge methodological and substantive questions regarding Internet use and online sexuality are not yet part of a national research agenda. Therefore, sex researchers must become adept at finding hard-to-reach respondents, prepare to conduct research that asks extremely sensitive questions, and have the ability to do so with limited funding. The Internet provides a reliable and powerful alternative for conducting circumscribed psychosexual research. For instance, traditional recruitment methods might make it difficult and expensive to find enough subjects to adequately study gay men who are experiencing difficulty in a primary relationship due to their online sexual activities. However, posting announcements at selected online sites will undoubtedly facilitate recruitment.

Next, we examined two dimensions of compulsive behaviors: (a) a group reporting offline problems, including history of difficulties controlling or excessively using alcohol, drugs, gambling, food, sex, work, and spending, and (b) a group reporting online problems, including six variables related to controlling or excessively using the Internet. We found no between-sample differences in offline compulsive behaviors. As predicted, we found a significantly greater proportion of respondents in the C than in the SR sample on the online compulsive behaviors. In fact, we found that there were no online compulsive behaviors in which there was not a significantly greater proportion of respondents in the C than in the SR sample. This is important precisely because we had hypothesized that the absence of control on inclusion in a sample about online problems administered via the Internet would draw a disproportionately large number of respondents with online problems (i.e., sampling on the dependent variable). This finding specifically supports the contention that a systematic sampling design is needed when studying online problems via the Internet.

In general, we found that the convenience and selected random samples were more similar than different. With the exceptions of small but significant (at \( p < 0.001 \)) differences in gender, age, rural versus urban residence, and professional versus student occupational status, we found remarkable similarities between the two samples. Online sexual activities (including online sexual problems) were the area in which there were the most significant differences. This has significant implications for interpretation of current research and the formulation of new studies.

Our findings indicate that clinicians and researchers can be fairly confident that convenience samples will reflect the results of selected random samples with regard to drugs, gambling, sex, and work. In essence, then, this finding supports the argument that Internet convenience samples regarding non-Internet problems do not yield significantly different results than inferential sampling methods when weighted by response bias.

The number of studies using the Internet to study various aspects of human sexuality is rapidly increasing. Studies of OSA, in particular, have and will continue to increase as the clinical and societal implications of this phenomenon are more clearly acknowledged. This study attempted to address a number of the most salient methodological concerns regarding OSA research. We hope that these ideas will prove helpful to others entering this field while simultaneously contributing to the confidence of the findings in future studies of Internet sexuality.

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REFERENCES


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