



Taylor & Francis
Taylor & Francis Group

Asexuality: Prevalence and Associated Factors in a National Probability Sample

Author(s): Anthony F. Bogaert

Source: *The Journal of Sex Research*, Vol. 41, No. 3 (Aug., 2004), pp. 279-287

Published by: [Taylor & Francis, Ltd.](#)

Stable URL: <http://www.jstor.org/stable/4423785>

Accessed: 12/06/2014 17:10

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Taylor & Francis, Ltd. is collaborating with JSTOR to digitize, preserve and extend access to *The Journal of Sex Research*.

<http://www.jstor.org>

Asexuality: Prevalence and Associated Factors in a National Probability Sample

Anthony F. Bogaert
Brock University

I used data from a national probability sample (N > 18,000) of British residents to investigate asexuality, defined as having no sexual attraction to a partner of either sex. Approximately 1% (n = 195) of the sample indicated they were asexual. A number of factors were related to asexuality, including gender (i.e., more women than men), religiosity, short stature, low education, low socioeconomic status, and poor health. Asexual women also had a later onset of menarche relative to sexual women. The results suggest that a number of pathways, both biological and psychosocial, contribute to the development of asexuality.

Asexuality, the state of having no sexual attraction for either sex, has been studied only sparingly. Related issues are sexual aversion disorder and hypoactive sexual desire disorder (HSDD), which have been studied more frequently in recent years (e.g., Beck, 1995; Rosen & Leiblum, 1995). In both sexual aversion disorder and HSDD, there usually is or was a sexual orientation toward partners of either or both genders, but there is either an aversion for genital contact with these partners (e.g., extreme anxiety when a sexual encounter presents itself) or a low sexual desire for these partners. Sexual aversion disorder and HSDD issues often arise within the context of couples—as, for example, when a “discrepancy of sexual desire” is diagnosed. Asexuality, in contrast, can be defined as the *absence* of a traditional sexual orientation, in which an individual would exhibit little or no sexual attraction to males or females. One such model of asexuality was developed by Storms (1980; see also Berkey, Perelman-Hall, & Kurdek, 1990). Storms classified heterosexuals as individuals who are highly attracted to the other sex (i.e., high in heteroeroticism), homosexuals as individuals who are highly attracted to the same sex (i.e., high in homoeroticism), bisexuals as individuals who are highly attracted to both sexes (i.e., high in both heteroeroticism and homoeroticism), and asexuals as individuals who are not attracted to either sex (i.e., low in both heteroeroticism and homoeroticism). In this study, I undertook the investigation of lifelong asexuality, defined as having no sexual attraction for either sex. Note that the definition of asexuality here concerns a lack of sexual attraction to either sex and not necessarily a lack of sexual behavior with either sex or self-identification as an asexual. Sexual behavior and sexual self-identification are of course correlated with sexual attraction, but, for a variety of reasons, one’s attraction to men or

women and overt sexual behavior or sexual self-identification may have a less-than-perfect correspondence. It is of note that many sexual orientation researchers have recently emphasized sexual attraction over overt behavior or self-identification in conceptualizing sexual orientation (e.g., Bailey, Dunne, & Martin, 2000; Bogaert, 2003b; Money, 1988; Zucker & Bradley, 1995).

One fundamental question for the present research was the prevalence of asexuality. Is it as prevalent as other atypical sexual orientations such as same-sex attraction or is it extremely rare? Given the paucity of research on the subject, one might expect asexuality, particularly life-long asexuality, to be very unusual. A very low level of asexuality is also predicted from evolutionary models of human behavior because one would expect strong selection pressures against such nonreproductive tendencies. On the other hand, same-sex attraction is also clearly a nonreproductive orientation, and yet its prevalence over time and across societies continues to challenge evolutionary theorists (e.g., Bobrow & Bailey, 2001).

Little is also known about the factors associated with asexuality. Therefore, the present study was an attempt to open up the field and begin to explore factors associated with this relatively uncharted area of sexual variability. Of course, one factor that should be an obvious predictor is sexual behavior itself, particularly with a partner. However, given that sexual attraction and sexual behavior are imperfectly correlated, a complete absence of partnered sexual behavior is not expected for all asexual people. Some level of sexual activity—perhaps as a result of exploration or to please a partner—is expected for some asexual people, although sexual activity should be much more infrequent in asexual people relative to sexual people. Thus, relative to sexual people, asexual people should report fewer sexual partners of both sexes, later first sexual experiences if indeed a sexual experience with a partner has occurred, and less frequent sexual activity with a partner.

Aside from sexuality itself, one factor that may be an important predictor is age. First awareness of sexual

This research was supported by a Social Sciences and Humanities Research Council of Canada Grant (#410-99-0521) to Anthony F. Bogaert. The author wishes to thank Ray Blanchard, John Cairney, and Carolyn Hafer for their help at various stages of this research.

Address correspondence to Anthony F. Bogaert, Ph.D., Department of Community Health Sciences, Department of Psychology, Brock University, St. Catharines, Canada, L2S 3A1; e-mail: tbogaert@brocku.ca.

attraction occurs for many people around the age of 10, often preceding puberty and associated with the development of the adrenal glands and not the gonads (Herdt & McClintock, 2000; McClintock & Herdt, 1996). However, people probably vary in their awareness and experience of first sexual attraction, with a variety of social and psychological factors along with biological aspects contributing to such awareness and experience. For example, sexual attraction to others has been argued to be partly the result of arousal experiences—through, for example, masturbation, fantasy, and sexual activity—directed at or with partners (e.g., Storms, 1981). Sexual attraction has also been argued to be partly the result of exposure to and familiarity with same-sex or opposite-sex peers (e.g., Bem, 1996). As a consequence, perhaps some younger individuals—for example, late adolescents or even young adults—may have had few if any relevant social and psychological opportunities to experience or initiate sexual attraction to others. Thus, young people may be more likely to be asexual, although they may be best described as in a “presexual” life stage, which may change as they age.

Another relevant factor may be illness, disease, and disability. Although I know of no strong empirical evidence supporting such a belief, there is a stereotype that disabled people are asexual beings (e.g., Milligan & Neufeldt, 2001). One of the reasons people with disabilities are perceived as asexual is that others assume that low sexual activity or functioning is equivalent to asexuality. Although probably an incorrect assumption in many cases, there may be some logic to this reasoning: Some chronic health problems may reduce sexual functioning and restrict sexual activity to such a degree that some people with these conditions may be perceived by others and themselves as having little or no sexual attraction to partners of either sex. Many chronic or debilitating health conditions have been associated with low sexual functioning and/or activity and thus may be relevant in this regard, including spinal cord injuries (e.g., Szasz & Carpenter, 1989), multiple sclerosis (e.g., Schover, Thomas, Lakin, Montague, & Fisher, 1988), pituitary disorders (e.g., Cohen, Greenberg, & Murray, 1984), schizophrenia and other neurological or psychiatric conditions (e.g., Fortier, Trudel, Mottard, & Pichè, 2000), and eating disorders (e.g., Carlat & Camargo, 1991; Ghizzani & Montomoli, 2000).

These and other health problems are often related to unusual physical development characteristics. People with unusual physical development characteristics—for example, short stature, obesity or extremely low weight, or late puberty onset—may have, or have had, debilitating medical conditions that led to these characteristics. Thus, these characteristics may be markers of poor health and development, which may alter sexual functioning and thus lead to the perception by others and themselves that they have little or no attraction for a partner of a particular sex.

Note that in the above discussion it is assumed that these health problems and the unusual physical characteristics

they may give rise to affect asexuality indirectly by, for example, reducing sexual functioning and sexual drive, which in turn can cause those with such problems and characteristics, as well as other people, to think that they have little attraction to others. However, it should be kept in mind that certain biological conditions could affect mechanisms of sexual attraction for a partner more directly by, for example, specifically affecting brain structures hypothesized to underlie sexual orientation (e.g., anterior hypothalamus; see LeVay, 1991). Both stature and the timing of puberty are interesting in this regard because they are partially regulated by the hypothalamus (e.g., Grumbach & Styne, 1992). Indeed, the fact that homosexual men may differ from heterosexual men in height and pubertal timing has provided support for the notion that the development of sexual attraction processes is affected by biological factors (e.g., prenatal hormones) originating prior to birth (see Bogaert, 2003a; Bogaert & Blanchard, 1996; Bogaert, Friesen, & Klenrou, 2002; cf. Bogaert & Friesen, 2002).

Another possible factor related to asexuality is religiosity. Most religions have strong proscriptions against liberal sexual practices, and some (e.g., Buddhism, Roman Catholicism) see complete abstinence as a virtue. Some very religious individuals may have internalized these values to such a degree that they may not admit to arousal, or at least not label it as sexual attraction. In addition, some religious people may be less likely to have developed a strong attraction to others because they are less likely to have gone through relevant “conditioning” experiences (e.g., less early masturbation). On the other hand, religiosity may not play a causal role in the development of asexuality but it may still relate to asexuality, because asexual people may find acceptance in certain religious communities that value restricted sexuality or they may find religious regulations against sexual behavior easier to uphold than sexual people. There is some evidence that religious people relative to nonreligious people do have lower rates of some sexual activities such as masturbation or multiple partners (Laumann, Gagnon, Michael, & Michaels, 1994), but I do not know of any evidence that asexuality is higher among religious individuals.

Other factors that may be relevant are education and general economic circumstances, such as socioeconomic status (SES) or social class. If normal sexual development partly occurs within a context of a typical physical and social environment (e.g., exposure to and familiarity with peers; see Bem, 1996; Storms, 1981), then education and general economic circumstances may be relevant predictors of asexuality. Thus, low education (and low SES) may be a proxy for unusual social and physical circumstances during childhood and adolescence (e.g., fewer resources; increased stressors; fewer peer interactions), which may have altered typical sexual development. On the other hand, low education and SES and the unusual social circumstances they may underlie may not be causally related to asexuality, but may still be relevant predictors of asexuality because the putative health problems of asexual people

ple may lead to low educational opportunities and economic hardship.

A final factor related to asexuality may be gender. It is clear that men and women differ with regard to sexuality, with men relative to women reporting higher rates of certain sexual activities (e.g., more masturbation, sexual thoughts or fantasies, and casual sex; e.g., Oliver & Hyde, 1993). These differences are argued to be a reflection of gender roles (Oliver & Hyde, 1993), strength or flexibility of sex drive (Baumeister, 2000), or evolutionarily based reproductive strategies (e.g., Buss & Schmitt, 1993). If gender differences in sexuality—in particular masturbation and fantasy—are relevant to the development of sexual orientation (e.g., Storms, 1981), then one might speculate that women will be more likely than men to be asexual because they are, on average, less likely to have had conditioning experiences relevant to sexual orientation development. Moreover, research shows that women are less likely than men to label genital responses, even when measured by psychophysical devices, as sexual arousal (e.g., Heiman, 1977; Laan, Everaerd, van Bellen, & Hanewald, 1994). As a consequence, women relative to men may be less likely to label males or females as salient sexual objects and hence more likely to report themselves as having no attraction for men or women because they do not perceive sexual arousal as consistently as men do, even under conditions when genital responses are occurring. On the other hand, men are more likely than women to have an increased prevalence of atypical sexual attraction, such as same-sex attraction and paraphilias (e.g., Freund, 1994; Laumann et al., 1994); thus, it may be the case that asexuality is another atypical sexual proclivity for which men show higher rates than do women.

In the present study, I investigated asexuality, defined as having no attraction for males or females. The data came from a national probability sample of British residents (Johnson, Wadsworth, Wellings, & Field, 1994; Wellings, Field, Johnson, & Wadsworth, 1994) in which the prevalence and predictors (e.g., health, physical development, demographics, religiosity) of asexuality were investigated. This survey was stimulated by the need for sexual information about the general population in the wake of the AIDS epidemic, and it is among the most representative sexuality surveys of recent years (see Hyde & DeLamater, 2000). In addition, unlike other samples of its kind (e.g., Laumann et al., 1994), it contains relatively specific information relevant to the assessment of asexuality.

METHOD

Sample

Johnson et al. (1994) used a probability sample of households in Britain (England, Wales, and Scotland). In households where an eligible respondent—a person between the ages of 16 and 59—could be identified and interviewed, participation rate was 71.5%. The final sample contained 18,876 participants. Participants were interviewed and

given one of two versions of a questionnaire: a long form to which a representative quarter of the sample responded ($n = 4,548$) or a short form to which the remainder responded. For this study, I used the total sample to maximize the number of cases. However, from the total of 18,876 cases, I eliminated 195 participants because the interviewers reported that these individuals had “severe” language, literacy, or other problems during the interview and questionnaire process.

Measure of Sexual Attraction and Asexuality

The measure of sexual attraction was introduced as follows: “I have felt sexually attracted to...” Six options followed: (a) “only females, never to males” (male $n = 7,482$, female $n = 28$); (b) “more often to females, and at least once to a male” (male $n = 321$, female $n = 21$); (c) “about equally often to males and females” (male $n = 45$, female $n = 21$); (d) “more often to males, and at least once to a female” (male $n = 42$, female $n = 406$); (e) “only males, never to females” (male $n = 42$, female $n = 9,969$); and (f) “I have never felt sexually attracted to anyone at all” (male $n = 57$, female $n = 138$). Thirty-eight men and 63 women refused to answer this question and were thus eliminated from further analyses.

For the present study, I counted as asexuals those who responded to this sexual attraction question with “I have never felt sexually attracted to anyone at all.” I categorized as “sexuals” the remaining participants—those reporting that they had felt attraction to either males, females, or both (male $n = 7,932$, female $n = 10,494$).

Predictors of Asexuality

The survey comprised three measures of sexuality: age of first experience, total partners, and sexual frequency. For the first of these measures, both men and women were asked about their age of first sexual experience with the other sex: “How old were you when you first had *any* type of experience of a sexual kind—for example, kissing, cuddling, petting—with someone of the opposite sex?” They were also asked about their first same-sex experience: “Have you ever had *any* kind of sexual experience or sexual contact with a male? (or “female” if the respondent was a woman)?” and “How old were you the first time that ever happened?” If the respondent had experience with both sexes, the earlier of the two ages was used; if the respondent had experience with only one sex, only that score was used. This measure was recorded in full years. Interviewers also asked for their total number of male and female sexual partners (“Altogether, in your life so far, with how many men [women] have you had sexual intercourse [vaginal, oral, or anal]?”). If the respondent had both male and female partners, the total of the two counts was used; if the respondent had only male or female partners, only that score was used. For frequency of sexual experiences with a partner, the participants were asked about their frequency of sexual activity with men and women over the last 7 days (“On how many occasions in the last 7 days have you had sex with a man [woman]?”). If the respondent

had sex with both men and women in the last week, the total of the two frequencies was used; if the respondent had sex with only men or women, only that score was used. Unfortunately, there were no questions relevant to masturbation and fantasy during childhood, adolescence, or adulthood on the survey (Johnson et al., 1994; Wellings et al., 1994).

Four measures assessed participants' health. One was "For your age, would you describe your state of health as..." with response options from 1 = *very good* to 5 = *very poor*. A second measure was "Do you have a permanent disability?" (1 = yes and 2 = no). A third measure was "Do you have a long-term medical condition that requires treatment or check-ups?" (1 = yes and 2 = no). The last measure was "In the last 5 years, did you have any illness/accident that affected your health for at least 3 months?" (1 = yes and 2 = no). The last three health measures were recoded so that poor health had high scores (1 = 1; 2 = 0) and the mean of the four health measures served as an aggregate variable of health problems.

Physical development measures included a question about the age of onset for menarche, which was recorded in full years (men were not asked about their age of puberty). Interviewers also asked participants for their weight (responses converted to kilograms) and height (responses converted to meters).

Two questions assessed religiosity. One was the frequency of attendance at services, where 1 = *once a week or more* and 8 = *never* (or not applicable because not religious). This variable was recoded so that 0 = *never* and 7 = *once a week or more*. A second measure of religiosity was whether the respondent had a religious affiliation: 1 = religious affiliation; 2, 3, and 4 = Christian affiliations; and 5 = non-Christian affiliation. This variable was recoded so that 1 = religious affiliation and 0 = no religious affiliation.

Demographics

Demographic variables included age (in years); marital status (1 = married, 2 = cohabitation, opposite sex, 3 = cohabitation, same sex, 4 = widowed, 5 = divorced/separated, or 6 = single); education (1 = degree, 2 = higher education, but below degree level, 3 = 0 level or equivalent, 4 = other/foreign, or 5 = none/no exams passed); and social class or SES (1 = professional, 2 = intermediate, 3 = skilled non-manual, 4 = skilled manual, 5 = part-skilled, 6 = unskilled, or 7 = other). Both education and social class were reverse coded so that high levels of education and social class had high scores (i.e., 1 = none/no exams passed to 5 = degree; and 1 = other to 7 = professional). Finally, the interviewers assessed race-ethnicity (1 = White, 2 = Black, 3 = Asian, or 4 = other). Race-ethnicity was recoded so that 0 = White and 1 = non-White.

RESULTS

Of the participants, 195 or 1.05% reported being asexual.¹

¹ Although they do not discuss asexuality per se, Johnson et al., (1994, see p. 187) do present a table showing the distribution of sexual attraction.

This rate is very similar to the rate of same-sex attraction (both exclusive same-sex and bisexuality combined; 207 or 1.11%). However, binomial tests indicated that there were more gay and bisexual men than asexual men ($p < .001$) and more asexual women than lesbian and bisexual women ($p < .001$).²

Sexuality

As shown in Table 1, relative to sexual people, asexual people had fewer sexual partners, had a later onset of sexual activity (if it occurred), and had less frequent sexual activity with a partner currently. Overall, then, asexual people had less sexual experience with sexual partners, and this fact provides some validation of the concept of asexuality.

Demographics

As also shown in Table 1, some significant relationships occurred between asexuality and the demographics. Contrary to prediction, asexual people were not younger than sexual people; in fact, they were somewhat older. However, as predicted, more women than men reported being asexual. Not surprisingly, there were fewer asexual people than sexual people currently in (or having had) a long-term relationship. On the other hand, a significant minority of the asexual people, 85 of the 195 (44%), were currently in or had had long-term cohabiting or marital relationships, with 64 (33%) currently married or cohabitating (see Diamond, 2003, for a distinction between romantic and sexual desire/attraction). Asexual individuals were also more likely than sexual individuals to come from lower socioeconomic conditions. A higher percentage (13%) of asexual individuals were also non-White relative to the sexual individuals (4%). Finally, asexual individuals were less well educated than the sexual individuals.

Health, Physical Development, and Religiosity

Asexual people were more likely to have adverse health, and the asexual women had a later onset of menarche relative to the sexual women. Asexual people were also shorter and weighed less than the sexual people. Finally, there was some evidence that asexual people were more religious than sexual people, at least with regard to attendance at religious services.

Multivariate Analyses

I conducted logistic regressions, one for men and one for women, with asexuality (0 = sexual, 1 = asexual) as the criterion and the significant demographics (except for gender and marital status/cohabitation), religiosity, and health and physical development factors as simultaneously entered predictors. The results of these analyses are shown in Table 2. For women, the majority of the predictors—age, social class, race-ethnicity, education, menarche, height, and religiosity—

² This procedure assessed whether the proportion of gay men to asexual men was greater than .50 and whether the proportion of asexual women to lesbian women was greater than .50.

Table 1. Comparisons of Asexual and Sexual People on Predictor Variables

Variable	Asexuals (<i>n</i> = 195)		Sexuals (<i>n</i> = 18,426)		<i>t</i> or χ^2	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Sexual activity						
Age first sex	16.78	3.36	14.82	2.99	6.64	< .001
Total partners	0.94	1.20	2.65	1.61	19.27	< .001
Sex frequency	0.20	0.71	1.16	1.59	18.19	< .001
Demographics						
Age	38.36	14.29	36.31	11.71	1.99	= .015
Gender (% men)	29.23	—	43.17	—	15.30	< .001
Marital status (% non-single)	32.82	—	63.65	—	118.1	< .001
Education	2.03	1.31	2.94	1.32	9.56	< .001
Race/ethnicity (% White)	86.01	—	95.51	—	39.31	< .001
SES	3.27	1.71	4.51	1.69	10.28	< .001
Religiosity						
Affiliation (%)	60.00	—	56.99	—	0.71	= .398
Attendance	2.24	2.92	1.65	2.47	2.80	= .006
Health/physical characteristics						
Menarche	13.54	1.95	12.93	1.56	3.44	= .001
Height	1.65	0.10	1.69	0.10	5.98	< .001
Weight	66.39	15.72	69.05	13.77	2.28	= .024
Health problems	0.68	0.49	0.59	0.35	3.34	= .001

Note. Total partners varies from 0 (*no partners*) to 5 (*10 or more*); sex frequency is the number of occasions in the last 7 days; education varies from 1 (*none/no exams passed*) to 5 (*degree*); SES varies from 1 (*other*) to 7 (*professional*); race/ethnicity refers to the percentage of participants who were White (versus non-White); religious affiliation refers to the percentage of participants who reported having an a religious affiliation; religious attendance refers to the frequency of attendance at religious services and varies from 0 (*never*) to 7 (*once a week or more*).

were significant. Thus, all of these variables accounted for unique variation in the prediction of asexuality. Only weight and health were not significant. However, when social class and education were eliminated from the regression equation, health was significant, suggesting that health and social class (and education) are related (e.g., Link & Phelan, 1995; Ross & Van Willigen, 1997) and that the health problems of asexual women may be partly the result of economic problems experienced by individuals of lower socioeconomic status.³

For men, social class, education, height (marginal), and religiosity were significant, and therefore all of these variables accounted for unique variation in the prediction of asexuality. As in women, health was not significant. However, similar to the results for women, when social class and education were eliminated from the regression equation, health was significant, suggesting again that health and social class (and educational attainment) are related (e.g., Link & Phelan, 1995; Ross & Van Willigen, 1997).^{4, 5}

³ Both lower SES and lower education were related to health problems in this sample ($r = .142, p < .001$ and $r = .186, p < .001$, respectively).

⁴ To correct for differential response between regions and differential selection probabilities, I weighted the data using a weight suggested by Wellings et al. (1994). The results were very similar to the unweighted analyses.

⁵ In additional logistic regression analyses, the participants who had been eliminated because of language, literacy, and interview problems were included and then these variables were controlled for (i.e., entered as simultaneous predictors) to see if the results would be affected. For example, I wanted to test the idea that perhaps one of the reasons low education (and low SES) relates to asexuality is that people with low education (and/or SES) may be more likely to misunderstand the question and thus indicate erroneously that they are asexual. However, after this test, all the relationships for both women and men remained significant, including education and SES (both $ps < .001$).

Table 2. Logistic Regressions of Sexual Attraction (0 = sexual, 1 = asexual) in Women and Men, With All Predictors Entered

Predictor	<i>B</i>	<i>SE</i>	Wald	<i>p</i>	<i>e^B</i>
Women's analysis					
Age	0.02	0.01	5.53	= .019	1.02
SES	-0.24	0.06	18.44	< .001	0.79
Education	-0.28	0.09	11.01	< .001	0.75
Race/ethnicity	1.51	0.28	28.66	< .001	4.52
Health	0.31	0.24	1.66	<i>ns</i>	1.34
Height	-3.06	1.36	5.06	= .024	0.05
Weight	-0.00	0.01	0.19	<i>ns</i>	1.00
Menarche	0.18	0.06	9.82	= .002	1.20
Religiosity	0.09	0.04	6.37	= .012	1.09
Men's analysis					
Age	-0.01	0.01	1.07	<i>ns</i>	0.99
SES	-0.37	0.09	16.62	< .001	1.27
Education	-0.43	0.12	13.10	< .001	1.54
Race/ethnicity	0.66	0.47	2.02	<i>ns</i>	1.94
Health	0.43	0.36	1.46	<i>ns</i>	1.54
Height	-3.20	1.89	2.87	= .09	0.41
Weight	0.01	0.01	0.31	<i>ns</i>	1.01
Religiosity	0.14	0.06	6.70	= .01	1.15

Note. Education varies from 1 (*none/no exams passed*) to 5 (*degree*); SES varies from 1 (*other*) to 7 (*professional*); race/ethnicity is 0 = White and 1 = non-White; religiosity refers to the frequency of attendance at religious services and varies from 0 = *never* to 7 = *once a week or more*; *B* represents the change in the logarithmic odds of asexuality for a one-unit increase in the corresponding predictor, with all other predictors in the model controlled for; *SE* is the standard error for each *B*; Wald statistic is the statistical quantity used to determine the significance level (*p*) of each predictor variable; *e^B* is the multiplicative change in the odds of asexuality for a one-unit increase in the corresponding predictor.

DISCUSSION

This study investigated asexuality, defined as a lack of sexual attraction for either sex, in a national probability sample. A significant minority (1.05%) of people reported that they had never felt sexual attraction to anyone at all. This rate of asexuality was similar to the rate of same-sex attraction. It is interesting to speculate why asexual people have been overlooked when discussions of sexual variability are presented. Perhaps this group is relatively invisible because their inclinations do not lead to overt sociosexual activities that would bring attention to their activities. The absence of sexual activities and the inclinations that induce this absence are not likely to bring public attention or scrutiny, either positive or negative. Neither, of course, has it been illegal or perceived as morally wrong to have such inclinations. Therefore, unlike other sexual minorities (e.g., gay people), asexual individuals would not have had to face public scrutiny from the press, religious institutions, or the legal system. (This is not to say, of course, that in their private and family lives asexual people have not felt pressure to take on traditional sexual and reproductive roles.) In addition, until recently sexual surveys using national probability samples were not conducted, so the vast majority of sexual studies using convenience samples of volunteers probably did not include many asexual people. Research shows, for example, that those who choose to participate in a sexual study have more sexual experience (e.g., more partners) and are more interested in sexual activity than those who do not participate (Bogaert, 1996; Morokoff, 1986; Saunders, Fisher, Hewitt, & Clayton, 1985). Indeed, it is interesting to speculate about whether the rate of asexuality is actually higher than reported here given that some of the participants who declined to participate in this survey (about 30%) could also be asexual.

This study provided a preliminary examination of some of the factors associated with asexuality. A variety of demographic (gender, social class, education, and race-ethnicity), physical development (height and menarche onset), health, and religiosity variables predicted asexuality. It is interesting that many of these variables independently predicted asexuality. This suggests that there may be a number of independent developmental pathways, perhaps both biological and psychosocial, leading to asexuality. Even the physical development and health variables—late menarche, a shorter stature, and health problems in women and a shorter stature and health problems in men—independently predicted asexuality. This suggests that physical development factors that are independent of general debilitating illnesses (which may lower sex drive or interest) may affect growth and development mechanisms related to sexual orientation (e.g., anterior hypothalamus; see LeVay, 1991). These findings also add to a growing body of literature showing that the development of sexual attraction to adult men and women along with some atypical sexual proclivities may be partly biologically based and determined prior to birth (e.g., Bogaert, 2001; Bogaert, 2003a; Ellis & Ames, 1987; Lalumière, Blanchard, & Zucker, 2000; Williams et al., 2000).

The results regarding the demographic variables suggest that one pathway to asexuality may relate to an environment different from a traditional middle-class or upper-middle-class White home (e.g., one with fewer resources). I found large differences between asexual and sexual people in education and social class, with asexual people tending to score lower on these demographic variables. This suggests that the educational system and the home environment play fundamental roles in typical sexual development, and that alterations of these circumstances can have a profound effect on basic sexual attraction processes. Moreover, the fact that the social class–asexuality and education–asexuality relationships remained significant when I controlled for general physical health suggests that these relationships do not occur merely because people with serious health problems, which may contribute to asexuality, are less likely to be able to attain a higher education or improve their life circumstances. Rather, these results suggest that the health problems of some asexual people may be the result of disadvantaged economic and social conditions. It is difficult to know what aspects of the educational and home environments may contribute to asexuality. As mentioned earlier, perhaps processes related to exposure to and familiarity with peers (see Bem, 1996; Storms, 1981) are altered when the home and educational environment are atypical. It is also important to point out that an atypical home environment for asexual people may have occurred prior to childhood during gestation, as might be expected if an altered prenatal milieu (e.g., altered prenatal hormones) partly underlies asexuality and other atypical sexual inclinations (e.g., Bogaert, 2001; Ellis & Ames, 1987; Lalumière et al., 2000; Williams et al., 2000).

Gender was also an important predictor of asexuality. More women than men reported being asexual. This difference may be a reflection of gender roles and/or sexual strategies in which men are or at least are expected to be more sexual than women. If so, perhaps some women have internalized to an extreme degree, and hence “overadapted” to, these feminine roles or strategies (e.g., Mazur, 1986). Some research has also suggested that women’s sexuality (or at least their sex drive) is more “plastic” than men’s sexuality (e.g., Baumeister, 2000). Thus, cultural influences may have a more profound effect on women’s sexuality than on men’s; as a result, more women than men may become asexual if life circumstances are atypical. A related explanation is that women relative to men may be less likely to label males or females as salient sexual objects and hence may report themselves as having no attraction to either sex because they may not be as aware of their own sexual arousal as men are, even under conditions when genital responses are occurring (e.g., Heimen, 1977; Laan et al., 1994). A third possibility is that women may have fewer conditioning experiences (e.g., masturbation) relevant to sexual orientation development and this may lead to an increased likelihood of asexuality, along with other conditions.

Another possibility is that our conception of sexual orientation as an attraction to another person does not ade-

quately address some women's subjective experience of sexual arousal and attraction. Traditional sexual orientation questions have an inherent "target-oriented" view of sexual response and arousal; that is, they imply that sexual response and arousal must be directed toward or targeted to someone or to a particular sex. These questions may not adequately capture the nature of some women's sexuality. The distinction between *proceptive* and *receptive* sexual desire may be relevant in this regard (Beach, 1976; Wallen, 1995). Proceptive desire—the urge to seek out and initiate sexual activity—may be more common in men than in women, whereas receptive desire—the capacity to become aroused upon encountering certain sexual circumstances—may characterize women's sexuality more than men's (e.g., Baumeister, 2000; Diamond, 2003). Proceptive desire relative to receptive desire may be more conducive to a target-oriented view of sexual arousal and thus may capture the traditional and hence more male-oriented conceptions of sexual attraction. It is also interesting that recent data using psychophysical measures of genital response are challenging the assumption that women's sexual arousal patterns are like men's (Chivers, Rieger, Latty, & Bailey, in press). Chivers et al. (in press) have found that, unlike those of men, women's sexual arousal patterns are not primarily targeted toward the other sex (i.e., sex-specific). Instead, women have a bisexual arousal pattern to sexual stimuli, being physiologically aroused to both male and female stimuli. How these findings relate to the present gender difference in asexuality is unknown, but they do underscore the fact that sexual arousal and attraction processes may play fundamentally different roles in men's and women's sexuality.

Contrary to prediction, a younger age was not related to asexuality. In fact, asexual people were slightly older than sexual people. This result does not give support to the idea that many asexual individuals are "presexual" or in an early developmental stage prior to adult-oriented sexual attraction. Thus, although adolescents and some young adults probably vary in their awareness or experience of first sexual attraction (with a variety of social and psychological circumstances and biological aspects contributing to such awareness or experience), it would seem that most of the asexual individuals in this sample probably had had enough time to encounter the necessary circumstances to initiate sexual attraction experiences. Either they did not want to enter into such circumstances because of their asexual natures, or they had passed a critical age window beyond which these social and psychological circumstances were no longer sufficient to initiate sexual attraction to others.

The present study attempted to begin to explore factors associated with asexuality, a relatively uncharted area of sexual variability. A first limitation of this type of exploratory investigation is that the results are preliminary and in need of replication. Second, although the size and nature (national probability) of the sample make these data the best currently available to test ideas relevant to this

investigation, there are a number of sample and survey limitations that need to be addressed. For example, the interview and questionnaire protocol were designed as a general survey on sexuality and STDs (i.e., HIV/AIDS). As a result, the questions were not specifically designed to test issues related to the development of asexuality, and thus a number of questions relevant to the developmental history of sexual and asexual people (e.g., early sexual life, fantasy, masturbation) were not included.

Some researchers may also have concerns about the measure of asexuality used in this survey. As mentioned, a sexual attraction measure of this kind, relative to measures of sexual behavior and sexual self-identification, is often the preferred method for assessing sexual orientation (e.g., Bailey et al., 2000; Bogaert, 2003b; Money, 1988; Zucker & Bradley, 1995). However, to increase reliability of measurement and to expand this research, a number of components of attraction (e.g., fantasy, arousal) along with a self-identification of asexuality should be included in future research. It is possible that the results may differ in future research when individuals are categorized as asexual based on self-identification. Moreover, future research could include measures of affectional bonding to or romantic desire for males or females, which may still occur in asexual people even though sexual attraction to males or females may be low or nonexistent (c.f. Diamond, 2003).

Another issue regarding the measure of asexuality concerns how people with other atypical sexual proclivities might respond to the sexual attraction question used here ("I have felt sexually attracted to..." with options relating to males, females, or no one at all). It is unknown whether, for example, some of the asexual people in this sample pedophiles or other paraphiliacs. This is probably unlikely, given that the statement "I never felt sexually attracted to anyone at all" would presumably exclude not only heterosexuals and homosexuals but also pedophiles and most paraphiliacs, because these sexual tendencies usually entail some level of human partner involvement. It is also unlikely that a significant number of the asexuals are paraphiliacs given that most of the asexual people in this sample were women, who tend to be very underrepresented in the incidence of paraphilias (e.g., Freund, 1994). An additional consideration is that the sample represents only a small region of the Western world (England, Wales, & Scotland). Other nations, including other Western nations, may exhibit different patterns of asexuality.

Another limitation of this study is that there is likely to be an underreporting of sensitive or socially undesirable information, particularly because face-to-face interviews were used. This probably results in a lowering of reports of same-sex attraction and behavior, along with a decreased reporting of a lack of sexual attraction (i.e., asexuality). Thus, as mentioned above in the context of participation rates, the incidence of asexuality may be higher than what is reported here. Also, any comparison between the prevalence of asexuality and the prevalence of same-sex attraction—similar in the present study—will

probably vary depending on the survey and the information-gathering technique.

An additional limitation is that the data are not longitudinal and the causal and temporal order of the variables is not clear. Thus, although a number of factors are related and independently predicted asexuality, these relationships need further examination. For example, religious people tended to be asexual, but it is unclear why this relationship exists. One possibility is that asexual people seek out (or are accepted by) religious institutions because they offer a supportive haven for their lifestyles. Another possibility is that extreme religiosity contributes more directly to asexuality, perhaps by reducing the tendency to admit to sexual arousal (or at least to label it as sexual attraction) or by restricting normal peer interactions such as dating and/or sexual fantasy and masturbation, activities that may help stimulate typical sexual attraction processes. A final possibility is that there may be a third (unknown and unmeasured) variable that accounts for this relationship between asexuality and religiosity.

Using psychophysical (e.g., phallometry) measures, future research could evaluate the physiological arousal and attraction patterns of asexual people. Similar to the evidence presented here that asexual people have limited sexual experience, an investigation of this kind would provide validation of the concept of asexuality if asexual people showed little or no sexual response to sexual stimuli involving (potential) partners of either sex. In addition, such research may be able to investigate whether some people's asexuality is best described as a "perceived" or "reported" lack of attraction rather than a true lack of physiological attraction to a partner of either sex. In other words, there may be a group of so-called "true" asexual people (defined as those who lack sexual attraction for partners of either sex) who show no physiological response to stimuli with males or females as sexual targets and another group of individuals who show typical attraction and arousal patterns and yet report, label, or perceive themselves as being asexual for various reasons (e.g., not aware of own arousal; deny arousal). Given that studies of sexuality—particularly volunteer studies with invasive procedures—select against people with low levels of sexual activity (e.g., Bogaert, 1996; Morokoff, 1986), a challenge for this type of psychophysical research would be recruiting a sizable sample of asexual people.

REFERENCES

- Bailey, J. M., Dunne, M. P., & Martin, N. G. (2000). Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. *Journal of Personality and Social Psychology*, 78, 524–536.
- Baumeister, R. F. (2000). Gender differences in erotic plasticity: The female sex drive as socially flexible and responsive. *Psychological Bulletin*, 126, 347–374.
- Beach, F. A. (1976). Sexual attractivity, proceptivity, and receptivity, in female mammals. *Hormones and Behavior*, 7, 105–138.
- Beck, J. G. (1995). Hypoactive sexual desire disorder: An overview. *Journal of Consulting and Clinical Psychology*, 63, 919–927.
- Bem, D. J. (1996). Exotic becomes erotic: A developmental theory of sexual orientation. *Psychological Review*, 103, 320–335.
- Berkey, B. R., Perelman-Hall, T., & Kurdek, L. A. (1990). The multidimensional scale of sexuality. *Journal of Homosexuality*, 19, 67–87.
- Bobrow, D., & Bailey, J. M. (2001). Is male homosexuality maintained by kin selection? *Evolution and Human Behavior*, 22, 361–368.
- Bogaert, A. F. (1996). Volunteer bias in males: Evidence for both personality and sexuality differences. *Archives of Sexual Behavior*, 25, 125–140.
- Bogaert, A. F. (2001). Handedness, criminality, and sexual offending. *Neuropsychologia*, 39, 465–469.
- Bogaert, A. F. (2003a). The interaction of fraternal birth order and height in the prediction of sexual orientation in men. *Behavioral Neuroscience*, 117, 381–384.
- Bogaert, A. F. (2003b). Number of older brothers and sexual orientation: New tests and attraction/behavior distinction in two national probability samples. *Journal of Personality and Social Psychology*, 84, 644–652.
- Bogaert, A. F., & Blanchard, R. (1996). Physical development and sexual orientation in men: Height, weight, and onset of puberty differences. *Personality and Individual Differences*, 21, 77–84.
- Bogaert, A. F., & Friesen, C. (2002). Sexual orientation and height, weight, and age of puberty: New tests from a British national probability sample. *Biological Psychology*, 59, 135–145.
- Bogaert, A. F., Friesen, C., & Klentrou, P. (2002). Age of puberty and sexual orientation in a national probability sample. *Archives of Sexual Behavior*, 31, 73–81.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100, 204–232.
- Carlat, D. J., & Camargo, C. A. (1991). Review of bulimia nervosa in males. *American Journal of Psychiatry*, 148, 831–843.
- Chivers, M. L., Rieger, G., Latty, E., & Bailey, J. M. (in press). A sex difference in the specificity of sexual arousal. *Psychological Science*.
- Cohen, L. M., Greenberg, D. B., & Murray, G. B. (1984). Neuropsychiatric presentation of men with pituitary tumors (the "four A's"). *Psychosomatics*, 25, 925–928.
- Diamond, L. M. (2003). What does sexual orientation orient? A biobehavioral model distinguishing romantic love and sexual desire. *Psychological Review*, 110, 173–192.
- Ellis, L., & Ames, M. A. (1987). Neurohormonal functioning and sexual orientation: A theory of homosexuality-heterosexuality. *Psychological Bulletin*, 101, 233–258.
- Fortier, P., Trudel, G., Mottard, J.-P., & Pichè, L. (2000). The influence of schizophrenia and standard or atypical neuroleptics on sexual and socio-sexual functioning: A review. *Sexuality & Disability*, 18, 85–104.
- Freund, K. (1994). In search of an etiological model of pedophilia. *Sexological Review*, 2, 171–184.
- Ghizzani, A., & Montomoli, M. (2000). Anorexia nervosa and sexuality in women: A review. *Journal of Sex Education and Therapy*, 25, 80–88.
- Grumbach, M. M., & Styne, D. M. (1992). Puberty: Ontogeny, neuroendocrinology, physiology, and disorders. In J. D. Wilson & D. W. Foster (Eds.), *Williams textbook of endocrinology* (8th ed.; pp. 1139–1221). Philadelphia: W. B. Saunders.
- Heiman, J. R. (1977). A psychophysiological exploration of sexual arousal patterns in females and males. *Psychophysiology*, 14, 266–274.
- Herd, G., & McClintock, M. (2000). The magical age of 10. *Archives of Sexual Behavior*, 29, 587–606.
- Hyde, J. S., & DeLamater, J. (2000). *Understanding human sexuality* (7th ed.). Boston: McGraw-Hill.
- Johnson, A., Wadsworth, J., Wellings, K., & Field, J. (1994). *Sexual attitudes and lifestyles*. Oxford, England: Blackwell Scientific Publications.
- Laan, E., Everaerd, W., van Bellen, G., & Hanewald, G. (1994). Women's sexual and emotional arousal responses to male- and female-produced erotica. *Archives of Sexual Behavior*, 23, 153–170.
- Lalumière, M. L., Blanchard, R., & Zucker, K. J. (2000). Sexual orientation and handedness in men and women: A meta-analysis. *Psychological Bulletin*, 126, 575–592.
- Laumann, E. O., Gagnon, J. H., Michael, R. T., & Michaels, S. (1994). *The social organization of sexuality: Sexual practices in the United States*. Chicago: University of Chicago Press.
- LeVay, S. (1991). A difference in hypothalamic structure between homosexual and heterosexual men. *Science*, 253, 1034–1037.
- Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior, Extra Issue*, 95–114.
- Mazur, A. (1986). U.S. trends in feminine beauty and overadaptation. *The Journal of Sex Research*, 22, 281–303.

- McClintock, M., & Herdt, G. (1996). Rethinking puberty: The development of sexual attraction. *Current Directions in Psychological Science*, 5, 178–183.
- Milligan, M. S., & Neufeldt, A. H. (2001). The myth of asexuality: A survey of social and empirical evidence. *Sexuality & Disability*, 19, 91–109.
- Money, J. (1988). *Gay, straight, and in-between*. New York: Oxford University Press.
- Morokoff, P. J. (1986). Volunteer bias in the psychophysiological study of female sexuality. *The Journal of Sex Research*, 22, 35–51.
- Oliver, M., & Hyde, J. S. (1993). Gender differences in sexuality: A meta-analysis. *Psychological Bulletin*, 114, 29–51.
- Rosen, R. C., & Leiblum, S. R. (1995). Hypoactive sexual desire. *Psychiatric Clinics of the North America*, 18, 107–121.
- Ross, C., & Van Willigen, M. (1997). Education and subjective quality of life. *Journal of Health and Social Behavior*, 38, 275–297.
- Saunders, D. M., Fisher, W. A., Hewitt, E. C., & Clayton, J. P. (1985). A method for empirically assessing volunteer selection effects: Recruitment procedures and responses to erotica. *Journal of Personality and Social Psychology*, 49, 1703–1712.
- Schover, L. R., Thomas, A. J., Lakin, M. M., Montague, D. K., & Fisher, J. (1988). Orgasm phase dysfunctions in multiple sclerosis. *The Journal of Sex Research*, 25, 548–554.
- Storms, M. D. (1980). Theories of sexual orientation. *Journal of Personality and Social Psychology*, 38, 783–792.
- Storms, M. D. (1981). A theory of erotic orientation development. *Psychological Review*, 88, 340–353.
- Szasz, G., & Carpenter, C. (1989). Clinical observations in vibratory stimulation of the penis with spinal cord injury. *Archives of Sexual Behavior*, 18, 461–474.
- Wallen, K. (1995). The evolution of female sexual desire. In P. R. Abramson & S. D. Pinkerton (Eds.), *Sexual nature/sexual culture* (pp. 57–79). Chicago: University of Chicago Press.
- Wellings, K., Field, J., Johnson, A., & Wadsworth, J. (1994). *Sexual behaviour in Britain: The National Survey of Sexual Attitudes and Lifestyles*. London: Penguin Books.
- Williams, T., Pepitone, M. E., Christensen, S. E., Cooke, B. M., Huberman, A. D., Breedlove, N. J., et al. (2000). Finger length patterns and human sexual orientation. *Nature*, 404, 455–456.
- Zucker, K. J., & Bradley, S. J. (1995). *Gender identity disorder and psychosexual problems in children and adolescents*. New York: Guilford Press.

Manuscript accepted February 9, 2004