

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/270007678>

Asexuality: An Extreme Variant of Sexual Desire Disorder?

Article in *Journal of Sexual Medicine* · March 2015

DOI: 10.1111/jsm.12806

CITATIONS

5

READS

258

3 authors:



[Lori Brotto](#)

University of British Columbia - Vancouver

188 PUBLICATIONS 3,556 CITATIONS

[SEE PROFILE](#)



[Morag Yule](#)

University of British Columbia - Vancouver

16 PUBLICATIONS 214 CITATIONS

[SEE PROFILE](#)



[Boris B. Gorzalka](#)

University of British Columbia - Vancouver

214 PUBLICATIONS 7,197 CITATIONS

[SEE PROFILE](#)

All content following this page was uploaded by [Lori Brotto](#) on 05 May 2015.

The user has requested enhancement of the downloaded file. All in-text references [underlined in blue](#) are added to the original document and are linked to publications on ResearchGate, letting you access and read them immediately.

Asexuality: An Extreme Variant of Sexual Desire Disorder?

Lori A. Brotto, PhD,* Morag A. Yule, MA,[†] and Boris B. Gorzalka, PhD[†]

*Department of Gynaecology, University of British Columbia, Vancouver, BC, Canada; [†]Department of Psychology, University of British Columbia, Vancouver, BC, Canada

DOI: 10.1111/jsm.12806

ABSTRACT

Introduction. Human asexuality is defined as a lack of sexual attraction to anyone or anything. Various theories have been proposed to explain how asexuality should best be classified, and some have maintained that asexuality is an extreme variant of hypoactive sexual desire disorder (HSDD)—a sexual dysfunction characterized by a lack of interest in sex and significant distress. To date, this has never been empirically examined.

Aim and Method. Using measures of sexual desire and behavior, sex-related distress, personality, and psychopathology, the aim of the current study was to compare individuals scoring above the cutoff for asexuality identification (AIS >40) (n = 192) to sexual individuals (n = 231). The sexual group was further divided into a control group (n = 122), a HSDD group (n = 50), and a group with symptoms of low desire that were nondistressing (n = 59).

Results. Analyses were controlled for age. Individuals in the AIS >40 group had a greater likelihood of never previously engaging in sexual intercourse, fantasies, or kissing and petting than all other groups and a lower likelihood of experiencing sex-related distress than those with HSDD. For women, those in the HSDD and AIS >40 groups had significantly lower desire than the subclinical HSDD and control groups. Men in the AIS >40 group had significantly lower desire than the other three groups. Symptoms of depression were highest among those with subclinical HSDD and HSDD, whereas there were no group differences on alexithymia or desirable responding. A binary logistic regression indicated that relationship status (long-term dating/married), sexual desire, sex-related distress, and lower alexithymia scores were the best predictors of group membership (HSDD vs. AIS >40).

Conclusion. Taken together, these results challenge the speculation that asexuality should be classified as a sexual dysfunction of low desire. **Brotto LA, Yule MA, and Gorzalka BB. Asexuality: An extreme variant of sexual desire disorder? J Sex Med **;**,**:*-**.**

Key Words. Asexuality; Hypoactive Sexual Desire Disorder; Sexual Attraction; Sexual Dysfunction; Romantic Attraction

Introduction

What Is Asexuality?

Prior to 2004, asexuality was a term that was largely reserved for describing the reproductive patterns of many single-celled organisms. The publication of a large population-based study of British residents, which found that approximately 1% reported a lack of sexual attraction [1], ignited interest in the construct of asexuality from theoretical, academic, clinical, and feminist perspectives. In parallel with this development has been the explo-

sion of the largest online community of asexual men and women known as the “Asexuality and Visibility Education Network” (AVEN; <http://www.asexuality.org>) developed by David Jay in 2002. There has also been a multitude of blogspots (e.g., <http://www.asexualexplorations.net>; <http://www.asexualunderground.blogspot.com>), YouTube videos (e.g., Hot Pieces of Ace YouTube channel), and dating websites (e.g., <http://www.asexualitic.com>) catering to asexual individuals. Although a flurry of empirical studies have since documented the characteristics and correlates of asexuality

[1–4], much remains unknown about factors leading to the development of lack of sexual attraction, and therefore, how best to classify asexuality. Moreover, although there are different definitions proposed, asexuality is defined by AVEN as occurring when a person does not experience sexual attraction while recognizing that there may be variation among asexual individuals in their experience of relationships, attraction, and arousal (<http://www.asexuality.org>).

Given the centrality of sexual attraction as a core feature of being human [5], critics have argued that asexuality is a manifestation of some underlying psychopathology. Although Prause and Graham [4] found evidence for low excitatory processes, they discounted the view that asexual individuals were depressed. Another mixed-methods study found no evidence that levels of depression, alexithymia (tendency to not experience emotions), and social desirability differed from established norms for sexual individuals [3]. The same study, however, found higher rates of social withdrawal and some qualitative support for higher rates of Asperger's disorder—both of which are characterized by difficulties with social interaction, in the asexual population. A recent study that focused exclusively on mental health found elevated rates of depression and anxiety associated with asexuality [6]. However, because membership in a sexually marginalized group may be experienced as stressful and stigmatizing, this may account for the elevated rates of psychopathology found among asexual individuals [7] and does not directly support the contention that asexuality may be an expression of a psychiatric illness. There is also evidence of outright discrimination against asexual individuals [8], which may further contribute to mood symptoms. The evidence for asexuality as a psychiatric disorder is, thus, equivocal at best.

Another classification places asexuality within the realm of paraphilias as paraphilias are defined as atypical sexual attractions. Bogaert [1,2,9] discounted this possibility as individuals with paraphilic tendencies often engage in some human sexual contact—whether in the context of their paraphilia or independent of it—whereas asexual individuals deny attraction toward *anyone*. More recently, Bogaert has identified a type of paraphilia, *autochorissexualism*, defined as a perceived “disconnect between an individual's sense of self and a sexual object/target” or “identity-less sexuality” [10] (p. 513), and he suggests that some asexual men and women might fit this definition

of a paraphilia. In particular, the finding that some asexual individuals masturbate [3] yet their sexual fantasies do not depict images of themselves as sexual or engaging in sexual acts [10] supports this overlap between asexuality and autochorissexualism. Although not the focus of this article, we cannot rule out the possibility that Bogaert raises (2012) that some asexuals might indeed have a paraphilia [10].

A third proposal is that asexuality is best classified as a unique sexual orientation [2,7,9,11], and the asexual movement, including the development and growth of AVEN along with activism in the asexual community, supports the consideration of asexuality as a sexual orientation. Asexual individuals share experiences of discrimination with other sexual minority groups. For example, in an experimental paradigm, asexual individuals were evaluated more negatively as a social group, were viewed as less human, and were less valued as contact partners compared with heterosexual and other sexual minority groups [8]. In part, concerns about such social discrimination and stigmatization are directly the objective of AVEN through its visibility and education efforts. Self-reported sexual attraction is at the heart of sexual orientation, regardless of one's sexual behavior proclivities. Because the self-reports of asexual individuals center around their lack of subjective attraction to anyone, the existing evidence seems to lean in favor of asexuality being considered as a unique sexual orientation.

A fourth proposal classifies asexuality as an extreme variant of the sexual dysfunction formerly classified as “Hypoactive Sexual Desire Disorder” (HSDD) given that both asexual individuals and those with HSDD share a distinct disinterest in sex. Bogaert (2006) [2] challenged this position, however, on the grounds that: (i) HSDD, but not asexuality, requires the presence of significant distress; (ii) a lack of sexual attraction does not necessarily imply a lack of desire for sex; and (iii) most individuals diagnosed with HSDD have, at some point in their lives, experienced sexual desire whereas most asexual individuals often report a lifelong absence of sexual interest.

Aims

The goal of this study was to explore the similarities and differences between individuals likely to be asexual and those meeting diagnostic criteria for the former condition, HSDD. We were specifically interested in responses to measures of

sexual desire, distress, mood, and sexual behavior. It has been suggested that asexual individuals may be motivated (e.g., by socially desirable responding) to conceal their sexual (dis)interests [2]. To explore this, we also included a measure of socially desirable responding. To test the possibility that those with lifelong HSDD may overlap categorically with individuals likely to be asexual, we also compared the latter with a subset of the HSDD group who reported a lifelong pattern of distressing lack of sexual desire. A significant strength of this study pertains to the use of a validated measure of asexuality [12], rather than basing categorization on individuals' self-report. The benefit of this method of classification is that those individuals with a nondistressing lack of sexual attraction who have not *yet* encountered and identified with the label "asexual" could still be included in this asexual group, which we describe as the "AIS >40" group, allowing us to separate out the impact of self-disclosure on the findings.

Methods

Participants

Placement into the asexual group was based on scores from the *Asexuality Identification Scale* (AIS) [12], a 12-item valid and reliable self-report questionnaire that assesses the degree to which respondents agree with a series of statements from 1 (completely true) to 5 (completely false). The AIS has been found to significantly differentiate asexual from sexual individuals, and a score of 40 out of 60 was previously found to capture 93% of individuals who self-identified as asexual [12]. Any individual who scored at or above 40 on the AIS was placed into the "AIS >40" group, and those scoring below 40 were placed into the sexual group and further subcategorized as per the criteria described below.

A total of 799 individuals provided consent to participate; however, complete data were obtained from 668 individuals. The age range of these 668 individuals was between 15 and 79 years (mean age 28.0, standard deviation [SD] 11.2) and included 162 men, 505 women, and one individual who did not respond to the question about sex. Because the data were positively skewed to a disproportionate number of young participants, and because of the known influence of age on sexual experiences, we corrected for this by including individuals in the AIS >40 group only if they were older than age 23. Doing this led to $n = 193$ in the AIS >40 group (mean 30.9 years, SD 11.1; 79.7% female) and

$n = 231$ in the sexual group (mean 33.9 years, SD 12.3; 68.1% female), with significantly more female than male participants, $\chi^2(1) = 7.21$, $P = 0.008$, and significantly older sexual than AIS >40 participants (mean difference 3.0 years), $t(422) = 2.59$, $P = 0.010$.

The sexual group was further classified into control, HSDD, and subclinical HSDD on the basis of their responses to items addressing the HSDD criteria, as outlined by the former *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, text-revised [13] and asking participants to indicate whether the symptom was true or false for them.¹ An individual who endorsed each of the HSDD criteria: criterion A: "I experience persistently or recurrently deficient (or absent) sexual fantasies and desire for sexual activity"; criterion B: "This deficiency/absence of sexual fantasies and desire causes me marked distress or interpersonal difficulty"; and criterion C: "This deficiency/absence of sexual fantasies and desire for sexual activity are not better accounted for by a mental health disorder (such as depression), a drug (legal or illegal), or some other medical condition", was placed into the HSDD group. An additional question asked whether the deficiency/absence of sexual fantasies and desire were lifelong ("I have always had low/no desire") or acquired ("This low/no desire started after a period of normal sexual functioning"). If a sexual individual endorsed criterion A (lack of desire for sex and low/no fantasies) but not criterion B (distress), they were placed into the subclinical HSDD group. Only individuals who denied all of criteria A, B, and C, and whose AIS scores were <40 were placed into the control group.

This further subcategorization led to 50 individuals categorized as HSDD (mean age 36.5, SD 12.2; 74.0% female), 59 as subclinical HSDD (mean age 36.2, SD 13.2; 66.1% female), and 122 control (i.e., score <40 on the AIS and no reported difficulties in sexual desire or distress; mean age 31.7, SD 11.5; 66.4% female) participants.

Procedure

Participants were recruited through several separate and concurrent avenues, including postings on local websites (e.g., Craigslist), on the AVEN online web-community general discussion board,

¹Note: we did not use criteria for Sexual Interest/Arousal Disorder as in the current DSM-5 [36] given that this study was carried out before the DSM-5 was available.

through online and in-clinic postings at the offices of sexual therapists and sexologists, and through our university's human subject pool. We attempted to recruit participants from a wide range of avenues in order to maximize the opportunity to recruit self-identifying asexual individuals, as well as those who lack sexual attraction but do not yet identify as asexual.

Our university's behavioral research ethics board approved all procedures. Data were collected between September and December 2010 via a web-based survey hosted by SurveyMonkey. Data were collected using questionnaires that assessed demographic, sexual health, sexual behavior, sexual distress, asexual identity, mood, and social desirability. The questionnaire took 60 minutes to complete online. No remuneration was provided.

Main Outcome Measures

Demographic Information

Apart from sex and education, which were asked in a free-response format, all other demographic questions adopted a forced-choice format. Relevant to the current study, we inquired about sexual orientation, education, ethnicity, presence of sexual concerns and treatment thereof, and relationship status and length.

Sexual Functioning

The Female Sexual Function Index (FSFI) [14] is a 19-item multidimensional self-report scale that assesses key dimensions of sexual response in women. We focused on the two-item desire domain only given that all remaining subscales require the individual to have participated in recent sexual activity [15] and the expected low base rate of this activity among our asexual subsample. The FSFI has good construct validity and reliably discriminates women with and without sexual desire and arousal disorders [16]. A cutoff of 6 or higher on the desire domain reliably distinguishes sexually healthy controls from those with HSDD [17]. Cronbach's alpha on the desire domain for our sample was high at 0.912.

The International Index of Erectile Function (IIEF) [18] is a 15-item self-report questionnaire that provides a brief assessment of sexual functioning in men. Like the FSFI for women, it assesses five domains: erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction; however, we chose to focus only on

the two-item sexual desire subscale in the current study given the reliance of the other domain items on recent sexual activity [19]. Unfortunately, cutoffs for the sexual desire domain are not available. Cronbach's alpha in the current sample was high at 0.931.

Sexual Distress

Sex-related distress was measured with the *Female Sexual Distress Scale-Revised* (FSDS-R) [20]. The gender-neutral language of the FSDS-R allowed us to administer this scale also to male participants without changing any of the item phrasing. This brief 13-item self-report scale quantified sexually related personal distress based on frequency rather than the intensity of distress. Each item was scored on a five-point scale ranging from *Never* to *Always*. The results were summed with a score of 15 or more being recommended as a cutoff for determining the presence of personal sexual distress [21]. The FSDS has been shown to reliably discriminate between women with and without sexual dysfunction and is sensitive to therapeutically induced change. Cronbach's alpha on our female participants was very high at 0.958 and was similarly high for our male participants at 0.973.

Sexual Behaviors

The Derogatis Sexual Functioning Inventory (DSFI) Drive Scale [22] is a multidimensional self-report scale that was used to quantify frequency of current sexual behaviors. The first four items assessed the frequency of sexual fantasies, kissing and petting, masturbation, and sexual intercourse. Behaviors were assessed on a nine-point scale from *Not at all* to *4 or more per day*, and a single score was obtained from the sum of these four items. The remaining three items of the DSFI Drive Scale assessed the ideal frequency of intercourse, age of sexual debut, and age at which the individual first became interested in sex. In addition, participants were asked the total number of individuals with whom they have had sexual activity in their lifetime, and the total number of partners with whom they have had a close committed relationship, regardless of whether it involved sexual activity (defined as romantic relationship).

Mood and Alexithymia

The Toronto Alexithymia Scale [23] is a 20-item self-report measure designed to measure alexithymia. It is based on three factors that characterize alexithymia: difficulty identifying and

distinguishing between feelings and bodily sensations, difficulty describing feelings, and externally oriented thinking. Each item is measured on a five-point scale ranging from *Strongly Disagree* to *Strongly Agree*. A score of ≥ 61 has been suggested as a cutoff score to identify alexithymic subjects. Internal consistency was moderate for our sample (Cronbach's $\alpha = 0.705$).

The Beck Depression Inventory: Second Edition (BDI-II) [24] is a 21-item self-report questionnaire revised from the original BDI and designed to assess severity of depressive symptoms over the past week in clinical and nonclinical samples. The statements are rated on a four-point scale ranging from 0 to 3. A score of ≥ 15 denotes probable depression. In a sample of college students, the internal consistency of the BDI-II was excellent at 0.90 [25], and it was similarly high in the current sample at 0.919.

Socially Desirable Responding

We used the Balanced Inventory of Desirable Responding (BIDR) [26] to measure socially desirable responding. The BIDR is a 40-item scale in which respondents indicate how true they think a series of statements are that refer to the participants' behaviors or feelings. Each statement is rated on a seven-item scale ranging from *Not True* to *Very True*, and scores are calculated by reversing inversely keyed items and summing the scores across items. Two subscales were calculated: impression management (degree of performing desirable but uncommon behaviors; e.g., "I always obey laws even if I'm unlikely to get caught") and self-deceptive enhancement (unconscious favorability bias similar to narcissism; e.g., "It's all right with me if some people happen to dislike me") with a maximum score of 140 for each scale. Internal reliability for the scales are in the highly satisfactory range for the two domains (Cronbach's $\alpha = 0.70\text{--}0.86$), and it has been shown to have excellent face, discriminant, and convergent validity [26]. For the current sample, BIDR scores were on the low end for both the impression management (Cronbach's $\alpha = 0.634$) and self-deceptive enhancement (Cronbach's $\alpha = 0.556$) domains.

Data Analyses

Given that the sexually identifying participants were significantly older than those in the AIS >40 group, age was controlled for in all analyses. Participants who scored more than two standard

deviations above the group mean for any single end point were excluded from that analysis.

Results

Demographic Characteristics

Table 1 presents the results of a one-way analysis of covariance (ANCOVA) comparing the groups (AIS >40 , control, HSDD, and subclinical HSDD) on age, years education, and relationship length (with the latter two controlling for age), and the results of χ^2 analyses for categorical variables, including: sexual orientation, relationship status, whether the individual has children, ethnicity, and whether the individual has been previously treated for a sexual concern. The majority of the participants were white, with no significant group differences. After controlling for age, there was no significant group difference on years of education, $F(3,392) = 2.09$, $P = 0.10$. The groups significantly differed on relationship status, $\chi^2(9) = 92.96$, $P < 0.001$, with many more AIS >40 individuals reporting that they were single (75.9%) compared with the control group (31.4%), the HSDD group (18.0%), and the subclinical HSDD group (46.6%). After for controlling for age, the groups did not differ on relationship length, $F(3,186) = 0.91$, $P = 0.44$ (Table 1). The groups significantly differed in the proportion who reported having children, $\chi^2(3) = 32.54$, $P < 0.001$, with individuals in the AIS >40 group being significantly less likely to have children than the other three groups. Participants in the HSDD group were significantly more likely to have received prior treatment of a sexual concern than the other groups, $\chi^2(3) = 17.93$, $P < 0.001$. Among the sexual participants, there were no significant group differences in self-reported sexual orientation, $\chi^2(6) = 6.66$, $P = 0.354$; interestingly, at least a few individuals in the HSDD ($n = 3$), subclinical HSDD ($n = 6$), and control groups ($n = 3$)—all of whom were categorized as "sexual" based on AIS scores <40 —self-identified as asexual (Table 1). AIS >40 participants were significantly more likely to self-identify as asexual than the other three groups, $\chi^2(9) = 240.89$, $P < 0.001$.

Asexual Identification

AIS scores, by definition, differed between the groups and are presented in Table 1.

Sexual Behaviors

After excluding the data from five outliers (individuals who reported more than 100 sexual

Table 1 Demographic characteristics of participants in the AIS >40 (n = 193), control (n = 122), hypoactive sexual desire disorder (HSDD; n = 50), and subclinical HSDD (n = 59) groups

	AIS >40	Controls	HSDD	Subclinical HSDD	P value
Age M (SD)	30.92 (11.06)	31.72 (11.54)	36.46 (12.15)	36.15 (13.20)	0.001
Self-identified sexual orientation* (%)					<0.001
Heterosexual	16.1	70.5	68.0	67.8	
Bisexual	3.6	18.0	20.0	18.6	
Homosexual	2.1	9.0	6.0	3.4	
Asexual	78.2	2.5	6.0	10.2	
Relationship status* (%)					<0.001
Single	75.9	31.4	18.0	37.9	
Casual dating	1.6	5.8	10.0	3.4	
Long-term relationship	20.4	60.3	70.0	50.0	
Other	2.1	2.5	2.0	0	
Have children* (%)	9.4	22.1	42.0	29.3	<0.001
Ethnicity (%)					0.054
Euro-Caucasian	90.5	79.5	78.0	72.4	
East/South Asian	4.2	9.8	10.0	6.9	
African American	0.5	4.1	4.0	6.9	
Aboriginal/First Nation	0	0	2.0	1.7	
Hispanic	1.6	1.6	2.0	5.2	
Other	3.2	4.9	2.0	6.9	
Treated for sexual concern (%) [†]	7.8	9.0	28.0	16.9	<0.001
Years education M (SD)	14.34 (4.81)	13.68 (4.85)	13.21 (5.41)	12.73 (5.65)	ns
Relationship length in years M (SD)	8.48 (9.65)	6.77 (8.00)	9.62 (8.69)	7.90 (7.79)	ns
AIS M (SD)*	50.65 (5.68)	20.82 (7.14)	27.10 (6.62)	27.46 (7.29)	<0.001

*AIS >40 individuals significantly different from other groups

[†]HSDD group significantly different from other groups, ns = nonsignificant ANCOVA

AIS = Asexuality Identification Scale

partners), a multivariate analysis of covariance (MANCOVA) examining the total number of romantic and sexual partners revealed a significant overall effect, $F(6,784) = 9.85$, $P < 0.001$. Univariate analyses revealed a significant effect for number of past sexual partners, $F(3,392) = 20.54$, $P < 0.001$, such that those in the AIS >40 group had the fewest past sexual partners (Table 2). There was also a significant univariate effect on total number of past romantic partners after controlling for age, $F(3,392) = 5.61$, $P = 0.001$, with the AIS >40 also having the fewest past romantic partners (Table 2). We also examined the proportion of sexual to romantic partners across groups, controlling for age. For this analysis, we coded as missing any individual who reported a zero for either sexual or romantic partners; however, we retained data from individuals who reported having neither sexual nor romantic partners (and coded these as zero). From the AIS >40 group, this led to 86 being excluded on sexual partners and 83 being excluded on romantic partners; for the HSDD group, this led to one individual being excluded on sexual and one on romantic partners; for the subclinical HSDD group, this led to one being excluded on past sexual partners and seven being excluded on romantic partners; and for the control group, this led to four being excluded on past sexual and eight being excluded on past

romantic partners. The univariate ANCOVA was significant, $F(3,356) = 8.20$, $P < 0.001$, with those in the AIS >40 group having the lowest ratio of sexual to romantic partners (Table 2).

Significantly, more participants in the AIS >40 group reported never having engaged in any type of sexual activity (including kissing, petting, and intercourse) compared with the other three groups, $\chi^2(3) = 16.03$, $P = 0.001$ (AIS >40: 7.9%; controls: 0%; HSDD: 2.0%; subclinical HSDD: 0%). Each of the DSFI behavior items were examined separately. As detailed in Table 2, those in the AIS >40 group were significantly less likely to currently be engaged in sexual intercourse, $\chi^2(21) = 156.25$, $P < 0.001$, masturbation, $\chi^2(24) = 72.53$, $P < 0.001$, kissing and petting behaviors, $\chi^2(24) = 127.73$, $P < 0.001$, and sexual fantasies, $\chi^2(24) = 108.37$, $P < 0.001$.

DSFI item 2 assessed participants' ideal intercourse frequency and again found a significant difference between groups, $\chi^2(21) = 309.68$, $P < 0.001$, with 83.9% of the AIS >40 group stating that they would prefer not to have sexual intercourse at all compared with 3.6% of the control group, 6.8% of those with HSDD, and 9.4% of those with subclinical HSDD. DSFI item 3 assessed age of first interest in sexual activity and significantly more AIS >40 individuals (37.7%) reported never having any interest in sexual activ-

Table 2 Sexual activity frequency by group

	AIS >40	Controls	HSDD	Subclinical HSDD	P value
Total sexual partners* M (SD)	2.55 (5.03)	10.94 (14.29)	15.57 (19.26)	14.09 (18.05)	<0.001
Total romantic partners* M (SD)	1.71 (2.51)	3.84 (9.16)	5.02 (4.16)	3.85 (3.33)	0.001
Ratio of sexual to romantic partners [†]	1.36 (3.58)	4.54 (6.67)	7.15 (15.39)	3.80 (3.70)	<0.001
Intercourse frequency (%)					<0.001
Not at all	78.2	24.2	12.2	45.6	
<2/month	16.5	37.5	49.0	35.1	
1–3/week	5.3	30.8	34.7	14.0	
>4/week	0	7.5	4.1	5.3	
Masturbation (%)					<0.001
Not at all	27.0	5.1	12.2	15.8	
<2/month	39.2	23.7	49.0	40.4	
1–3/week	23.8	41.5	32.7	26.3	
>4/week	10.0	29.7	6.1	17.5	
Kissing and petting (%)					<0.001
Not at all	63.8	17.6	8.2	33.3	
<2/month	20.7	22.7	30.6	24.6	
1–3/week	8.0	16.0	28.6	15.8	
>4/week	7.4	43.7	32.7	26.3	
Sexual fantasies (%)					<0.001
Not at all	38.0	4.2	16.3	15.8	
<2/month	39.0	26.7	40.8	35.1	
1–3/week	12.8	30.0	22.4	10.5	
>4/week	10.2	39.2	20.4	38.6	
Age of first interest in sexual activity [‡] M (SD)	15.36 (4.53)	12.80 (3.43)	14.04 (3.62)	13.30 (3.09)	<0.001
Age of first intercourse [§] M (SD)	18.84 (4.78)	18.54 (3.98)	18.43 (6.42)	17.13 (3.42)	ns

Data represent means and standard deviations

Note: *Excluding individuals who have had more than 100 romantic or sexual partners

[†]Excluding individuals who have had at least one romantic partner but no sexual partners, or at least one sexual and no romantic partners. Those with neither romantic nor sexual partners received a zero score

[‡]After excluding individuals who reported never being interested in sexual activity

[§]After excluding individuals who reported never having engaged in sexual intercourse

ns = nonsignificant; SD = standard deviation

ity compared with those in the control (1.7%), HSDD (0%), and subclinical HSDD (0%) groups. After excluding those who reported never having an interest in sexual activity, we carried out a univariate ANCOVA controlling for age and found a significant main effect of group, $F(3,321) = 8.96$, $P < 0.001$, such that the AIS >40 group were significantly older when they first experienced any interest in sexual activity compared with the remaining three groups. On DSFI item 4 (age of sexual intercourse debut), after excluding those who had never experienced sexual intercourse (50.6% of the AIS >40 group, 7.7% of the control group, 2.0% of the HSDD group, and 10.3% of those with subclinical HSDD), an ANCOVA failed to reveal a statistically significant group difference, $F(3,289) = 1.73$, $P = 0.161$. The mean age for sexual intercourse debut, across groups, was 18.36 years (SD 4.62; Table 2).

Sexual Desire Difficulties and Distress

Those in the AIS >40 group were significantly less likely to report having any current sexual concerns compared with the other three groups, $\chi^2(3) = 35.75$, $P < 0.001$, with individuals in the

HSDD and subclinical HSDD groups more often reporting a low sex drive as their sexual concern, and some individuals in the control group reporting discrepant desire with a partner, erectile and ejaculatory issues, pain with sex, and dissatisfaction with the frequency of sexual contact. Moreover, individuals in the HSDD group were significantly more likely to have been treated by a professional for a sex-related concern, $\chi^2(3) = 17.93$, $P < 0.001$ (Table 3).

The desire domain of the FSFI was examined with a univariate ANCOVA controlling for age on female participants only. There was a significant main effect of group, $F(3,280) = 69.35$, $P < 0.001$. Controls had the highest levels of desire followed by the other three groups (Table 3). Moreover, scores in the control group nearly approached the threshold for women without sexual desire difficulties previously published [17], whereas women in the HSDD, subclinical HSDD, and AIS >40 groups scored in the range similar to previous samples of women with HSDD.

Data were available for 98 male participants on the IIEF desire domain. A univariate ANCOVA controlling for age found a significant main effect of

Table 3 Reported sexual difficulties and distress across groups

	AIS >40 (n = 191)	Controls (n = 121)	HSDD (n = 50)	Subclinical HSDD (n = 58)	P value
Current sexual concerns* (%)	20.9	28.9	64.0	36.2	<0.001
Ever received treatment for a sexual difficulty† (%)	7.8	9.0	28.0	16.9	<0.001
FSFI Desire‡ M (SD)	2.62 (1.34) (n = 145)	5.93 (1.92) (n = 75)	3.30 (1.70) (n = 33)	4.44 (2.42) (n = 32)	<0.001
IIEF Desire‡ M (SD)	3.00 (1.62) (n = 36)	6.62 (2.28) (n = 37)	5.80 (2.74) (n = 10)	5.20 (2.24) (n = 15)	<0.001
SDS§§ M (SD)					
Men	9.59 (16.00)	15.49 (13.07)	31.60 (11.24)	27.79 (16.15)	<0.001
Women	10.47 (13.21)	17.62 (11.43)	27.79 (13.04)	21.86 (13.98)	

Note: *AIS >40 significantly different from other groups

†HSDD group significantly different from other groups

‡Significant effect of group

§No significant effect of sex

FSFI = female sexual function index; IIEF = international index of erectile function; SDS = sexual distress scale

group, $F(3,93) = 19.20$, $P < 0.001$, with those in the control group having the highest level of desire and those men in the AIS >40 group having the lowest scores (Table 3).

The FSDS-R was examined in both sexes using a univariate ANCOVA exploring effects of group and sex (as independent factors) after controlling for age. The group by sex interaction was not significant, $F(3,357) = 1.07$, $P = 0.360$. The main effect of sex was not significant, $F(1,357) = 0.81$, $P = 0.369$, but the main effect of group was significant, $F(3,357) = 23.71$, $P < 0.001$, such that men and women in the AIS >40 group had the lowest levels of sex-related distress, and those in the HSDD group had the highest scores on sex-related distress (Table 3).

Alexithymia, Mood, and Desirable Responding

We carried out a MANCOVA controlling for age using TAS, BDI-II, BIDR-Self-Deceptive Enhancement, and BIDR-Impression Management Scores. We found a significant multivariate main effect of group, $F(12,1113) = 5.87$, $P < 0.001$. Follow-up

univariate analyses indicated significant group differences on symptoms of depression (BDI-II scores), $F(3,372) = 4.15$, $P = 0.007$, with individuals in the subclinical HSDD group having the highest BDI-II scores followed by those with HSDD. Those in the AIS >40 group had the lowest BDI-II scores (Table 4). The univariate ANCOVA was also significant for BIDR Impression Management scores, $F(3,372) = 14.82$, $P < 0.001$, and those in the AIS >40 group had the highest levels of impression management (Table 4). The univariate ANCOVA was not significant for BIDR Self-Deceptive Enhancement, $F(3,372) = 0.66$, $P = 0.58$, nor for alexithymia, $F(3,372) = 2.20$, $P = 0.09$.

Logistic Regression Predicting HSDD vs. AIS >40 Group

A binary logistic regression was used to assess predictors of group membership in HSDD ($n = 42$, coded as 1) over and above AIS >40 group ($n = 166$, coded as 0) groups. Interest focused on three sets of variables: set 1 (demographics: relationship status, age); set 2 (sex-related: sexual

Table 4 Alexithymia (TAS), depressive symptoms (BDI-II), self-deceptive enhancement (BIDR-SDE), and impression management (BIDR-IM) across groups

	AIS >40 (n = 177)	Controls (n = 112)	HSDD (n = 42)	Subclinical HSDD (n = 46)	P values
TAS	47.63 (13.42)	45.12 (13.07)	44.95 (13.96)	50.48 (14.74)	ns
BDI-II	10.88 (10.51)	11.88 (9.91)	13.50 (10.29)	17.22 (12.52)	0.007
BIDR-SDE	82.60 (13.90)	80.38 (12.01)	81.74 (12.54)	82.65 (16.97)	ns
BIDR-IM	86.99 (15.60)	75.20 (16.43)	80.55 (14.40)	77.35 (13.38)	<0.001

Note: Data represent means and standard deviations

TAS = Toronto Alexithymia Scale; BDI = Beck Depression Inventory; BIDR = balanced inventory of desirable responding; SDE = self-deceptive enhancement; IM = impression management; ns = nonsignificant

Table 5 Logistic regression predicting to HSDD group over AIS >40 group

	Correct predictions to group		β	SE(B)	Wald χ^2	Odds ratio	95% CI	P value
	AIS >40	HSDD						
<i>Step one</i>	93.4%	23.8%			46.75			<0.001
Age			0.03	0.016	4.24	1.033	1.00–1.07	0.04
Relationship status			1.13	0.199	32.48	3.107	2.10–4.59	<0.001
<i>Step two</i>	94.0%	59.5%			34.02			<0.001
Sexual desire			0.577	0.218	7.03	1.780	1.16–2.73	0.008
Sex-related distress			0.054	0.016	12.165	1.056	1.02–1.09	<0.001
Sexual behaviors			0.098	0.060	2.66	1.103	0.98–1.24	ns
<i>Step three</i>	96.4%	64.3%			11.58			0.021
BDI-II			-0.012	0.029	0.176	0.99	0.93–1.05	ns
TAS			-0.062	0.026	5.675	0.94	0.89–0.99	0.017
BIDR-SDE			0.009	0.023	0.153	1.01	0.96–1.06	0.696
BIDR-IM			-0.021	0.017	1.527	0.98	0.95–1.01	0.217

Note: Data were coded as 0 = asexuals, 1 = HSDD. BDI = Beck Depression Inventory; TAS = Toronto Alexithymia Scale; BIDR = balanced inventory of desirable responding; IM = impression management; ns = nonsignificant; SDE = self-deceptive enhancement

distress, sexual desire, and DSFI total sexual behavior score); set 3 (psychiatric: BDI-II, BIDR, and TAS). Comparisons of nested logistic regression fits were based on the likelihood ratio χ^2 test, and the significance of individual regression coefficients was assessed using Wald tests. Step 1 was significant, $\chi^2(2) = 46.75$, $P < 0.001$ with both relationship status ($P < 0.001$) and age ($P = 0.04$) being significant predictors (Table 5). Partnered individuals were more likely to be in the HSDD compared with the AIS >40 group, and single individuals were less likely to be in the HSDD group. Older individuals were more likely to be in the HSDD group. Step 2 was also statistically significant, $\chi^2(3) = 34.02$, $P < 0.001$, and 94.0% of those in the AIS >40 group and 59.5% in the HSDD group being correctly classified based on these predictors. Specifically, sexual distress scores ($P < 0.001$) and sexual desire scores ($P = 0.008$) were significant predictors, whereas sexual behaviors did not significantly predict to the HSDD group ($P = 0.103$). With each unit increase in FSDS-R scores, participants were 1.06 times more likely to be in the HSDD group, and with each unit increase in sexual desire scores they were 1.78 more likely to be in the HSDD group. The addition of the psychological variables (BIDR, BDI-II, and TAS) also led to an overall significant model, $\chi^2(4) = 11.58$, $P = 0.021$; however, only the TAS scores significantly predicted to the HSDD group ($P = 0.017$) such that with every unit increase in TAS scores, participants were 0.94 times less likely to be in the HSDD group.

Comparison of Lifelong HSDD and Asexuality

Among our sample of individuals with HSDD, 14 indicated that their absent sexual desire and sexual

fantasies had been lifelong. Given speculation that individuals with lifelong HSDD may overlap the most with asexuality, we conducted an exploratory analysis to compare these 14 individuals with lifelong HSDD to the sample of 193 individuals in the AIS >40 group. Because the two groups differed substantially in sample size, and an independent samples Mann–Whitney U -test revealed that the two groups had different distributions, we used independent samples median tests to assess whether the median scores of several variables were the same between the two groups. As expected, AIS scores were significantly higher in the AIS >40 group compared with the lifelong HSDD group ($P < 0.001$). The DSFI sexual behavior scores did not differ between the AIS >40 group compared with the lifelong HSDD group ($P = 0.101$), and neither FSFI sexual desire scores ($P = 0.823$) nor IIEF sexual desire scores ($P = 0.954$) significantly differed between the two groups. Sex-related distress was three times higher in those with lifelong HSDD ($P = 0.006$) (Table 6).

Table 6 Comparison of those in the AIS >40 group and those with lifelong HSDD

	AIS >40 (n = 193)	Lifelong HSDD (n = 14)	P value
AIS	50.65 (5.68)	27.21 (7.65)	0.001
DSFI sexual behaviors score	8.93 (3.86)	12.36 (6.55)	ns
FSFI desire	2.62 (1.34)	2.57 (1.13)	ns
IIEF desire	3.00 (1.62)	5.40 (3.85)	ns
SDS	10.30 (13.75)	30.83 (14.24)	0.006

Data represent means and standard deviations

AIS = Asexuality Identification Scale; DSFI = Derogatis Sexual Functioning Inventory; FSFI = Female Sexual Function Index; IIEF = International Index Of Erectile Function; ns = nonsignificant; SDS = sexual distress scale

Discussion

Summary of Findings

The aim of this study was to compare demographic, sexual desire and distress, sexual behavior-related, and select indices of psychological functioning among individuals with elevated scores on asexuality identification (AIS >40), individuals who met diagnostic criteria for HSDD, individuals with low sexual desire without distress, and a sexually healthy control group. We classified those in the AIS >40 group according to scores on a validated measure of asexuality [12] and not based on self-identified asexual orientation. Both asexual individuals and those with HSDD share a lack of desire for sex, though these groups are conventionally distinguished based on the lack of concurrent distress among asexuals and the clinically significant levels of distress in those with HSDD. In addition to comparing groups on sexual desire and distress, we also compared the groups on other variables of interest that have been speculated as differentiating low desire with and without distress. The impetus for this study emerged from voiced skepticism of the existence of asexuality as a discrete sexual orientation, and the position that asexuality represents an extreme form of low sexual desire. Although our study does not allow us to rule out the possibility that some individuals who initially meet criteria for HSDD might subsequently be classified as asexual, we believe that this study represents a first step in describing the unique areas of overlap and distinction between these populations. Moreover, by using a validated measure of asexuality identification to classify participants to asexual vs. sexual groups, this study has the advantage of overcoming the limitations associated with relying on self-identification for group comparisons [27].

We limited our analyses to individuals in the AIS >40 group who were older than 23 years of age in an effort to match the ages of the groups and reduce the possibility that observed group differences in demographic characteristics and sexual behaviors may be an artifact of older age in the sexual samples. Although the AIS >40 sample was still significantly younger than the other three groups, the difference in their ages was minimal (3 years), and age was used as a covariate in all analyses. We found no significant group differences in years of education, which is inconsistent with previous research that found low levels of education to be associated with asexuality [1,28,29], although one other study did find asexual individuals to have

higher levels of education than other groups [4]. The equivocal findings on the association between asexuality and level of education may be related, at least in part, to the sources of recruitment. Because our study used a combination of recruitment sources, this may account for the difference between our AIS >40 participants level of education compared with controls vs. those found in other studies.

Not surprisingly, even after controlling for age, AIS >40 individuals were significantly less likely to be in a relationship (75.9%) compared with the control group (31.4%), the HSDD group (18.0%), and the subclinical HSDD group (46.6%), and the mean number of total sexual and romantic partners were significantly less in the AIS >40 group compared with the other three groups. These findings highlight that, despite their low desire for sex, individuals with HSDD in this study did not differ significantly from controls in mean sexual or romantic partners, yet individuals identifying as AIS >40 differed on both these variables. Romantic attraction varies widely among asexual individuals, with some desiring the same nonsexual benefits of partnership declared by sexual individuals [3] and others self-defining as “aromantic asexuals,” or in other words, desiring neither a sexual nor a romantic partner. After excluding those with either no history of romantic or sexual partners, we next compared the proportion of sexual with romantic partners across the groups and found those in the AIS >40 group to have a significantly lower ratio compared with the other three groups. This finding suggests that the AIS >40 participants were more likely to have romantic relationships that did not include sexual activity whereas those in the other groups (who had higher ratios) were more likely to have sexual encounters outside of a romantic partnership. Having HSDD did not seem to impact this proportion and suggests that a comparison of the ratio of romantic with sexual partners might be one means of differentiating those with HSDD from asexuals.

The diagnostic criteria for HSDD in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) focus on desire for sex and sexual fantasies [13]. On the desire domain of the FSFI, there was an expected linear relationship between group and desire such that the control group had significantly higher scores, followed by the HSDD and subclinical HSDD groups, which did not significantly differ from one another, followed by the AIS >40 group. The range of scores for our control and HSDD

samples were comparable with other published data on women with and without HSDD [30], and FSFI desire scores in the AIS >40 group were comparable with previously published data on asexual samples of women [31]. IIEF desire scores among the men in this study showed a similar pattern with men in the AIS >40 group showing the lowest IIEF desire scores followed by the HSDD group and then the control group. The desire scores for our AIS >40 men were comparable with another recruited sample of asexual men [3] and scores for our control group were similar to other published data on sexually healthy men [18]. Our findings suggest that although asexuals and those with HSDD share a similar disinterest in sexual activity, the groups can still be differentiated on the basis of a validated measure of sexual desire and that asexuals report even lower levels of desire than those with a sexual desire dysfunction. Criteria for HSDD in the DSM-IV-TR also required deficient or absent sexual fantasies; in this study, we found that significantly more participants in the AIS >40 group (38.0%) compared with the other groups (4.2–16.3%) reported never having experienced a sexual fantasy. These findings mirror another recent large study that found 40% of asexuals have never experienced a sexual fantasy [32]. Interestingly, although a reduced frequency of fantasy is part of the diagnostic criteria for HSDD, it is notable that at least 85% of the HSDD and sub-clinical HSDD participants have experienced sexual fantasies, and nearly half of those with HSDD currently experience at least one sexual fantasy per week. These data suggest that AIS >40 and HSDD participants may be differentiated on the basis, at least in part, of their sexual fantasy frequency.

Although 62% of the AIS >40 participants did report experiencing sexual fantasies, we did not explore the contents of their fantasies in this study. Bogaert [10] speculated that asexual person's fantasies are somewhat "identity-less"—or involving characters unknown to the individual or perhaps even fictional characters. If Bogaert's speculation is correct, we might hypothesize that at least some of the fantasies among this subsample of AIS >40 who do fantasize may depict scenes that do not involve other persons. Future research employing qualitative stories that invite asexual persons to describe their fantasies might illuminate this further. Taking the sexual desire and sexual fantasy findings together, our findings suggest that asexuals and those with HSDD can be differentiated on the basis of sexual desire and sexual fantasy frequency.

Asexuals maintain that their lack of sexual interest and attraction evokes no sexual distress for them personally, although it may result in distress in a relationship. A diagnosis of HSDD also requires the presence of clinically significant distress. There was a significant group difference in sex-related distress after controlling for age, and no differences between male and female participants. Those in the HSDD group had the highest levels of distress and fell above the clinical threshold on the FSDD. Those in the control group had significantly lower levels of distress, and scores in the AIS >40 group were even lower. Population based studies do find that approximately 10% of men and women experience sex-related distress [33], so the finding that participants in the control group had higher distress than AIS >40 participants is perhaps not surprising. The HSDD sample had the highest rates of sex-related distress, even in the absence of any specific sexual symptom. The significantly higher levels of distress in the HSDD group may also be associated with this group's higher frequency of having previously sought treatment by a sex therapist (28.0% vs. 7.8–16.9% in the other three groups). Our findings provide strong support for the low levels of personal sex-related distress reportedly experienced among asexuals [3,7,9] and further support distress as a distinguishing feature of these two groups. Qualitative research has shown that when asked whether they would accept an effective treatment for improving their sexual desire, asexual individuals were unanimous in their rejection of this option [3]. When distress does arise for asexuals, it seems that it may be related to the impact of one's asexuality on a relationship when that individual is partnered with a sexual individual [3]. It is also possible that distress arises before an asexual has discovered an asexual community and experienced validation from others who can relate to their experiences.

Data obtained from the DSFI show significantly lower rates across all sexual activities in the AIS >40 group, and no significant differences between the HSDD and control groups. These findings suggest that their lack of sexual attraction translates also to a lack of sexual behavior among those asexually identified, whereas those in the HSDD group continue to engage in sexual activity despite their distressing low desire. Notably, however, approximately 20% of AIS >40 individuals were in a relationship at the time of the study, and 16.1% reported an ideal sexual intercourse frequency greater than zero. Although we did not

explore the nature of their relationships, or specifically the characteristics of their partners (i.e., whether they were sexual or asexual), it is possible that some of our partnered AIS >40 participants were in a relationship with a sexually identified partner who desired ongoing sexual activity. Negotiating sexuality in an asexual–sexual partnership has been a topic of interest and the focus of qualitative science, and sexual activity in these relationships has been described as consensual but undesired [3]—akin to descriptions among sexual samples recently studied [34]. One notable difference between our AIS >40 and HSDD samples was that despite their common lack of interest in sex, many of the HSDD participants reported a wish for sexual intercourse and other sexual behaviors. Specifically, 83.9% of AIS >40 individuals reported that they would prefer not to engage in sexual intercourse, whereas the comparable figure was significantly lower for the control group (3.6%), the HSDD sample (6.8%), and those with subclinical HSDD (9.4%).

The reduced desire for sex seen among our AIS >40 participants was also evident in nongenital sexual activities. There was an overall greater proportion of individuals in the AIS >40 group who reported never having engaged in any type of sexual activity (7.9%; including kissing, petting, and intercourse) compared with the other three groups (range from 0% to 2%). Rates did not differ between the HSDD and control samples, suggesting that the desire for nonsexual physical intimacy may not differ between controls and those with HSDD, whereas these groups differ from rates seen among asexuals.

Unlike many individuals with low desire who report a reduction from a previous higher level of desire, asexual individuals have described a more lifelong pattern of no sexual attraction or desire, or feeling like they “could not relate” to friends who described sexual desire and attractions during adolescence [3]. Indeed, we found that age of first interest in sex significantly differed between the groups with the AIS >40 group being more likely (37.7%) to report never having had an interest in sex compared with those in the control (1.7%), HSDD (0%), and subclinical HSDD (0%) groups. Among those in the AIS >40 group who did recall having an interest in sex at least at some point in their lives, it occurred at a significantly older age than in the other three groups. Interestingly, however, age of intercourse debut did not significantly differ between the groups. We might conclude that whereas interest in sex may differentiate

asexuals from those with HSDD, age of intercourse debut does not reliably distinguish the groups, and may be influenced by a multitude of factors that do not reflect one’s motivation/desire for sex [35]. Indeed, asexuals have reported “trying out” intercourse as a way of testing their lack of sexual attraction in a similar manner to same-sex attracted individuals trying out sex with opposite-sex partners.

On our measured domains of psychological functioning, there were no group differences in alexithymia scores, and scores among our sample of AIS >40 participants were the same as previously published data using the same measure with asexual men and women [3]. There was a significant group difference in depressive symptoms with the AIS >40 sample showing the lowest rates and the HSDD and subclinical HSDD groups showing the highest rates, equivalent to a mild level of depressive symptoms. Given the strong association between mood and sexual desire [36,37], it is not surprising that our samples with clinical symptoms of low desire had significantly higher rates of depressive symptoms. On a measure of desirable responding, there were significant group differences in impression management (i.e., lying) but not in self-deceptive enhancement (i.e., overconfidence). Specifically, those in the AIS >40 group endorsed more items reflecting a higher need for impression management compared with the other groups. This finding suggests that there may be a potential bias in this group wanting to appear favorable to the research team, and this may have impacted their responses on other items.

Predictors of HSDD vs. Asexuality

We carried out a three-stage binary logistic regression with demographic variables in stage 1, sexual desire, distress, and behavior in stage 2, and psychological variables in stage 3. Here we found (older) age, (partnered) relationship status, higher distress scores, and higher sexual desire scores significantly predicted to the HSDD group above and beyond prediction to the AIS >40 group. Level of sexual behavior, depression, and social desirability scores did not significantly predict to group. Alexithymia scores did significantly predict to group such that a one unit increase in TAS scores decreased the odds of being in the HSDD group markedly. These findings suggest that, during an assessment of considering whether one may have HSDD vs. an asexual orientation, it may be important to consider the individual’s relation-

ship status, level of desire, their sex-related distress, and characteristics of alexithymia, but examining their sexual behaviors only may not be a useful predictor.

Differences and Similarities Between Lifelong HSDD and Asexuality

As an exploratory analysis, we also compared the lifelong HSDD ($n = 14$) and AIS >40 ($n = 193$) groups in order to explore whether those with a lifelong pattern of never desiring sex may overlap more with the AIS >40 group than the entire group of HSDD individuals, which mostly included those with an acquired desire disorder. To explore this, we were specifically interested in four variables: AIS scores, sexual desire, sex-related distress, and overall sexual behavior. We found that those with lifelong HSDD had significantly lower AIS scores and significantly more sex-related distress; however, the groups did not differ on total sexual behaviors or on sexual desire. These findings illustrate potentially more overlap between lifelong HSDD and sexuality given that the groups could not be differentiated on the basis of behavior or desire. We cannot rule out the possibility, however, that some individuals with asexuality may in fact have lifelong HSDD or that some diagnosed with lifelong HSDD may end up self-identifying as asexual, particularly because self-identification was not used as a basis of group classification in this study and because an in-person clinical assessment was not administered. That we found 6% of our HSDD sample self-identified as asexual, despite having AIS scores that did not meet the threshold for asexuality, suggests that there is likely overlap between some individuals with HSDD and asexuality. This group should be the focus of research in the future given that most research on low desire has focused on individuals who have acquired HSDD.

Not surprisingly, scores on the AIS [12], which were used to classify participants to the asexual group (defined as AIS >40) significantly differed across the groups, with the HSDD participants having scores nearly half the level of the AIS >40 participants, and the latter having scores well above the cutoff (50.65). Group means were similar to available data on the AIS during its psychometric testing [12]. It is notable that scores among the HSDD participants were elevated, although they did not reach the threshold for classifying asexuality. An examination of individual items on the AIS (data not shown) revealed that

individuals with HSDD tended to have higher scores on items relating to low desire for sex than the control group. These findings provide further evidence that the AIS is a useful instrument for discriminating sexual from asexual groups and provide new data showing that those with HSDD can be differentiated from those likely categorized as asexual on the basis of AIS scores.

Limitations

There are limitations to this study that must be considered. First, although our sample was large and we attempted to recruit from a variety of sources, we had a proportionately small number of HSDD individuals, and a very small subsample of those with lifelong HSDD. Second, there were markedly more female than male participants, thus, we were unable to include sex as a factor in most analyses. Previous studies of asexuality, however, have failed to find significant sex differences for most correlates of asexuality. Third, we did not use a clinical interview to assign individuals to HSDD group. We did advertise for the study in the waiting rooms of sex therapists who treat loss of sexual desire, however, only a series of self-report dichotomous questions were used to determine the extent to which participants met criteria for HSDD.

Another limitation relates to the possibility of respondent fatigue. Although 799 individuals provided consent and started to take part in the online questionnaire, complete data were received by 668 participants (83.6%). Because AIS data were not available by these 131 individuals, a respondent fatigue by group interaction cannot be ruled out.

Conclusion

Taken together, these findings suggest that there are notable differences between AIS >40 individuals (those likely to identify as asexual) and those who meet diagnostic criteria for HSDD. Although a face-to-face clinical interview was not used to designate individuals to the HSDD group, we used diagnostic criteria based on the DSM-IV-TR, similar to the questions used in the Decreased Sexual Desire Screener [38]; thus, it is likely that our sample classified as HSDD would have met diagnostic criteria if a full clinical interview were performed. Nonetheless, we acknowledge the lack of a clinical interview as a weakness in our study design. We found that sexual desire, sexual distress, relationship status, and alexithymia were significant predictors to the AIS >40 group over and

above the HSDD group, and these variables may be important to assess in the clinical setting when differentiating between HSDD and asexuality. It is notable that level of engagement in sexual behaviors as well as age of intercourse debut do not discriminate the groups, suggesting that in instances of making a classificatory decision between asexuality vs. a sexual dysfunction, the interviewer must assess a broad range of sex-related domains and not focus exclusively on sexual behavior (in)frequency. Our findings also lend support for the use of the AIS in categorizing individuals as asexual and support the clinical cutoffs determined in psychometric analyses [12]. AIS scores significantly differentiated the groups, and even the lifelong HSDD from AIS >40 groups (the latter two arguably having the most overlap), and thus, future researchers may consider implementing this measure in asexuality research.

In conclusion, these data add to the growing literature on the correlates and characteristics of asexuality and suggest that asexuality is a category distinct from a sexual desire dysfunction. A review of the literature suggests that asexuality is likely best classified as a unique sexual orientation and not as a sexual dysfunction. In the current edition of the *Diagnostic and Statistical Manual for Mental Disorders (DSM-5)* [39], a statement excluding a diagnosis of a sexual desire disorder when an individual identifies as asexual is made. Clearly more research is needed to explore the likely overlap between those with lifelong low sexual desire and asexuality, which may ultimately prove invaluable for gaining a greater understanding of the processes that underlie the development of romantic vs. sexual attraction, and lack thereof.

Corresponding Author: Lori A. Brotto, PhD, Department of Gynaecology, University of British Columbia, 2775 Laurel Street, 6th Floor, Vancouver, BC V5Z 1M9, Canada. Tel: 604-875-4111 x68898; Fax: 604-875-4869; E-mail: Lori.Brotto@vch.ca

Conflict of Interest: The author(s) report no conflicts of interest.

Statement of Authorship

Category 1

(a) Conception and Design

Lori A. Brotto; Morag A. Yule

(b) Acquisition of Data

Lori A. Brotto; Morag A. Yule

(c) Analysis and Interpretation of Data

Lori A. Brotto; Morag A. Yule

Category 2

(a) Drafting the Article

Lori A. Brotto; Morag A. Yule; Boris B. Gorzalka

(b) Revising It for Intellectual Content

Lori A. Brotto; Morag A. Yule; Boris B. Gorzalka

Category 3

(a) Final Approval of the Completed Article

Lori A. Brotto; Morag A. Yule; Boris B. Gorzalka

References

- 1 Bogaert AF. Asexuality: Prevalence and associated factors in a national probability sample. *J Sex Res* 2004;41:279–87.
- 2 Bogaert AF. Toward a conceptual understanding of asexuality. *Rev Gen Psychol* 2006;10:241–50.
- 3 Brotto LA, Knudson G, Inskip J, Rhodes K, Erskine Y. Asexuality: A mixed methods approach. *Arch Sex Behav* 2010;39:599–618.
- 4 Prause N, Graham CA. Asexuality: Classification and characterization. *Arch Sex Behav* 2007;36:341–56.
- 5 Buss DM, Schmitt DP. Sexual strategies theory: An evolutionary perspective on human mating. *Psychol Rev* 1993;100:204–32.
- 6 Yule MA, Brotto LA, Gorzalka BB. Mental health and interpersonal functioning in self-identified asexual men and women. *Psychol Sexual* 2013;4:136–51.
- 7 Scherrer KS. Coming to an asexual identity: Negotiating identity, negotiating desire. *Sexualities* 2008;11:621–41.
- 8 MacInnis CC, Hodson G. Intergroup bias toward “Group X”: Evidence of prejudice, dehumanization, avoidance, and discrimination against asexuals. *Group Proc Intergroup Rel* 2012;15:725–43.
- 9 Bogaert AF. Asexuality: Dysfunction or variation? In: Caroll JM, Alena MK, eds. *Psychological sexual dysfunctions*. New York: Nova Science Publishers; 2008:9–13.
- 10 Bogaert AF. Asexuality and autochorissexualism (identity-less sexuality). *Arch Sex Behav* 2012;41:1513–4.
- 11 Yule MA, Brotto LA, Gorzalka BB. Biological markers of asexuality: Finger length ratios, handedness, and older siblings in self-identified asexual men and women. *Arch Sex Behav* 2014;43:299–310.
- 12 Yule MA, Brotto LA, Gorzalka BB. A validated measure of no sexual attraction: The Asexuality Identification Scale. *Psychol Assess* 2014. doi: 10.1037/a0038196.
- 13 American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th edition, text revised ed. (DSM-IV-TR). Washington, DC: American Psychiatric Publishing; 2000.
- 14 Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, D’Agostino RJ. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000;26:191–208.
- 15 Meyer-Bahlburg HFL, Dolezal C. The Female Sexual Function Index: A methodological critique and suggestions for improvement. *J Sex Marital Ther* 2007;33:217–24.
- 16 Wiegel M, Meston C, Rosen R. The Female Sexual Function Index (FSFI): Cross-validation and development of clinical cutoff scores. *J Sex Marital Ther* 2005;31:1–20.
- 17 Gerstenberger EP, Rosen RC, Brewer JV, Meston CM, Brotto LA, Wiegel M, Sand M. Sexual desire and the Female Sexual Function Index (FSFI): A sexual desire cutpoint for clinical interpretation of the FSFI in women with and without hypoactive sexual desire disorder. *J Sex Med* 2010;7:3096–103.

- 18 Rosen RC, Riley A, Wagner G, Osterloh IH, Kilpatrick J, Mishra A. The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology* 1997;49:822–30.
- 19 Yule MA, Davison BJ, Brotto LA. The International Index of Erectile Function: A methodological critique and suggestions for improvement. *J Sex Marital Ther* 2011;37:255–69.
- 20 Derogatis LR, Clayton AH, Lewis-D'Agostino D, Wunderlich G, Fu Y. Validation of the female sexual distress scale-revised for assessing distress in women with hypoactive sexual desire disorder. *J Sex Med* 2008;5:357–64.
- 21 Derogatis LR, Rosen R, Leiblum S, Burnett A, Heiman J. The Female Sexual Distress Scale (FSDS): Initial validation of a standardized scale for assessment of sexually related personal distress in women. *J Sex Marital Ther* 2002;28:317–30.
- 22 Derogatis LR, Melisaratos N. The DSFI: A multidimensional measure of sexual functioning. *J Sex Marital Ther* 1979;5:244–81.
- 23 Bagby RM, Parker JDA, Taylor GJ. The twenty-item Toronto Alexithymia scale—I. Item selection and cross-validation of the factor structure. *J Psychosom Res* 1994;38:23–32.
- 24 Beck AT, Steer RA, Brown GK. *Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation; 1996.
- 25 Storch EA, Roberti JW, Roth DA. Factor structure, concurrent validity, and internal consistency of the Beck Depression Inventory—Second edition in a sample of college students. *Depress Anxiety* 2004;19:187–9.
- 26 Paulhus DL. *Manual for balanced inventory of desirable responding (BIDR-6)*. Toronto, Ontario: Multi-Health Systems; 1988.
- 27 Brotto LA, Yule M. Reply to Hinderliter, letter to the editor. *Arch Sex Behav* 2009;38:622–3.
- 28 Bogaert AF. The demography of asexuality. In: Baumle AK, ed. *International handbook on the demography of sexuality*. Netherlands: Springer; 2013:275–88.
- 29 Poston DLJ, Baumle AK. Patterns of asexuality in the United States. *Demogr Res* 2010;23:509–30.
- 30 Gerstenberger EP, Rosen RC, Brewer JV, Meston CM, Brotto LA, Wiegel M, Sand M. Sexual desire and the Female Sexual Function Index (FSFI): A sexual desire cutpoint for clinical interpretation of the FSFI in women with and without Hypoactive Sexual Desire Disorder (HSDD). *J Sex Med* 2010;7:3096–103.
- 31 Brotto LA, Yule MA. Physiological and subjective sexual arousal in self-identified asexual women. *Arch Sex Behav* 2011;40:699–712.
- 32 Yule MA, Brotto LA, Gorzalka BB. Sexual fantasy and masturbation among asexual individuals. *Can J Hum Sex* 2014;23:89–95.
- 33 Mitchell KR, Mercer CH, Ploubidis GB, Jones KG, Datta J, Field N, Copas AJ, Tanton C, Erens B, Sonnenberg P, Clifton S, Macdowall W, Phelps A, Johnson AM, Wellings K. Sexual function in Britain: Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). *Lancet* 2013;382:1817–29.
- 34 O'Sullivan LF, Allgeier ER. Feigning sexual desire: Consenting to unwanted sexual activity in heterosexual dating relationships. *J Sex Res* 1998;35:234–43.
- 35 Meston CM, Buss DM. Why humans have sex. *Arch Sex Behav* 2007;36:477–507.
- 36 Dennerstein L, Leher P, Guthrie J, Burger H. Modeling women's health during the menopausal transition: A longitudinal analysis. *Menopause* 2007;14:53–62.
- 37 Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: Prevalence and correlates. *Obstet Gynecol* 2008;112:970–8.
- 38 Clayton AH, Goldfischer ER, Goldstein I, DeRogatis L, Lewis-D'Agostino DJ, Pyke R. Validation of the decreased sexual desire screener (DSDS): A brief diagnostic instrument for generalized acquired female hypoactive sexual desire disorder (HSDD). *J Sex Med* 2009;6:730–8.
- 39 American Psychiatric Association. *Sexual dysfunctions. Diagnostic and statistical manual of mental disorders. 5th edition (DSM-5)*. Washington, DC: American Psychiatric Association; 2013:423–50.