

Mental health and interpersonal functioning in self-identified asexual men and women

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Human asexuality is defined as a lack of sexual attraction to anyone or anything, and preliminary evidence suggests that it may best be defined as a sexual orientation. As asexual individuals may face the same social stigma experienced by gay, lesbian and bisexual persons, it follows that asexual individuals may experience higher rates of psychiatric disturbance that have been observed among these non-heterosexual individuals. This study explored mental health correlates and interpersonal functioning and compared asexual, non-heterosexual and heterosexual individuals on these aspects of mental health. Analyses were limited to Caucasian participants only. There were significant differences among groups on several measures, including depression, anxiety, psychoticism, suicidality and interpersonal problems, and this study provided evidence that asexuality may be associated with higher prevalence of mental health and interpersonal problems. Clinical implications are indicated, in that asexual individuals should be adequately assessed for mental health difficulties and provided with appropriate interventions that are sensitive to their asexual identity.

Keywords: asexuality; mental health; suicidality; interpersonal functioning

Introduction

Human asexuality is defined as an absence of sexual attraction to anyone or anything. According to the first empirical study of asexuality, approximately 1% of the population is thought to be asexual (Bogaert, 2004), and this estimate has been confirmed by a more recent study investigating the association between sexual attraction and mental health in a large sample of high school students (Lucassen et al., 2011). Other definitions of asexuality include a lack of sexual behaviour (Rothblum & Brehony, 1993), a lack of sexual orientation (Storms, 1980) and a lack of sexual desire or excitement (Prause & Graham, 2007). Asexuality has appeared sporadically throughout the scientific literature since Kinsey's *Sexual Behavior in the Human Male* was released in 1948 (Kinsey & Pomeroy, 1948). However, the topic began to receive serious empirical attention only in 2004 when Bogaert published his analysis of individuals lacking sexual attraction within a large British probability sample (Bogaert, 2004). Initial reports focused on conceptualising and defining the construct (Bogaert, 2004, 2006; Brotto, Knudson, Inskip, Rhodes, & Erskine, 2010; Prause & Graham, 2007), whereas more recent research has begun to explore the physiological and prenatal etiological aspects (Brotto & Yule, 2011; Yule, Brotto, & Gorzalka, in press).

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The largest online web community of asexual individuals, the Asexuality Visibility and Education Network (AVEN, www.asexuality.org), describes asexuality as a sexual orientation or sexual identity akin to heterosexuality, bisexuality and homosexuality (Jay, 2008). This recent trend to examine biological aspects aligns with the position of many online asexual communities, which posits that the discovery of an underlying biological explanation might lead to a lessening of the current stigma surrounding asexuality (Brotto et al., 2010). Non-heterosexual (gay, lesbian or bisexual) orientation has previously been linked to mental health variables (Busseri, Willoughby, Chalmers, & Bogaert, 2008; D'Augelli, Hershberger, & Pilkington, 2001; Sandfort, de Graaf, Bijl, & Schnabel, 2001), including increased prevalence of mood disorders and anxiety, as well as increased substance abuse/dependence (Fergusson, Horwood, & Beauvais, 1999; Sandfort et al., 2001) and suicidality (D'Augelli et al., 2001; Fergusson et al., 1999; Remafedi, 1994, 1999; Remafedi, French, Story, Resnick, & Blum, 1998) among non-heterosexual groups. These problems are thought not to be a direct response to the individual's sexual orientation per se, but to various external stressors, perhaps including difficulties encountered during the coming-out period or attempts to negotiate a non-heterosexual sexual identity in a heterosexual society.

Because asexual individuals may face similar social stigma to that experienced by homosexual and bisexual persons, in that they may also experience discrimination and/or marginalisation, it follows that asexual individuals might also experience higher rates of psychiatric disturbance. Asexuals may, in fact, experience additional stigma because of the experience of a lack of sexual attraction in a culture that is arguably dominated by sexuality. Today's mainstream view on sex is that it is positive, healthy and desirable, and individuals who are not interested in sexuality may be viewed as having a disorder or something 'wrong' with them. Asexuality is also often understood by laypeople as being the result of negative childhood experiences, although there is no evidence for this claim (Brotto et al., 2010). Large-scale studies on mental health issues in gay men and lesbian women (e.g. Busseri et al., 2008; Sandfort et al., 2001) have found evidence that these sexual minorities do have higher rates of mental health problems (e.g. depression, substance abuse) than heterosexual individuals. The causes of such elevated rates in gays and lesbians are unclear and debated, but if asexual people feel similar pressure to other sexual minorities to conform to heterosexual norms, then it is possible that they too may have elevated rates of mental health problems.

In an early study investigating the relationship between sexual orientation and mental health, Nurius (1983) assessed homosexual, bisexual, heterosexual and asexual (who were defined as those who preferred not to be involved in any sexual activities) college students in the United States and found asexual participants to demonstrate the highest level of symptoms on measures of depression, self-esteem and sexual satisfaction, followed by homosexual participants, bisexual participants and lastly, heterosexual participants. The author questioned to what extent the observed distress was due directly to sexual orientation as opposed to being an indirect consequence of sexual preference. Nurius suggested the possibility that individuals of non-heterosexual orientations, including asexual individuals, are 'paying the price' for breaking social norms (Nurius, 1983). Thus, the experience of the asexual individual, who lacks sexual attraction but exists in a society seemingly focused on sexuality, might lead to distress and perhaps mental health difficulties.

In a recent mixed-methods study of asexual men and women (Brotto et al., 2010), there was no evidence to suggest elevated rates of depression or alexithymia (a collection of personality traits that indicates difficulty identifying and describing feeling of others) among asexual individuals. However, there was modest evidence for other psychological

difficulties (in that the asexual individuals had elevated scores on a brief measure of personality indicating social withdrawal), indicating problems with anger control and suicidal thinking. Asexual individuals had scores that fell just below clinical cut-off point for moderate personality characteristics of alienation, hostile control, negative affect, health problems and psychotic features. Additionally, asexual individuals demonstrated elevated scores on a measure of interpersonal problems, including subscales indicating cold/distant and socially inhibited interpersonal styles (Brotto et al., 2010). On the basis of these elevated traits, the authors speculated that asexual individuals may be more likely to show traits consistent with the DSM-IV Cluster A personality disorders and suggested that Schizoid Personality Disorder, which is characterised by emotional coldness, a lack of desire for close relationships and a limited capacity to express warmth towards others (American Psychiatric Association [APA], 2000), might be more prominent in this population. The latter was explored and confirmed through a series of in-depth qualitative interviews (Brotto et al., 2010).

Previous research investigating asexuality and correlates of mental health is scant, and more direct comparisons, for example, to other sexual minorities, are warranted. This study explored mental health correlates and interpersonal functioning and compared asexual, non-heterosexual (bisexual and homosexual) and heterosexual individuals on these aspects of mental health. We hypothesised that asexual individuals would differ from other sexual orientation groups on these measures. Because of conflicting findings in the two previous research studies investigating mental health in asexual individuals (Brotto et al., 2010; Nurius, 1983), we did not predict a specific directionality of findings. Based on the conclusions of previous researchers (Bogaert, 2006; Brotto et al., 2010), we allowed participants to self-identify as asexual, as there is not yet a clear definition of, or tool, to measure asexuality.

Method

Participants

The original sample consisted of 1293 individuals between the ages of 19 and 72, including 317 men and 976 women. A significant majority of the participants identified themselves as Caucasian/White (88% of asexual, 48% of heterosexual, and 71% of non-heterosexual; $\chi^2(2) = 161.24, p < 0.001; \varphi_c = 0.35, p < 0.001$), and a large proportion (32%) of heterosexual participants identified themselves as East Asian, a significantly greater proportion than the 3% of asexual and 12% of non-heterosexual participants who self-identified as East Asian ($\chi^2(2) = 128.87, p < 0.001; \varphi_c = 0.32, p < 0.001$). This discrepancy reflects the large proportion of East Asian participants in the main city of recruitment, a phenomenon that is not reflected in the online asexual community. As observed in previous research, there were significant differences among ethnic groups on measures of mental health (e.g. Vega & Rumbaut, 1991). As the majority of participants were Caucasian, we based the present analysis only on Caucasian participants to avoid differences in ethnic groups obscuring any potential differences in mental health among sexual orientation groups.

Data for 806 Caucasian participants between the ages of 19 and 72 were included in this analysis, including 203 men and 603 women. Participants were asked to select which of the four sexual orientation options best described them: heterosexual, homosexual, bisexual or asexual, resulting in 54 asexual, 110 heterosexual and 39 non-heterosexual (22 gay and 17 bisexual) men and 228 asexual, 223 heterosexual and 152 non-heterosexual (73 lesbian

and 79 bisexual) women. This non-representative sample was recruited through several separate and concurrent avenues, including postings on local websites (e.g. Craigslist), on the AVEN online web community general discussion board and through a large university's human subject pool.

The average age of male participants was 27.0 years for asexual men ($SD = 10.9$), 27.2 years for heterosexual men ($SD = 9.9$) and 31.3 years for non-heterosexual men ($SD = 10.8$), and there was no significant group difference in age ($F(2, 200) = 2.591$, $p > 0.05$). The average age of female participants was 24.6 years for asexual women ($SD = 6.9$), 24.8 years for heterosexual women ($SD = 8.4$) and 31.1 years for non-heterosexual women ($SD = 9.6$), and there was a significant group difference in age ($F(2, 600) = 34.72$, $p < 0.001$). Post hoc Tukey's tests revealed non-heterosexual women to be significantly older than both asexual and heterosexual women. Because of this significant age difference, we controlled for age in all subsequent analyses.

There were no significant group differences in highest level of education achieved, $\chi^2(2) = 2.47$, $p > 0.05$; $\varphi_c = 0.06$, $p > 0.05$, with the majority of participants (89% asexual, 92% heterosexual and 88% non-heterosexual) having received at least some post-secondary education. Fifteen percent of asexual, 57% of heterosexual and 59% of non-heterosexual individuals indicated that they were in a relationship, either committed or non-committed, and these proportions differed significantly, $\chi^2(2) = 135.18$, $p < 0.001$; $\varphi_c = 0.41$, $p < 0.001$, with asexual participants being least likely to be in a relationship.

Procedure

All procedures were approved by the university's research ethics board. Data were collected between September and December 2010 via a web-based survey hosted by SurveyMonkey (Gordon, 2002). We administered measures of physical and mental health, sexual functioning and sexual behaviours, and the entire questionnaire battery took approximately 60 minutes to complete. The majority of asexual individuals were recruited from AVEN, while heterosexual and non-heterosexual participants were recruited via the authors' university's human subject pool, Craigslist, and other targeted websites.

Measures

Demographic information

Participants were asked two questions directly inquiring into their mental health: 'do you have a mood disorder such as depression, bipolar disorder, mania or dysthymia?' and 'do you have an anxiety disorder such as a phobia, obsessive-compulsive disorder, or a panic disorder?' Response options for these two items were 'yes', 'no' or 'I don't know'.

Brief Symptom Inventory

The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) is a 53-item self-report symptom inventory designed to assess psychological symptom status. Created as a shorter version of the Symptom Checklist-90-Revised (Derogatis, 1977), the BSI has nine primary symptom dimensions and three global indices of distress: the Global Severity Index, the Positive Symptom Distress Index and the Positive Symptom Total. Symptom dimensions include somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation

and psychoticism. Responses are collected on a five-point scale ranging from 0 'not at all' to 4 'extremely'. Internal consistency was found to be $\alpha = 0.80$ for the somatic dimension, $\alpha = 0.83$ for the obsessive-compulsive dimension, $\alpha = 0.74$ for interpersonal sensitivity, $\alpha = 0.85$ for depression, $\alpha = 0.81$ for anxiety, $\alpha = 0.78$ for hostility, $\alpha = 0.77$ for phobic anxiety, $\alpha = 0.77$ for paranoid ideation and $\alpha = 0.77$ for psychoticism (Derogatis & Melisaratos, 1983). Test-retest reliability over two weeks was found to be $r(60) = 0.68$ (somatisation dimension) to 0.91 (phobic anxiety dimension) (Derogatis & Melisaratos, 1983). The BSI has convergent validity with the Minnesota Multiphasic Personality Inventory, and factor analytic studies have shown the BSI to have good construct validity. Of the three global indices of distress, the Global Severity Index is thought to be the single best indicator of current distress levels, as it combines information on the number of symptoms and the intensity of perceived distress (Derogatis & Melisaratos, 1983). This index of distress will be used in this study. Two individual items in the BSI are related to suicidal ideation and have been used in previous research investigating suicidality (D'Augelli et al., 2001): Question 9 of the BSI asks if, in the past two weeks, the respondent has had 'thoughts of ending your life', and Question 39 inquires about 'thoughts of death or dying'.

Inventory of Interpersonal Problems

The Short Circumplex form of the Inventory of Interpersonal Problems (IIP-SC; Soldz, Budman, Demby, & Merry, 1995) is a 32-item scale designed to measure interpersonal distress. It is a shorter version of the 64-item IIP Circumplex Form (Alden, Wiggins, & Pincus, 1990), which itself was derived from the original 127-item IIP (Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988). The IIP-SC contains eight subscales: domineering, vindictive, cold, socially avoidant, non-assertive, exploitable, overly nurturant and intrusive, each containing four items. Each item is measured using a five-point Likert scale ranging from 0 'not at all' to 4 'extremely'. The raw scale scores are obtained by summing the items for each scale, and the total score is calculated by summing the eight scales (Horowitz, Alden, & Wiggins, 2000). A higher total score indicates greater interpersonal problems experienced by respondents and has been found to measure general psychopathology. The IIP has been used in studies of interpersonal difficulties in nonclinical populations and has the ability to distinguish among people who demonstrate characteristics such as differing attachment styles and ability to describe other people (Bartholomew & Horowitz, 1991), as well as between an asymptomatic community sample, a student sample and a clinical sample (Hansen & Lambert, 1996). The IIP has been demonstrated to have acceptable reliability, validity and sensitivity to changes that occur during psychotherapy (Horowitz et al., 1988), and the IIP-SC has excellent internal reliability ($\alpha = 0.88$) and strong test-retest correlations ($\alpha = 0.83$) (Soldz et al., 1995). Individual subscales similarly had adequate internal reliability: domineering, $\alpha = 0.72$; vindictive, $\alpha = 0.69$; cold, $\alpha = 0.77$; socially avoidant, $\alpha = 0.80$; non-assertive, $\alpha = 0.82$; exploitable, $\alpha = 0.70$; overly nurturant, $\alpha = 0.78$; and intrusive, $\alpha = 0.83$.

Statistical analyses

Baseline group comparisons for continuous variables used analysis of variance (ANOVA) followed by Tukey's multiple comparison tests in cases of an overall significant effect. Given the significant group differences in age, we included age as a covariate (ANCOVA) for all analyses. Multivariate ANOVA was used for multiple comparisons of continuous

variables, using age as a covariate (MANCOVA). Bonferroni post hoc tests were used with all MANCOVAs to calculate conservative p -values to control for the inflated error rate that accompanies multiple comparisons. Effect sizes for all independent ANCOVAs and MANCOVAs were calculated with the partial eta-squared (η^2). For categorical variables, baseline group comparisons used chi-squared analyses. Effect sizes for all chi-squared analyses were calculated using Cramer's V (φ_c). For this study, the correlation was considered mild when φ_c was between 0.1 and 0.3, moderate when φ_c was between 0.301 and 0.5 and high when φ_c was between 0.501 and 1.0 (Cohen, 1988). Data met key assumptions for all statistical analyses.

Results

Asexual individuals were more likely to respond positively to the two items assessing presence of mood or anxiety disorders. Twenty-four percent of asexual men, compared to 10% of non-heterosexual men and 15% of heterosexual men ($\chi^2(4) = 16.08, p < 0.01$; $\varphi_c = 0.31, p < 0.01$), noted that they did have a mood disorder. Follow-up tests indicated that asexual men were significantly more likely to report having a mood disorder than heterosexual men. There was no significant difference between asexual and non-heterosexual men. Thirty percent of asexual women, 34% of non-heterosexual women and 16% of heterosexual women reported a current mood disorder ($\chi^2(4) = 23.36, p < 0.001$; $\varphi_c = 0.22, p < 0.001$). Again, follow-up tests indicated that asexual women were more likely to report having a mood disorder than heterosexual participants. Non-heterosexual participants were significantly more likely to report a mood disorder than heterosexual participants.

Similarly, asexual men and women were significantly more likely to note that they had an anxiety disorder. Twenty-three percent of asexual men, 20% of non-heterosexual men and 8% of heterosexual men responded positively to the enquiry about anxiety disorders ($\chi^2(4) = 14.03, p < 0.01$; $\varphi_c = 0.29, p < 0.01$). Twenty-three percent of asexual women, 20% of non-heterosexual women and 15% of heterosexual women reported a current anxiety disorder ($\chi^2(4) = 20.33, p < 0.001$; $\varphi_c = 0.20, p < 0.001$). Follow-up tests revealed both asexual men and women to be significantly more likely to report a current anxiety disorder than heterosexual men and women.

Brief Symptom Inventory

There were significant differences between men and women on mean scores of several BSI subscales: somatisation ($F(1, 662) = 11.61, p = 0.001, \text{partial } \eta^2 = 0.017$), interpersonal sensitivity ($F(1, 662) = 6.65, p = 0.01, \text{partial } \eta^2 = 0.010$), anxiety ($F(1, 662) = 7.06, p < 0.01, \text{partial } \eta^2 = 0.011$), and phobic anxiety ($F(1, 662) = 7.27, p < 0.01, \text{partial } \eta^2 = 0.011$) and the Global Severity Index ($F(1, 662) = 4.15, p < 0.05, \text{partial } \eta^2 = 0.006$). Although these differences were small according to our effect size calculations, they were statistically significant, and thus, we performed subsequent analyses on men and women separately.

Statistically significant differences were noted between asexual and non-heterosexual men on the somatisation subscale, between asexual and heterosexual men on the depression subscale and between asexual and both non-heterosexual and heterosexual participants on the psychoticism subscale. Asexual men had higher scores on the interpersonal sensitivity subscale than heterosexual men, with a difference approaching statistical significance. Non-heterosexual men had significantly higher scores on the interpersonal sensitivity subscale than heterosexual men. Asexual women were noted to have significantly lower

scores than non-heterosexual women on the hostility subscale and to have significantly higher scores than heterosexual woman on the phobic anxiety and psychoticism subscales. Non-heterosexual women similarly had significantly higher scores on the phobic anxiety and psychoticism subscales than heterosexual women (Table 1).

Suicidality items

There was no significant difference between men's and women's responses to the two suicidality items (BSI Item 9, $t(663) = 0.538, p > 0.05$, Cohen's $d = 0.04$; BSI Item 39, $t(660) = 0.048, p > 0.05$, Cohen's $d = 0$); thus, these items were analysed in a single group. Responses to the two questions concerning suicidal thinking are shown in Table 2. Results from BSI Item 9 revealed that 26% of asexual individuals had some suicidal feelings in the past two weeks, compared to 24% of non-heterosexual individuals and 12% of heterosexual individuals. BSI Item 39 revealed that 36% of asexual participants had had some thoughts of death or dying in the previous two weeks, compared to 33% of non-heterosexual participants and 23% of heterosexual participants.

When mean scores of these two items were compared, asexual participants had significantly higher scores on Item 9 than heterosexual individuals. Asexual participants similarly had significantly higher scores on Item 39 than heterosexual participants. There were no significant differences in scores between asexual and non-heterosexual participants nor between non-heterosexual and heterosexual participants on either item.

Inventory of Interpersonal Problems

There were significant differences between men and women on several IIP-SC subscales: non-assertive ($F(1, 648) = 18.66, p < 0.001$, partial $\eta^2 = 0.028$), exploitable ($F(1, 648) = 13.24, p < 0.001$, partial $\eta^2 = 0.020$) and overly nurturant subscales ($F(1, 648) = 6.90, p < 0.01$, partial $\eta^2 = 0.011$). Women scored significantly higher than men on the non-assertive, exploitable and overly nurturant subscales.

Sexual orientation groups (asexual, heterosexual and non-heterosexual) for men and women were then compared separately. Asexual men were noted to score significantly higher than both heterosexual and non-heterosexual men on the cold subscale and to score significantly higher than heterosexual men only on the socially avoidant and non-assertive subscales and on the IIP-SC total score.

Asexual women had significantly higher scores than heterosexual participants on the vindictive subscale, and non-heterosexual women also scored significantly higher than heterosexual participants on this subscale. Asexual women were found to score significantly higher on the cold, socially avoidant and non-assertive subscales than both their heterosexual and non-heterosexual counterparts, and non-heterosexual women scored significantly higher than heterosexual women on the cold and socially avoidant subscales. Asexual women had significantly higher scores than heterosexual women on the exploitable subscale and on the IIP-SC total score. Non-heterosexual women had significantly higher total scores than heterosexual women (Table 3).

Discussion

Summary of findings

Participants completed online questionnaires assessing mental health correlates and interpersonal problems. There were significant differences between asexual, non-heterosexual and heterosexual men and women on multiple psychological symptoms, including anxiety,

Table 1. Mean scores on the Brief Symptom Inventory by sexual orientation for men and women.

Variable	Men			Women				
	Asexual (<i>n</i> = 44)	Non- heterosexual (<i>n</i> = 30)	Heterosexual (<i>n</i> = 93)	Partial eta-squared (η^2)	Asexual (<i>n</i> = 195)	Non- heterosexual (<i>n</i> = 108)	Heterosexual (<i>n</i> = 195)	Partial eta-squared (η^2)
BSI Subscale:	Mean (SD)							
Somatisation	0.36 (0.62) ^b	0.10 (0.19)	0.25 (0.40)	0.039	0.40 (0.56)	0.48 (0.64)	0.40 (0.54)	0.005
Obsession/ Compulsion	0.82 (0.76)	0.55 (0.66)	0.84 (0.75)	0.021	0.93 (0.83)	0.88 (0.69)	0.90 (0.76)	0.000
Interpersonal sensitivity	0.84 (0.98) ^d	0.95 (0.95) ^c	0.67 (0.72)	0.056	0.89 (1.00)	0.95 (0.96)	0.83 (0.85)	0.005
Depression	1.06 (0.92) ^a	0.80 (0.77)	0.67 (0.72)	0.043	0.91 (0.94)	0.94 (0.90) ^e	0.73 (0.82)	0.014
Anxiety	0.51 (0.69)	0.36 (0.47)	0.39 (0.52)	0.011	0.60 (0.76)	0.61 (0.63)	0.65 (0.64)	0.004
Hostility	0.56 (0.64)	0.42 (0.51)	0.50 (0.58)	0.007	0.49 (0.61) ^b	0.62 (0.68)	0.53 (0.60)	0.012
Phobic anxiety	0.31 (0.54)	0.11 (0.20)	0.16 (0.35)	0.033	0.40 (0.66) ^a	0.37 (0.60) ^c	0.23 (0.46)	0.020
Paranoid ideation	0.69 (0.81)	0.39 (0.62)	0.47 (0.56)	0.030	0.51 (0.71)	0.57 (0.78)	0.47 (0.70)	0.003
Psychoticism	0.65 (0.64) ^{a,b}	0.32 (0.44)	0.39 (0.48)	0.055	0.54 (0.60) ^f	0.52 (0.61) ^c	0.37 (0.55)	0.022
Global Severity Index	0.66 (0.58)	0.44 (0.38)	0.47 (0.44)	0.033	0.64 (0.59)	0.67 (0.58)	0.57 (0.54)	0.009

Notes: ^aIndicates a significant difference between asexual and heterosexual participants, $p < 0.05$.

^bIndicates a significant difference between asexual and non-heterosexual participants, $p < 0.05$.

^cIndicates a significant difference between non-heterosexual and heterosexual participants, $p < 0.05$.

^dIndicates a difference approaching significance between asexual and heterosexual participants, $p = 0.06$.

^eIndicates a difference approaching significance between non-heterosexual and heterosexual participants, $p = 0.06$.

^fIndicates a significant difference between asexual and heterosexual participants, $p < 0.01$.

Table 2. Suicidal ideation among sexual orientation groups.

		Asexual	Non-heterosexual	Heterosexual
BSI Item 9 'Thoughts of ending your own life'	Not at all	74%	76%	88%
	Slightly	15%	16%	8%
	Moderately	6%	3%	2%
	Quite a bit	3%	4%	1%
	Extremely	2%	1%	0%
	Mean (SD)	0.43 (0.88) ^a	0.38 (0.80)	0.19 (0.57)
BSI Item 39 'Thoughts of death and dying'	Not at all	64%	67%	77%
	Slightly	18%	20%	15%
	Moderately	9%	7%	4%
	Quite a bit	5%	4%	3%
	Extremely	4%	1%	1%
	Mean (SD)	0.67 (1.09) ^a	0.51 (0.93)	0.37 (0.80)

Note: ^aIndicates a significant difference between asexual and heterosexual participants, $p < 0.001$.

hostility, phobic anxiety and psychoticism. More specifically, asexual men scored higher on measures of somatisation, depression and psychoticism than their non-heterosexual counterparts. Asexual women scored higher on measures of phobic anxiety and psychoticism than heterosexual women and had scores similar to non-heterosexual women on these variables. Notably, asexual men and women scored significantly higher on items assessing suicidality than heterosexual individuals. Further, asexual women scored higher on several interpersonal problem domains, including vindictive, cold, socially avoidant, non-assertive and exploitable personality styles than heterosexual women. Asexual men had scores indicating greater cold, socially avoidant and non-assertive personality styles compared to heterosexual men and had higher scores indicating cold personality styles than non-heterosexual men.

Mental health

The effect of external factors on mental health among gay men and lesbian women has been clearly established by a number of studies demonstrating that experience with stigma, prejudice and discrimination are linked with mental health status (Bradford & Ryan, 1994; Brooks, 1981; Frable, Wortman, & Joseph, 1997; Herek, Gillis, & Cogan, 1997, 1999; Meyer, 1995; Meyer & Dean, 1998; Otif & Skinner, 1996; Ross, 1990; Rotheram-Borus, Hunter, & Rosario, 1994; Safen & Heimberg, 1999; Sandfort et al., 2001). Scherrer (2008) has likened an asexual identity to that of other marginalised sexual groups and paralleled asexual and queer sexualities, as both have had histories of medicalisation and pathologisation through inclusion in the DSM. Scherrer also noted that, like other sexual minority groups, asexual individuals have been subject to discrimination, a feature often associated with mental and physical health (Conrad & Schneider, 1994). Thus, our finding of increased mental health problems among asexual individuals might be explained by the experience of discrimination because of having a non-heterosexual orientation or may perhaps even be a consequence of lacking sexual attraction within a social environment that is arguably centred on sexuality.

Asexuality has only been the focus of empirical study within the last eight years, and the asexual community itself has only existed for the past decade or so, fuelled by the growth of Internet exposure, and expanding from its original primary venue (AVEN)

Table 3. Mean scores on the Inventory of Interpersonal Problems by sexual orientation for men and women.

Variable	Men				Women			
	Asexual (<i>n</i> = 43)	Non- heterosexual (<i>n</i> = 28)	Heterosexual (<i>n</i> = 91)	Partial eta-squared (η^2)	Asexual (<i>n</i> = 190)	Non- heterosexual (<i>n</i> = 105)	Heterosexual (<i>n</i> = 194)	Partial eta-squared (η^2)
IIP-SC subscale;	Mean (SD)							
Domineering	2.40 (2.59)	2.04 (2.20)	2.04 (2.33)	0.004	2.38 (2.56)	2.29 (2.35)	2.11 (2.42)	0.003
Vindictive	2.74 (3.79)	1.79 (2.35)	2.04 (2.75)	0.013	2.13 (2.67) ^a	2.06 (2.62) ^c	1.45 (2.11)	0.020
Cold	7.14 (4.30) ^{f,g}	2.39 (3.13)	3.14 (4.04)	0.183	5.83 (4.62) ^{f,g}	3.55 (4.19) ^c	2.54 (3.64)	0.112
Socially avoidant	7.37 (5.18) ^f	5.04 (4.26)	3.65 (4.30)	0.110	7.57 (5.33) ^{e,f}	5.45 (4.73) ^h	3.43 (4.23)	0.129
Non-assertive	5.81 (5.49) ^a	3.75 (3.96)	3.62 (3.84)	0.047	5.67 (5.04) ^{b,f}	5.61 (4.72)	5.08 (4.83)	0.054
Exploitable	4.49 (4.34)	3.36 (3.46)	3.67 (3.70)	0.012	5.81 (4.25) ^a	5.13 (3.85)	4.68 (4.20)	0.015
Overly nurturant	4.63 (4.06)	4.04 (4.24)	3.70 (3.88)	0.009	5.34 (4.69)	4.89 (3.88)	4.82 (4.06)	0.003
Intrusive	3.12 (3.95)	3.07 (4.35)	2.58 (2.93)	0.005	2.49 (3.41)	3.48 (3.76)	2.95 (3.34)	0.011
Total score	37.70 (24.38) ^{d,e}	25.46 (4.35)	24.45 (19.54)	0.071	39.22 (20.97) ^f	32.45 (19.60) ^e	27.07 (20.29)	0.067

Notes: ^aIndicates a significant difference between asexual and heterosexual participants, $p < 0.05$.

^bIndicates a significant difference between asexual and non-heterosexual participants, $p < 0.05$.

^cIndicates a significant difference between non-heterosexual and heterosexual participants, $p < 0.05$.

^dIndicates a difference approaching significance between asexual and non-heterosexual participants, $p = 0.06$.

^eIndicates a significant difference between asexual and heterosexual participants, $p < 0.01$.

^fIndicates a significant difference between asexual and heterosexual participants, $p < 0.001$.

^gIndicates a significant difference between asexual and non-heterosexual participants, $p < 0.001$.

^hIndicates a significant difference between non-heterosexual and heterosexual participants, $p < 0.001$.

to include a multitude of blogspots (e.g. www.asexualexplorations.net; asexualunderground.blogspot.ca), YouTube videos (e.g. Hot Pieces of Ace YouTube channel) and dating websites (e.g. www.asexualitic.com) discussing individuals' experiences of asexuality. The preceding invisibility of asexuality was not due to a scarcity of asexual individuals, but more likely to the lack of a cohesive group or platform (i.e. the Internet) in which an asexual community could flourish and publicly self-identify as such. Brotto and Yule (2009) noted that asexual communities such as AVEN have been described as an important place in the identification process of asexual individuals. These online communities are represented as places where asexual individuals' experiences are validated, where they can discuss their lack of sexual attraction and where they can find a sense of community. Brotto and Yule went on to suggest that those individuals who lack sexual attraction but have never heard the term 'asexuality' are more isolated, distressed or confused than those individuals who belong to an asexual community. Interaction with such a community, and the recognition of an asexual identity, may perhaps allow an asexual individual a sense of belonging. As the asexual community itself is relatively young, it is likely true that many of its members did not come into contact with the community until well into their adult life. It follows that throughout the majority of their formative years, because of their lack of sexual attraction, these individuals may have felt isolated from those around them, which might have increased symptoms of depression and other mental health correlates. We note, however, the relatively young age of the sample being investigated.

It could be that asexual individuals may experience some difficulty in negotiating a lack of sexual attraction within a society that puts great emphasis on sex and sexuality. Although the available research suggests that asexual individuals do not experience distress in direct relation to their lack of sexual attraction, it may be that they do experience some difficulty in response to negotiating their asexuality in a sexual world. In fact, Prause and Graham (2007) found that despite several advantages identified by asexual individuals (i.e. avoiding problems that arise in intimate relationships, decreased health and pregnancy risk, less social pressure to find a suitable partner and having a greater amount of free time), there were several drawbacks, including difficulties establishing intimate relationships, being unsure what 'problem' is causing asexuality and negative public perception of asexuality. One of the most pervasive assumptions of our society is that all people experience sexual desire (Cole, 1993; Przybylo, 2011). Prause and Graham (2007) noted that asexual individuals may experience pressure to conform to this social norm and may face challenges that are unrecognised by non-asexual individuals. It follows that distress arising from conflict with social expectations, from concerns that a potential physical abnormality may be causing a lack of sexual attraction or from unique challenges faced by asexual individuals could lead to psychological symptoms such as depression or anxiety. Furthermore, in recent qualitative research, asexual individuals expressed a sense of always having 'felt different' than others, beginning around the time where their peers began to develop sexual interest (Brotto et al., 2010). A sense of belonging can be crucial in mental health development, and disruption or unrest during formative years has been indicated in several mental health problems, such as social anxiety (Hudson & Rapee, 2000) and depression (Ross & Mirowsky, 1999). Bisexual individuals have been found to have indications of poorer mental health than homosexual and heterosexual individuals (Jorm, Koren, Rodgers, Jacomb, & Christensen, 2002), and it has been speculated that, in addition to social pressure arising from having a non-majority sexual orientation, having neither a clear homosexual nor a clear heterosexual orientation may pose an additional stressor on the bisexual individual (Jorm et al., 2002). The same may be argued for the asexual individual.

Relationship status has been linked to mental health problems (Berry & Worthington, 2001; Holt-Lunstad, Birmingham, & Jones, 2008), and it has been suggested that it may be a mediating factor between non-heterosexual sexual identity and higher prevalence rates of some disorders (Sandfort et al., 2001). Gay and lesbian individuals are less likely to be in a relationship compared to their heterosexual counterpart (perhaps owing to unavailability of a suitable partner or to social stigma and barriers to such a relationship), and Sandfort et al. (2001) suggested that this may lead to increased loneliness, which may in turn be linked to increased mental health problems. It follows that the same might be true for asexual individuals, who have consistently been shown to be less likely to be in a relationship compared to sexual individuals (Bogaert, 2004; Brotto & Yule, 2011; Brotto et al., 2010; Yule et al., in press), despite expressing interest in romantic relationships through online forum discussions and the existence of asexual dating sites. However, there has yet to be any academic research on the importance of relationships to asexual individuals.

Suicidality

Our finding of potentially increased suicidality among asexual individuals is novel and interesting. Lesbian, gay and bisexual youth have consistently been found to have high suicide attempt rates (D'Augelli & Hershberger, 1993; Grossman & Kerner, 1998; Hammelman, 1993; Jorm et al., 2002; Remafedi et al., 1998). Factors associated with suicide attempts among adolescents, such as psychiatric problems, intense personal stressors and losses and negative life events (Brent, Bridge, Johnson, & Connolly, 1998; Lewinsohn, Rodhe, & Seeley, 1994; Reinherz et al., 1995), have also been found to predict number of suicide attempts among non-heterosexual youth (D'Augelli et al., 2001). It may be that many of these factors are also intensified among asexual individuals, although this association has yet to be investigated. Evidence indicates that gay male youth who have attempted suicide frequently has not yet established a stable sexual identity (Schneider, Farberow, & Kruks, 1989). Because of the general lack of knowledge regarding asexuality as a sexual identity, an individual who lacks sexual attraction may have additional difficulty in finding a stable sexual identity, especially before coming into contact with the asexual community. This potential difficulty in establishing a sexual identity may in part explain the observed increase in endorsement of items indicating suicidality in this sample.

It is important to note that previous research on suicidality in non-heterosexual individuals reveals that this increased suicidality is not universal, but is linked with several risk factors, including self-identification as non-heterosexual at a younger age, substance abuse, family dysfunction, interpersonal conflict surrounding sexual orientation and non-disclosure of sexual orientation (Remafedi, 1994). Thus, increased suicide risk seems to be in response to negotiating sexual identity within the larger social picture. It is also noteworthy that much of the research conducted on suicidality and sexual orientation has been done with adolescents, using samples of high school students. This study investigated a wide range of ages and utilised only a cursory measure of suicidality composed of two items embedded within a larger measure. However, this finding should be taken seriously and explored in more depth, particularly in light of previous research examining suicide attempts among gay and lesbian youth (Koureny, 1987).

Interpersonal problems

In addition to the observation that a large proportion of asexual individuals had never engaged in sexual intercourse (Bogaert, 2004; Brotto et al., 2010) or been in a relationship

(Brotto et al., 2010), researchers found that asexual individuals exhibited elevated social inhibition and cold/distant scores on a measure of personality problems. This led the authors to speculate that asexual individuals may have had avoidant attachment styles (according to Bowlby's (1969) attachment theory) as young children, which in turn might have led to problems developing intimate relationships later in life (Brotto et al., 2010). Specifically, Brotto et al. (2010) wondered whether Schizoid Personality Disorder, which is characterised by disconnection from social relationships and a restricted range of emotions, might be related to asexuality. The qualitative portion of Brotto and colleague's study confirmed that nearly half of the participants felt that they met criteria for Schizoid Personality Disorder and that a number of members of AVEN were introverted and thus had characteristics of Cluster A Personality Disorders. Although the current finding that asexual individuals tended to have a socially avoidant and cold interpersonal style compared to non-heterosexual and heterosexual individuals supports Brotto et al.'s (2010) finding, it does not allow us to speculate whether Schizoid Personality Disorder underlies asexuality. This relationship between the current indications of socially avoidant and cold personality styles and asexuality requires more detailed exploration in future studies.

Combined, this evidence implies that asexuality may be the product of social functioning, rather than the root of it. Although this speculation cannot be ruled out, there is mounting evidence (including biological markers such as handedness and number of older siblings (Yule et al., in press)) supporting the assertion that a lifelong lack of sexual attraction would be more accurately considered a sexual orientation and a stable and intrinsic part of an asexual individual's self. It could alternatively be argued that the experience of growing up feeling different from one's peers and experiencing stigma associated with one's lack of sexual attraction may lead to difficulties developing social and/or intimate relationships.

Limitations

Previous researchers have noted that asexual participants have, in the past, felt compelled to curtail their responses to queries about psychiatric symptoms, in an attempt to downplay any potential relationship between asexuality and psychopathology (Brotto et al., 2010). If this was true in the current sample, our significant findings may be under-representative of the severity of mental health issues among asexual participants. Further, this study used an Internet sample recruited from established asexual communities. This may limit our findings to asexual individuals who are members of such a community, as we did not assess individuals who lack sexual attraction, but have not yet come across the term 'asexuality' or the asexual community (see Hinderliter (2009) and Brotto and Yule (2009) for a discussion on the limitations of recruiting samples from online asexual communities).

Conclusions

This study provided evidence that asexuality may be associated with higher prevalence of mental health and interpersonal problems. These findings support previous research that indicates elevated levels of these mental health correlates among individuals with non-heterosexual identities. Importantly, this research suggests that tendency toward suicidality may be elevated in asexual individuals, warranting further research into this important topic. Clinical implications are considerable, and asexual individuals should be adequately assessed for mental health difficulties and provided with appropriate interventions that are sensitive to their asexual identity.

Notes on contributors

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Lori Brotto received her PhD in Clinical Psychology from the University of British Columbia in Vancouver, Canada and completed a Fellowship in Reproductive and Sexual Medicine at the University of Washington, mentored by Dr. Julia Heiman, Director of the Kinsey Institute. She is currently the Division Head of the new Division of Gynaecologic Specialties as well as an Associate Professor in the UBC Department of Obstetrics and Gynaecology, Division of Gynaecologic Oncology. She is the director of the UBC Sexual Health Laboratory where research primarily focuses on developing and testing psychological/psychoeducational interventions for women with sexual desire and arousal difficulties and women with chronic genital pain. Other major lines of research include exploring sexuality and reproductive health in ethnic minority women, studying the intracrinology of androgen metabolites in women's desire, asexuality and sexuality after cancer. Dr. Brotto is the recipient of a Scholar Career Award from the Michael Smith Foundation for Health Research as well as a New Investigator Award from the Canadian Institutes of Health Research. She is also one of four members of the Sexual Dysfunctions sub-workgroup for the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders.

Dr. Boris Gorzalka received his Bachelor of Science with Honours in Psychology from McGill University in 1970 and his Doctorate in Psychobiology from the University of California at Irvine in 1974. After teaching at the University of Western Ontario for one year, he joined the University of British Columbia in the Department of Psychology in 1975. He is now a Full Professor. In 1976, Dr. Gorzalka was elected to membership in the International Academy of Sex Research. His research initially focused on animal models of human sexuality and hormonal and neurochemical control of sexual behaviour. Over the years, it has expanded to include psychoneuroendocrinological and clinical interests in the areas of sexual dysfunctions, sexual psychophysiology, ethnic differences in sexual behaviour and attitudes, cognitive factors in sexual arousal, menopause and health psychology. Dr. Gorzalka's primary affiliations are in the areas of Behavioural Neuroscience and Clinical Psychology.

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