ARTICLE

Disordered eating and sexual insecurities in young women

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There has long been a proposed clinical link between sexuality and eating disorders; however, little empirical evidence exists regarding this relationship. The limited body of research on sexuality in eating disorders supports the occurrence of considerable sexual concerns. The aim of the present study was to expand on the dearth of empirical literature exploring altered sexuality in relation to disordered eating. This research examines disordered eating in relation to sexual insecurities. Undergraduate female UBC students ($n = 789$) completed a series of online questionnaires assessing sexual insecurities and eating habits. Several domains of sexual insecurities were associated with disordered eating symptom severity. Mean differences in sexual self-efficacy, as well as body- and performance-based cognitive distractions during sexual activity emerged among women categorized as being at elevated, typical, or low eating disorder risk, with those at greater risk reporting greater sexual difficulties. Sexuality is rarely considered in the context of eating disorder treatment unless a history of sexual abuse is present. The results of this study suggest that sexual insecurities should be addressed during eating disorder care.

KEY WORDS: Sexual insecurities, disordered eating, sexual self-efficacy, cognitive distractions during sexual activity

INTRODUCTION

Clinicians have noted a significant link between sexual difficulties and eating disorders for a long time; however, little empirical evidence exists concerning the extent to which women with eating disorders experience sexual and intimacy issues. Though impaired sexuality is common in women with eating disorders, few studies have examined the possible relationships between anorexia nervosa (AN), bulimia nervosa (BN), and the manifestation of sexual difficulties. The limited body of research on sexuality in individuals with AN and BN demonstrates considerable sexual concerns (Beaumont, Abraham, & Simson, 1981; Hsu, Crisp, & Harding, 1979; Morgan, Lacey, & Reid, 1999; Raboch & Faltus, 1991), including difficulties with lubrication, orgasm, desire, and sexual arousal (Castellini et al., 2012). Empirical research on the associations between sexual insecurities and disordered eating is especially sparse. This is surprising, as poor body esteem represents a central feature of eating disorders and has also been linked to a variety of poor sexual outcomes (Seal, Bradford, & Meston, 2009; Seal & Meston, 2007). In line with the lack of empirical work on this subject, sexual concerns are seldom addressed during treatment of eating disorders, unless a history of sexual abuse is present. As numerous studies examining sexuality have found sexual health to be an integral aspect of quality of life in clinical populations (Pujols, Meston, & Seal, 2010), research connecting the occurrence of sexual insecurities in women with eating disorders is needed. The aim of the current research was to examine disordered eating symptoms in relation to the presence of sexual insecurities in a sample of undergraduate women.

Several subtypes of eating disorders have been defined in the literature, with the two primary types of disordered eating being AN and BN. Though these disorders are also observed in men, AN and BN predominantly occur in women, most often during adolescence or early adulthood. In the discussion of literature to follow, AN is characterized as a refusal to maintain a minimally normal body weight, an intense fear of gaining weight, and a significant disturbance in the perception of the shape and size of one's body (DSM-5; American Psychiatric Association, 2013). BN is characterized by the presence of binge eating, accompanied by the experience of loss of control over food intake, wherein an objectively large amount of food is consumed in a discrete period of time, followed by compensatory behaviours (e.g., vomiting, laxative abuse, excessive exercise, or fasting). It should be noted that these two conditions commonly occur together along a spectrum of eating disorders, such that a combination of AN- and BN-like symptoms manifest to varying extents. For example, AN can be further distinguished by two subtypes, namely: AN restrictive type, in which there is extreme dietary restraint and often excessive exercise, and AN binge-purge type, which is marked by binge-eating and compensatory behaviours in addition to caloric restriction (World Health Organization, 2002).

The extant literature suggests that women with AN experience decreased sexual desire, reduced sexual activity and satisfaction, anorgasmia, and heightened sexual anxiety (Pinheiro

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et al., 2010). These findings are thought to reflect both the physiologic consequences of extreme caloric restriction as well as the negative psychological sequelae characteristic of women with eating disorders. The diminished levels of reproductive hormones common to women with AN are thought to contribute to sexual dysfunction (Copeland & Herzog, 1987). Difficulties with sexual desire in women with AN result from endocrine changes and emaciation (Rothschild, Fagan, Woodall, & Andersen, 1991). Endocrine changes associated with amenorrhea in AN may contribute to reduced vaginal lubrication and subsequent pain with vaginal penetration. Research has found menstrual abnormalities to be negatively associated with orgasm frequency, post-intercourse mood, and sexual partner harmony (Raboch & Faltus, 1991).

In support of physiologic sources of sexual difficulties in women with AN, research has found weight restoration to improve sexual drive (Morgan et al., 1999), and sexual satisfaction to be inversely related to caloric restriction (Wiederman, Pryor, & Morgan, 1996). In women with AN, greater weight loss tends to result in corresponding decreases in sexual enjoyment (Beaumont et al., 1981). Despite a reported loss of sexual interest and enjoyment following weight loss in women with AN, corresponding decreases in sexual activity were not found (Beaumont et al., 1981). Low lifetime minimum body mass index (BMI) has also been associated with the loss of libido and increased sexual anxiety (Pinheiro et al., 2010). Indeed, one study found that the majority of women who endorsed abnormal psychosexual outcomes, such as aversion to sexual contact, also reported maintaining a low body weight, further illustrating the link between low BMI and sexual health (Hsu et al., 1979).

Fewer studies have examined the occurrence of sexual difficulties in women with BN, where hormonal dysregulation associated with emaciation is less prevalent. Some studies investigating sexual attitudes in women with bulimic symptoms have found such individuals to be fairly similar to a healthy control group (Rathner & Rumpold, 1994), while other studies have found women with bulimic symptoms to report lower levels of sexual esteem and sexual satisfaction, as well as increased perceptions of performance pressure during sexual activity (Allerdissen, Florin, & Rost, 1981; Raciti & Hendrick, 1992). The existing literature points to differences in sexuality among women with AN, which is typically marked by reductions in sexual activity, versus women with BN, which is not. These patterns of sexual activity may result from AN being associated with more constricted/overcontrolled personality styles, and BN being more characterized by emotionally dysregulated/undercontrolled personalities (Eddy, Novotny, & Westen, 2004). Research has found women with AN to be less sexually active than women with BN and those in healthy control groups, while women with BN report being more sexually active than women with AN or those in control groups (Wiederman et al., 1996). There is emerging evidence to suggest that women with AN are also less likely to have ever had sexual intercourse than women with BN, and are less likely to report being previously or currently involved in a romantic relationship (Beaumont et al., 1981; Morgan, Wiederman, & Pryor, 1995 Wiederman et al., 1996). Women with BN also tend to report an earlier age of sexual debut, more sexual partners, and higher levels of sexual fantasy and desire than women with AN (Morgan et al., 1995; Rothschild et al., 1991; Wiederman et al., 1996).

Both women with AN and women with BN are more likely to report their sexual experiences as being significantly more negative compared to women in control groups (Mangweth-Matzek, Rupp, Hausmann, Kemmler, & Biebl, 2007), and although comparisons between women with AN and BN have revealed different sexual complaints, both groups tend to experience significant difficulties in sexual function. A study using the Derogatis Sexual Functioning Inventory (DSFI), a widely used comprehensive measure of sexual function, found women with AN and women with BN to be in the lowest quartile of sexual functioning and sexual satisfaction compared to women in control groups (Rothschild et al., 1991).

Although extreme caloric restriction may reduce sexual interest and desire, malnutrition in isolation does not account for the negative attitudes toward sexuality observed in many women with an eating disorder, which often persist following weight-restoration (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950). Apart from lack of nourishment, a myriad of appearance-related cognitive distortions common to those with eating pathology, such as body dissatisfaction, poor sexual body esteem and shame, also compromise healthy sexual function and sexual satisfaction (Eddy et al., 2004). These cognitive distortions appear to be more complex than a result of the physical toll associated with extreme caloric restriction, in that body-oriented sexual difficulties before eating disorder onset have been acknowledged by many women with AN and BN (Raboch & Faltus, 1991).

The impact of these maladaptive cognitions on sexuality have also been observed in community samples of women, wherein body image and body dissatisfaction have been linked to lower sexual satisfaction and sexual dysfunction (Pujols et al., 2010). Further, several aspects of body satisfaction, such as sexual attractiveness, thoughts about the body during sex, and weight concerns, have been found to predict sexual satisfaction in women without eating disorders (Ackard, Kearney-Cooke, & Peterson, 2000; Pujols et al., 2010). Body image represents an integral contributor to sexual health and sexual well-being. Research has linked poor body image to sexual dissatisfaction and sexual dysfunction (Pujols et al., 2010; Weaver & Byers, 2006). Women with poor body esteem are more likely to be sexually inexperienced, avoid sexual activity, and perceive themselves as low in sexual skill (Faith & Schare, 1993; Holmes, Chamberlin, & Young, 1994; Trapnell, Meston, & Gorzalka, 1997). Conversely, women with positive body esteem have been found to experience higher levels of sexual esteem, sexual satisfaction, and perceived sexual desirability, as well as lower levels of sex-related anxiety and sexual dysfunction (Pujols et al., 2010; Seal et al., 2009; Wiederman & Hurst, 1998).

Body dissatisfaction has been found to predict the development of disordered eating (Wertheim, Koerner, & Paxton, 2001), and research has found poor self-esteem to mediate the relation between body dissatisfaction and disordered eating behaviour (Brechan & Kvalem, 2015). Body dissatisfaction has also been found to predict self-esteem in longitudinal research (Johnson & Wardle, 2005). Indeed, negative self-esteem, or a lack of confidence in ones self, is thought to represent one of the most proximal psychological factors contributing to disordered eating (Vitousek & Hollon, 1990); however, the associations between sexual self-confidence and disordered eating have yet to receive empirical attention. The current study expands on the extant literature by examining various facets of sexual self-efficacy, an index of confidence in various aspects of female sexuality. Given that one's physical appearance and feelings about sexual performance represent common areas of sexual concerns, body-and performance-based cognitive distractions during sexual activity were also studied in relation to disordered eating behaviours.

The associations between sexual insecurities in relation to disordered eating represent the focus of this research. Despite the body of literature on sexuality in eating disorders, empirical evidence supporting the important connections between sexual insecurities and disordered eating remains scarce. Existing literature on disordered eating and sexuality is limited by a narrow focus on women with AN and inpatient populations, which may not generalize to community samples of women with less severe manifestations of disordered eating patterns (Eddy et al., 2004). The primary goal of this research was to explore the occurrence of sexual insecurities in relation to disordered eating. Disordered eating variables were hypothesized to predict more body- and performance-based sexual concerns during sexual activity and low sexual self-efficacy. It was further anticipated that women scoring within the clinical range for elevated eating disorder risk would endorse more sexual insecurities than those in the typical eating disorder risk group, and again versus those in the low risk group.

METHODS

Participants

A total of 854 female undergraduates were requested to complete an online survey of disordered eating and sexuality. Eligibility requirements included age (over 19 years) and proficiency in the comprehension of written English. Sixty-five participants were omitted from this study because of incomplete data. The mean age of women who participated was 20.28 years ($SD = 2.104$).

Procedure

Participants were recruited by advertisements posted on the human subject pool system at a major North American university. The advertisements directed interested participants to a website (http://fluidsurveys.com) to complete a web-based questionnaire. After arriving at the website, participants were presented with an online consent form which provided further information on the study topic and procedures. Upon indicating consent to participate, participants were presented with a series of online questionnaires. Students received one course credit in exchange for participation. The university behavioural research ethics board approved all procedures. An online survey host was chosen in place of hard copy questionnaire distribution. Web-based media have previously been shown to have a disinhibiting effect, reducing social desirability responding of its users, and create a sense of anonymity, which translates into greater honesty in responses and higher rates of self-disclosure (Gackenbach, 2011).

Measures

Participants filled out a series of questionnaires assessing disordered eating and sexual insecurities.

Sexual Insecurity Measures

Sexual Self-Efficacy Scale for Female Function (SSES-F). The SSES-F is a 37-item measure of perceived competence in the behavioural, cognitive, and affective dimensions of female sexual response (Fisher, Davis, Yarber, & Davis, 2010). A total score, as well as eight subscales, are produced, including: interpersonal orgasm, desire, sensuality, individual arousal, affection, communication, body acceptance, and refusal. For each item, the woman indicates whether or not she is able to perform the activity; if yes, she rates her confidence on a 10 (quite uncertain) to 100 (quite certain) scale. Scores for inability to perform an activity are 0. Scores are averaged over all items to yield a total score between 0 and 100, with higher scores indicating greater levels of sexual self-efficacy. The SSES-F total score has shown excellent internal consistency, and adequate internal consistency for the separate subscales, as well as high convergent validity with respect to several other comparable measures (Bailes, Creti, Fichten, Libman, Brender, & Amsel, 1998). The Cronbach's alpha for SSES-F among women in the current sample was excellent at 0.968.

The Cognitive Distractions During Sexual Activity Scale (CDDSA). This self-report questionnaire includes 20 items measuring the experience of cognitive interference during sexual interactions (Dove & Wiederman, 2000). The scale provides two 10-item subscales: appearance-based concerns and performance-based concerns. On a 6-point Likert scale ranging from 1 "Always" to 6 "Never," participants indicate the frequency with which they experience agreement with each statement. Possible total scores range from 10 to 60, with lower scores indicating that participants experience more frequent distracting body- and performance-related thoughts during sex. The CDDSA has been tested in several investigations, and displays excellent internal consistency within each subscale (Dove & Wiederman, 2000; Meana & Nunnink, 2006). The Cronbach's alpha for the CDDSA on the current sample was excellent at 0.980.

Disordered Eating Measures

Eating Disorders Inventory-3 (EDI-3). The EDI-3 is a 91-item self-report questionnaire designed to measure attitudes, personality features, and eating disorder symptom severity associated with Anorexia Nervosa and Bulimia Nervosa (Garner, 2004). Respondents are asked to rate each item on a four-point scale. The EDI-3 yields 12 non-overlapping subscales: three of which assess eating disorder risk (drive for thinness, bulimia, and body dissatisfaction), which combined create an eating disorder risk composite score, and nine of which assess various psychological variables that have been associated with eating disorder symptomatology, including maturity fears, low self-esteem, personal alienation, interpersonal insecurity, interpersonal alienation, interoceptive deficits, emotional dysregulation, perfectionism, and asceticism. These psychological subscales can be divided into four composite scores, including ineffectiveness, interpersonal problems, affective problems, and over control, which all together produce a global psychological maladjustment score. Lower scores indicate lower eating pathology. The EDI-3 has shown excellent internal consistency and test-retest reliability, as well as acceptable convergent validity and discriminant validity (Cumella, 2006). The Cronbach's alpha for women in the current sample was excellent at 0.918.

Revised Rigid Restraint Scale (RRRS). The 12-item RRRS assesses individuals' tendency to avoid and feel guilty about eating foods they perceive as forbidden or unhealthy (Adams & Leary, 2007). The scale assesses two components of restrained eating: restrictive eating (desire and effort to avoid eating unhealthy, "forbidden" foods) and eating guilt (tendency to feel guilty when eating foods perceived as forbidden). Participants respond on 5-point scales ranging from 1 (never) to 5 (always). Total scores range from 12 to 60, with higher scores indicative of more disordered eating tendencies. The RRRS has shown adequate reliability (Ruderman, 1983). The Cronbach's alpha for the RRRS in the current sample was excellent at 0.919.

Body Shape Questionnaire (BSQ). The BSQ is a 34-item self-report instrument developed to measure concern about body image in the development, maintenance, and treatment of anorexia nervosa and bulimia nervosa (Cooper, Taylor, Cooper, & Fairbum, 1987). Respondents are asked to rate the frequency in which they experienced various body shape preoccupations over the previous four weeks. Response categories range from 1 (Never) to 6 (Always), with higher scores indicating a higher frequency of body shape concerns. The BSQ has been shown to be a valid and reliable measure of body image, with excellent test-retest reliability and concurrent validity (Rosen, Jones, Ramirez, & Waxman, 1996). The Cronbach's alpha for the BSQ among women in the current sample was excellent at 0.978.

Data Analysis

We examined the relationships between disordered eating and sexuality using zero-order correlations and a series of linear multiple regression analyses, with eating disorder variables entered as the independent variables and sexuality variables individually entered as the dependent variables. The entire sample was then categorized into three groups corresponding to the EDI-3 Eating Disorder Risk clinical ranges for elevated (T score > 57; $n = 177$), typical (T score $= 46$–56; $n = 270$), and low (T score < 45; $n = 407$) levels of disordered eating pathology. Scores in the elevated range indicate the presence of a clinical eating disorder with serious disordered eating symptoms. Scores in the typical risk range reflect significant eating concerns that characterize most patients with clinical eating disorders. Scores in the low clinical range suggest the absence of significant eating and weight concerns, and are most representative of individuals in nonclinical populations. A one-way Analysis of Variance (ANOVA) was used to examine mean differences in sexuality variables between the three eating disorder risk groups. A Bonferroni alpha adjustment was not employed, as doing so substantially decreases statistical power and results in evaluating effects on the basis of the number of effects examined rather than on the size of the effect or theoretical expectations (e.g., Feise, 2002; O'Keefe, 2003; Tutzauer, 2003). Consistent with recent guidelines in psychological research (Hojat & Xu, 2004) we based interpretation on the patterns of effect sizes and report effect sizes for all analysis in addition to providing p-values.

RESULTS

Sample Characteristics

Of the 854 women initially recruited for this study, 789 completed it; thus, 65 women were excluded from the analysis due to incomplete data. The mean age of the women was 20.63 years ($SD = 2.93$; range = 18–51). With respect to ethnicity, 37.2% reported being East Asian, 37.2% Euro-Caucasian, and 24.6% belonging to other ethno-cultural groups. A total of 66.5% identified as heterosexual, 18.3% heteroflexible, 10.2% bisexual, and 5.3% lesbian. With respect to relationship status, 52% of women were in a monogamous relationship, 1.1% were in an open relationship, 10.4% were in a mostly sexual relationship, and 36.1% were not in a relationship. Of those currently in a relationship, the average length was one year and three months. For sexual experience, 67.1% had engaged in mutual masturbation at least once in their life, 76.4% had engaged in oral sex, 72.1% had engaged in vaginal sex, and 25.4% had engaged in anal sex. The means and standard deviations of sexuality-related measures and disordered eating measures are presented in Table 1. Generally, the sample can be characterized as being relatively low in eating disorder risk.

Disordered Eating Variables Predicting Sexual Insecurity Variables

The overall models for CDDSA-Performance ($F(5, 315) = 17.21$, $p < .001$, $R^2 = .22$) and CDDSA-Body ($F(5, 315) = 31.94$, $p < .001$, $R^2 = .34$) were statistically significant, such

Table 1. Means and Standard Deviations of study variables

Variables	*M*	*SD*
EDI-3 Eating Disorder Risk	142.06	32.77
Drive for Thinness	10.82	7.79
Bulimia	6.74	6.73
Body Dissatisfaction	15.94	9.36
RRRS		
Eating Guilt	19.44	4.42
Rigid Restraint	15.30	4.81
BSQ Total	96.62	40.17
CDDSA		
Body	41.64	14.47
Performance	40.54	14.29
SSESF Total	50.37	33.00
Interpersonal Orgasm	43.46	34.52
Interpersonal Interest	56.80	36.08
Sensuality	59.96	39.84
Individual Arousal	49.34	37.41
Affection	59.96	36.87
Communication	46.62	36.20
Body Acceptance	47.53	36.05

that eating pathology explained a significant proportion of the variance in body- and performance-based sexual concerns. Bulimia ($p < .001$, $\beta = .24$) and Body Dissatisfaction ($p < .001$, $\beta = .26$) significantly predicted CDDSA-Body, while Bulimia ($p < .001$, $\beta = .31$) was the only significant predictor of CDDSA-Performance.

The overall model for Sexual Self-Efficacy (SSESF Total) was statistically significant ($F(5, 302) = 9.90$, $p < .001$), such that disordered eating accounted for a significant proportion of the variance ($R^2 = .14$). Bulimia ($p < .01$, $\beta = .22$) and Body Dissatisfaction ($p < .001$, $\beta = .25$) predicted SSESF Total, wherein greater eating pathology was associated with lower overall sexual self-efficacy. The models for all SSESF subscales were significant: Refusal ($F(5, 292) = 7.09$, $p < .001$, $R^2 = .11$), Body Acceptance ($F(5, 296) = 35.99$, $p < .001$, $R^2 = .38$), Communication ($F(5, 295) = 8.60$, $p < .001$, $R^2 = .13$), Affection ($F(5, 293) = 5.18$, $p < .001$, $R^2 = .08$), Individual Arousal ($F(5, 294) = 3.40$ $p < .01$, $R^2 = .06$), Sensuality ($F(5, 293) = 5.94$, $p < .001$, $R^2 = .09$), Interpersonal Interest ($F(5, 297) = 8.86$, $p < .001$, $R^2 = .13$), Interpersonal Orgasm ($F(5, 301) = 9.10$, $p < .001$, $R^2 = .13$). Bulimia significantly negatively predicted all SSESF subscales with the exception of Individual Arousal, with endorsements of bulimia being associated with lower sexual self-efficacy (Interpersonal Orgasm: $p < .001$, $\beta = .24$; Interpersonal Interest: $p < .05$, $\beta = .17$; Sensuality: $p < .01$, $\beta = .21$; Affection: $p < .01$, $\beta = .21$; Communication: $p < .01$, $\beta = .21$; Body Acceptance: $p < .001$, $\beta = .20$; Refusal: $p < .01$, $\beta = .23$). Body Dissatisfaction significantly negatively predicted all SSESF subscales except Refusal and Affection, such that greater body dissatisfaction was associated with lower sexual self-efficacy (Interpersonal Orgasm: $p < .01$, $\beta = .23$; Interpersonal Interest: $p < .001$, $\beta = .30$; Sensuality: $p < .05$, $\beta = .18$; Individual Arousal: $p < .01$, $\beta = .20$; Communication: $p < .01$, $\beta = .25$; Body Acceptance: $p < .001$, $\beta = .46$). Drive for Thinness failed to significantly predict any SSESF subscale, but predicted Refusal ($p = .074$, $\beta = .18$) with marginal significance. Restrictive Eating significantly predicted Interpersonal Orgasm and Individual Arousal, such that greater restriction was associated with lower orgasm ability and lower arousal ($p < .001$, $\beta = .24$), as well as marginally predicted Communication ($p = .058$, $\beta = .15$) and Body Acceptance ($p = .054$, $\beta = .13$). Eating Guilt also significantly predicted Interpersonal Orgasm ($p < .05$, $\beta = .20$), with more guilt associated with lower orgasm ability.

Mean Differences in Sexuality among Women with Low, Typical, and Elevated Eating Disorder Risk

A significant effect of eating disorder risk on sexual insecurities was found for SSESF Total ($F(2,798) = 15.30$, $p < .001$) and all SSESF subscales except Individual Arousal ($F(2,781) = 2.84$, $p = .06$), including: Interpersonal Orgasm ($F(2,796) = 12.06$, $p < .001$), Interpersonal Interest ($F(2,788) = 14.66$, $p < .001$), Sensuality ($F(2,779) = 7.00$, $p < .001$), Affection ($F(2,778) = 10.81$, $p < .001$), Communication ($F(2,781) = 12.00$, $p < .001$), Body Acceptance ($F(2,402) = 89.86$, $p < .001$), and Refusal ($F(2,778) = 11.70$, $p < .001$). The means and standard deviations for sexuality variables among women with elevated, typical, and low eating disorder risk are shown in Table 2, and Tukey HSD contrast coefficients for sexual insecurity variables are shown in Table 3. Planned contrasts showed that significant mean differences emerged between each of the three groups for SSESF Total, Interpersonal Interest, Communication, and Body Acceptance, with greater eating disorder risk indicative of lower sexual esteem across the aforementioned variables. Contrast statistics revealed significant mean differences among women in the elevated eating disorder risk group compared to those in both the typical and low risk groups for Refusal, and significant differences among women in the low eating disorder risk group compared to the elevated and typical risk groups for Interpersonal Orgasm. Significant mean differences in Sensuality and Affection emerged between women in the low risk group compared to the elevated risk group, and mean differences between the low and typical eating disorder risk groups for these variables approached significance.

One-way ANOVAs revealed that eating disorder risk significantly affected CDDSA Body ($F(2,822) = 81.39$, $p < .001$) and CDDSA Performance ($F(2,822) = 42.00$, $p < .001$), such that greater risk was associated with more sexual body- and performance-based cognitive distractions. Planned contrasts are provided in Table 3, and showed that significant group differences emerged across all three groups with respect to both CDDSA Body and CDDSA Performance, wherein lower scores were indicative of more cognitive distractions during sexual activity. Specifically, women in the elevated eating disorder risk group reported more body-and performance-based

Table 2. Means and standard deviations of sexuality variables among women with elevated, typical, and low eating disorder risk

	Elevated ($n = 177$)		Typical ($n = 270$)		Low ($n = 407$)	
Sexuality Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*
CDDSA						
Body*	55.85	15.10	41.52	13.16	30.82	12.55
Performance*	48.9	15.55	40.39	13.50	32.33	13.04
SSESF Total	40.21	30.62	46.32	32.52	55.85	32.53
Interpersonal Orgasm*	34.75	32.69	40.3	34.15	48.9	34.75
Interpersonal Interest*	44.11	34.47	51.93	35.27	61.47	35.46
Sensuality*	51.47	39.35	54.61	40.45	64.03	38.84
Individual Arousal	44.66	36.84	45.18	36.26	51.31	37.97
Affection*	49.33	35.98	57.35	37.36	65.55	36.19
Communication*	35.73	33.06	42.06	35.31	51.19	36.82
Body Acceptance*	21.67	27.93	43.71	33.12	62.02	33.44
Refusal*	36.82	35.12	48.44	38.05	54.74	37.23

Note: $p = .06$^, $p < .001$*

Table 3. Tukey HSD contrast coefficients for sexual insecurity variables among elevated, typical, and low eating disorder risk groups

Sexuality Variables	EDI Risk (I)	EDI Risk (J)	Mean Difference (I-J)	Cohen's *d*
CDDSA Body	1	2	−11.528***	−1.01
		3	−15.634***	−1.80
	2	3	−4.106***	−0.83
CDDSA Performance	1	2	−8.737***	−0.58
		3	−11.668***	−1.16
	2	3	−2.932**	−0.61
SSESF Total	1	2	−8.110*	−0.19
		3	−16.290***	−0.50
	2	3	−8.18**	−0.30
Interpersonal Orgasm	1	2	−7.332^	−0.17
		3	−15.277***	−0.42
	2	3	−7.945**	−0.25
Interpersonal Interest	1	2	−9.873**	−0.22
		3	−17.777***	−0.50
	2	3	−7.904**	−0.27
Sensuality	1	2	−6.305	−0.08
		3	−13.556***	−0.32
	2	3	−7.251^	−0.24
Individual Arousal	1	2	−1.808	−0.01
		3	−7.401^	−0.17
	2	3	−5.593	−0.17
Affection	1	2	−9.534*	−0.21
		3	−16.021***	−0.43
	2	3	−6.487^	−0.22
Communication	1	2	−8.700*	−0.19
		3	−16.245***	−0.44
	2	3	−7.548*	−0.26
Body Acceptance	1	2	−24.425***	−0.69
		3	−40.595***	−1.31
	2	3	−16.169***	−0.55
Refusal	1	2	−13.119***	−0.32
		3	−16.859***	−0.50
	2	3	−3.740	−0.17

Note: 1 = elevated risk, 2 = typical risk, 3 = low risk
$p < .09$^, $p < .05$*, $p < .01$**, $p < .001$***

cognitive distractions during sexual activity than those at typical risk, who reported more cognitive interference than women in the low group.

DISCUSSION

There is a dearth of empirical evidence examining the extent to which women with eating disorders experience difficulties with sexuality, and sexual problems are rarely addressed during treatment unless a history of sexual abuse is present. Even more sparse is the literature examining disordered eating and sexuality in women who exhibit eating disorder symptoms, but do not meet criteria for the diagnosis of an eating disorder. Among women without an eating disorder diagnosis, a better understanding of the relationship between sexuality and eating-related symptoms is still relevant, given the significant pressure, in Western societies, to be thin. The impetus for this study arose from the inattention to sexual concerns in women with eating disorders, and the position that sexuality represents an understudied area in the eating disorder literature. Thus, the primary aim of the current research was to examine the occurrence of sexual insecurities in relation to disordered eating. Although this study did not assess whether participants met diagnostic criteria for an eating disorder, we believe that these findings highlight the co-occurrence of sexual insecurities and disordered eating in a community sample of young women, a population under-represented in existing literature. The current research highlights considerable sexual concerns, such as those related to sexual body esteem, sexual self-efficacy, and cognitive interference during sex, in women with disordered eating.

Associations Between Disordered Eating and Sexuality

It was predicted that eating disorder variables would be associated with a greater occurrence of cognitive distractions during sexual activity, and low sexual self-efficacy. Consistent with this hypothesis, aspects of disordered eating were associated with more cognitive distractions during sexual activity and lower sexual self-efficacy.

Measures of disordered eating significantly predicted body- and performance-based cognitive distractions during sexual activity, as well as global sexual self-efficacy and all efficacy subscales. Body-related cognitive distractions were most impacted by bulimia and, unsurprisingly, body dissatisfaction, while performance concerns were significantly impacted by bulimia alone. Women scoring highly on bulimia in this context endorsed thoughts and behaviours that are consistent with binge eating, such as eating a large amount of food in secrecy and as a way to cope with negative emotions, as well as compensatory behaviours. In this vein, the experience of performance- and body-oriented cognitive interference during sexual activity might be more pronounced in women with binge-and-purge tendencies. Of course more research is needed to further understand these associations, as diagnoses for eating disorders cannot be made on the measures used. Body dissatisfaction can be described as discontentment with overall shape and with the size of regions of the body of extraordinary concern to those with eating disorders (e.g., stomach, thighs, hips, buttocks). The more dissatisfied women were with their bodies, the greater the occurrence of body-related distractions during sexual activity. Intuitively, individuals dissatisfied with the appearance of their bodies were more likely to fixate on or be negatively distracted by body-oriented concerns while sexually engaged. The mechanism connecting bulimic symptoms with body-and performance-based cognitive distractions during sexual activity is unclear. Presumably, women endorsing thoughts and behaviours related to binging and purging are likely to have shape and weight concerns, which have been linked to decreased enjoyment of sexual activity (Pujols et al., 2010).

Bulimia and Body Dissatisfaction also significantly predicted variation in overall sexual self-efficacy, indicating that women with binge-and-purge tendencies and women with poor body esteem may be more likely to have low self-efficacy with respect to their sexuality. Disordered eating variables significantly predicted each sexual self-efficacy subscale, with greater eating pathology predicting lower sexual self-efficacy for Refusal, Body Acceptance, Communication, Individual Arousal, Affection, Sensuality, Interpersonal Interest, and Interpersonal Orgasm. Again, Bulimia significantly predicted all self-efficacy subscales except for Individual Arousal, such that women endorsing bulimic symptoms were also more likely to endorse low sexual-self efficacy. Body Dissatisfaction also predicted all sexual self-efficacy subscales with the exception of Refusal and Affection. Restrictive Eating and Eating Guilt significantly predicted the Interpersonal Orgasm sexual self-efficacy subscale, but no other domain of sexual self-efficacy measured. Women that reported restrictive eating tendencies and eating guilt were thus more likely to also report lower dyadic orgasm ability. Drive for Thinness, which is characterized by a preoccupation with restrictive dieting and intense fears about weight gain, did not emerge as a significant predictor of sexual self-efficacy or cognitive distractions during sexual activity. Perhaps the lack of significant findings concerning Drive for Thinness was due to nature of the sample, in that women were characterized as being relatively healthy in terms of eating behaviours. Drive for Thinness may emerge as a significant predictor in a clinical sample with greater eating pathology.

It was also hypothesized that women with significant eating disorder risk would report more sexual insecurities than those falling below the clinical cutoff for elevated eating disorder risk. To reiterate, eating disorder risk was broken into the clinical ranges for elevated, typical, and low eating disorder risk. Consistent with our hypotheses, women with elevated levels of eating disorder risk reported more sexual insecurities compared to women with typical levels of eating disorder risk, who in turn reported more sexual insecurities than those at low risk.

Mean differences in sexual insecurities arose between elevated, typical, and low eating disorder risk with respect to all domains of sexual self-efficacy. In each analysis, greater eating disorder risk was associated with lower sexual self-efficacy. Women in the elevated eating disorder risk group reported lower overall sexual self-efficacy compared to those in the typical risk group, who in turn reported lower sexual self-efficacy than women in the low risk group. The same pattern emerged for sexual self-efficacy variables concerning interpersonal interest, communication, and body acceptance, suggesting that women with greater eating disorder risk reported less interest in partnered sexual activity, less confidence in sexual communication skills, and poorer body esteem. Findings revealed that women in the elevated eating disorder risk group also reported significantly lower sexual self-efficacy concerning refusal than those in the typical and low eating disorder risk groups, indicating that women with elevated eating disorder risk reported lower confidence in their ability to refuse unwanted sexual advances. Women in the low eating disorder risk group reported greater sexual self-efficacy with respect to interpersonal orgasm than those in the elevated and typical eating disorder risk groups, such that women at low risk for developing an eating disorder reported a superior ability to orgasm with a sexual partner than those at typical or elevated risk. Compared to women in the low risk group, women at elevated risk reported lower sexual self-efficacy for sensuality and affection, suggesting that women who reported extreme eating and weight concerns felt less secure in their ability to be affectionate and sensual than those who did not report significant problems with eating and weight concerns.

As hypothesized, mean differences in eating disorder risk also emerged for body- and performance-based cognitive distractions during sexual activity. Women at elevated eating disorder risk reported more body- and performance-based concerns than those in the typical risk group, who reported more cognitive interference than those in the low risk group. These findings suggest that women at higher eating disorder risk reported a greater occurrence of cognitive distractions related to one's body and sexual performance than women with fewer disordered eating symptoms.

In summary, women scoring in the elevated range for eating disorder risk, which communicates the presence of profound eating concerns and symptoms, reported lower sexual self-efficacy and a higher occurrence of body- and performance-based concerns during sexual activity than women who scored in the typical clinical range. Likewise, women scoring in the typical clinical range, which reflects significant eating concerns that characterize most patients with eating disorders, endorsed correspondingly poorer sexual outcomes than those in the low eating disorder risk group, which indicates a lack of significant eating and weight concerns and is most representative of women without an eating disorder diagnosis.

Taken together, these findings emphasize the importance of considering sexual insecurities in the context of eating difficulties. This research adds to the small but growing body of literature investigating sexual problems in relation to eating disorders. Within the limits of this study, findings provide further empirical support for sexual difficulties in the eating disorders, substantiating past research and decades of clinical writings connecting sexuality to disordered eating pathology. Sexual self-efficacy and cognitive distractions during sexual activity in varied greatly according to corresponding levels of disordered eating behaviour. Although this research demonstrates a clear link between disordered eating and sexuality, this association is likely complex. For example, it is likely that other variables, such as personality and mood, play a significant role in the relation between disordered eating and sexuality. Further research is needed to tease apart these associations and gain a more catholic understanding of the link between disordered eating and sexuality. Clinically, this study suggests that sexuality should be addressed in the context of eating disorder care.

Several study limitations must be addressed. We used correlational, cross-sectional research design, thus no causal inferences can be drawn. The generalizability of results is limited by the homogeneity of our sample, which predominantly consisted of young East Asian and Euro-Caucasian undergraduate students. Data was collected online through self-report, web-based questionnaires. Therefore, the results were dependent on the honesty of respondents. However, past research has indicated that online surveys provide a high level of anonymity, which facilitates truthful responding and guards against a variety of response biases (Booth-Kewley, Larson & Miyoshi, 2007). Advertisements for this study revealed the sexual nature of the questions participants would be asked to answer, meaning that more sexually liberal individuals would have been more likely to respond to this survey. This is an important limitation for the majority of human sexuality research (Morokoff, 1986; Saunders, Fisher, Hewitt, & Clayton, 1985). Finally, a limitation in this study was that sexual disorders and dysfunctions were not assessed, which require more thorough diagnostic procedures.

REFERENCES

Ackard, D.M., Kearney-Cooke, A., & Peterson, C.B. (2000). Effect of body image and self-image on women's sexual behaviors. *International Journal of Eating Disorders*, *28*(4), 422–429. http://dx.doi.org/10.1002/1098-108X(200012)28:4<422::AID-EAT10>3.0.CO;2-1 Medline:11054789

Adams, C.E., & Leary, M.R. (2007). Promoting self-compassionate attitudes toward eating among restrictive and guilty eaters. *Journal of Social and Clinical Psychology*, *26*(10), 1120–1144. http://dx.doi.org/10.1521/jscp.2007.26.10.1120

Allerdissen, R., Florin, I., & Rost, W. (1981). Psychological characteristics of women with bulimia nervosa (bulimarexia). *Behavioural Analysis and Modification*, *4*(4), 314–317.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. Washington, D.C.: American Psychiatric Pub.

Bailes, S., Creti, L., Fichten, C.S., Libman, E., Brender, W., & Amsel, R. (1998). Sexual self-efficacy scale for female functioning. In

C.M. Davis, W.L. Yarber, R. Bauserman, G. Shreer, & S.L. Davis (Eds.), *Handbook of sexuality-related measures* (pp. 531–534). London: Sage.

Beaumont, P.J., Abraham, S.F., & Simson, K.G. (1981). The psychosexual histories of adolescent girls and young women with anorexia nervosa. *Psychological Medicine*, *11*(1), 131–140. http://dx.doi.org/10.1017/S0033291700053344 Medline:7208736

Booth-Kewley, S., Larson, G.E., & Miyoshi, D.K. (2007). Social desirability effects on computerized and paper-and-pencil questionnaires. *Computers in Human Behavior*, *23*(1), 463–477. http://dx.doi.org/10.1016/j.chb.2004.10.020

Brechan, I., & Kvalem, I.L. (2015). Relationship between body dissatisfaction and disordered eating: Mediating role of self-esteem and depression. *Eating Behaviors*, *17*, 49–58. http://dx.doi.org/10.1016/j.eatbeh.2014.12.008 Medline:25574864

Castellini, G., Lelli, L., Lo Sauro, C., Fioravanti, G., Vignozzi, L., Maggi, M., …, & Ricca, V. (2012). Anorectic and bulimic patients suffer from relevant sexual dysfunctions. *Journal of Sexual Medicine*, *9*(10), 2590–2599. http://dx.doi.org/10.1111/j.1743-6109.2012.02888.x Medline:22925481

Cooper, P.J., Taylor, M.J., Cooper, Z., & Fairbum, C.G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders*, *6*(4), 485–494. http://dx.doi.org/10.1002/1098-108X(198707)6:4<485::AID-EAT2260060405>3.0.CO;2-O

Copeland, P. M., & Herzog, D. B. (1987). Menstrual abnormalities. *Psychobiology of bulimia*, 29–54.

Cumella, E.J. (2006). Review of the Eating Disorder Inventory–3. *Journal of Personality Assessment*, *87*(1), 116–117. http://dx.doi.org/10.1207/s15327752jpa8701_11

Dove, N.L., & Wiederman, M.W. (2000). Cognitive distraction and women's sexual functioning. *Journal of Sex & Marital Therapy*, *26*(1), 67–78. http://dx.doi.org/10.1080/009262300278650 Medline:10693117

Eddy, K.T., Novotny, C.M., & Westen, D. (2004). Sexuality, personality, and eating disorders. *Eating Disorders*, *12*(3), 191–208. http://dx.doi.org/10.1080/10640260490481410 Medline:16864318

Faith, M.S., & Schare, M.L. (1993). The role of body image in sexually avoidant behavior. *Archives of Sexual Behavior*, *22*(4), 345–356. http://dx.doi.org/10.1007/BF01542123 Medline:8368917

Feise, R.J. (2002). Do multiple outcome measures require p-value adjustment? *BMC Medical Research Methodology*, *2*(8), 8. Medline:12069695

Fisher, T.D., Davis, C.M., Yarber, W.L., & Davis, S.L. (2010). *Handbook of sexuality-related measures*. New York: Routledge.

Gackenbach, J. (Ed.). (2011). *Psychology and the Internet: Intrapersonal, interpersonal, and transpersonal implications*. San Diego: Academic Press.

Garner, D.M. (2004). *EDI 3: Eating disorder inventory-3: Professional manual*. Psychological Assessment Resources. http://www4.parinc.com/Products/Product.aspx?ProductID=EDI-3

Hojat, M., & Xu, G. (2004). A visitor's guide to effect sizes: Statistical significance versus practical (clinical) importance of research findings. *Advances in Health Sciences Education : Theory and Practice*, *9*(3), 241–249. http://dx.doi.org/10.1023/B:AHSE.0000038173.00909.f6 Medline:15316274

Holmes, T., Chamberlin, P., & Young, M. (1994). Relations of exercise to body image and sexual desirability among a sample of university students. *Psychological Reports*, *74*(3 Pt 1), 920–922. http://dx.doi.org/10.2466/pr0.1994.74.3.920 Medline:8058880

Hsu, L.K., Crisp, A.H., & Harding, B. (1979). Outcome of anorexia nervosa. *Lancet*, *1*(8107), 61–65. Medline:84126

Johnson, F., & Wardle, J. (2005). Dietary restraint, body dissatisfaction, and psychological distress: A prospective analysis. *Journal of Abnormal Psychology*, *114*(1), 119–125. http://dx.doi.org/10.1037/0021-843X.114.1.119 Medline:15709818

Keys, A., Brozek, J., Henschel, A., Mickelsen, O., & Taylor, H.L. (1950). *The biology of human starvation*. Minneapolis, MN: University of Minnesota Press.

Mangweth-Matzek, B., Rupp, C.I., Hausmann, A., Kemmler, G., & Biebl, W. (2007). Menarche, puberty, and first sexual activities in eating-disordered patients as compared with a psychiatric and a nonpsychiatric control group. *International Journal of Eating Disorders*, *40*(8), 705–710. http://dx.doi.org/10.1002/eat.20431 Medline:17610254

Meana, M., & Nunnink, S.E. (2006). Gender differences in the content of cognitive distraction during sex. *Journal of Sex Research*, *43*(1), 59–67. http://dx.doi.org/10.1080/00224490609552299 Medline:16817068

Morgan, C.D., Wiederman, M.W., & Pryor, T.L. (1995). Sexual functioning and attitudes of eating-disordered women: A follow-up study. *Journal of Sex & Marital Therapy*, *21*(2), 67–77. http://dx.doi.org/10.1080/00926239508404386 Medline:7643424

Morgan, J.F., Lacey, J.H., & Reid, F. (1999). Anorexia nervosa: Changes in sexuality during weight restoration. *Psychosomatic Medicine*, *61*(4), 541–545. http://dx.doi.org/10.1097/00006842-199907000-00019 Medline:10443763

Morokoff, P.J. (1986). Volunteer bias in the psychophysiological study of female sexuality. *Journal of Sex Research*, *22*(1), 35–51. http://dx.doi.org/10.1080/00224498609551288

O'Keefe, D.J. (2003). Colloquy: Should familywise alpha be adjusted? *Human Communication Research*, *29*(3), 431–477.

Pinheiro, A.P., Raney, T.J., Thornton, L.M., Fichter, M.M., Berrettini, W.H., Goldman, D., …, & Bulik, C.M. (2010). Sexual functioning in women with eating disorders. *International Journal of Eating Disorders*, *43*(2), 123–129. Medline:19260036

Pujols, Y., Meston, C.M., & Seal, B.N. (2010). The association between sexual satisfaction and body image in women. *Journal of Sexual Medicine*, *7*(2 Pt 2), 905–916. http://dx.doi.org/10.1111/j.1743-6109.2009.01604.x Medline:19968771

Raboch, J., & Faltus, F. (1991). Sexuality of women with anorexia nervosa. *Acta Psychiatrica Scandinavica*, *84*(1), 9–11.http://www.ncbi.nlm.nih.gov/pubmed/1927571 http://dx.doi.org/10.1111/j.1600-0447.1991.tb01412.x Medline:1927571

Raciti, M., & Hendrick, S.S. (1992). Relationships between eating disorder characteristics and love and sex attitudes. *Sex Roles*, *27*(9–10), 553–564. http://dx.doi.org/10.1007/BF00290009

Rathner, G., & Rumpold, G. (1994). Convergent validity of the eating disorder inventory and the anorexia nervosa inventory for self-rating in an Austrian nonclinical population. *International Journal of Eating Disorders*, *16*(4), 381–393. http://dx.doi.org/10.1002/1098-108X(199412)16:4<381::AID-EAT2260160407>3.0.CO;2-Q Medline:7866417

Rosen, J.C., Jones, A., Ramirez, E., & Waxman, S. (1996). Body Shape Questionnaire: Studies of validity and reliability. *International Journal of Eating Disorders*, *20*(3), 315–319. http://dx.doi.org/10.1002/(SICI)1098-108X(199611)20:3<315::AID-EAT11>3.0.CO;2-Z Medline:8912044

Rothschild, B.S., Fagan, P.J., Woodall, C., & Andersen, A.E. (1991). Sexual functioning of female eating-disordered patients. *International Journal of Eating Disorders*, *10*(4), 389–394. http://dx.doi.org/10.1002/1098-108X(199107)10:4<389::AID-EAT2260100403>3.0.CO;2-C

Ruderman, A.J. (1983). The restraint scale: A psychometric investigation. *Behaviour Research and Therapy*, *21*(3), 253–258. http://dx.doi.org/10.1016/0005-7967(83)90207-3 Medline:6615391

Saunders, D.M., Fisher, W.A., Hewitt, E.C., & Clayton, J.P. (1985). A method for empirically assessing volunteer selection effects: Recruitment procedures and responses to erotica. *Journal of Personality and Social Psychology*, *49*(6), 1703–1712. http://dx.doi.org/10.1037/0022-3514.49.6.1703

Seal, B.N., Bradford, A., & Meston, C.M. (2009). The association between body esteem and sexual desire among college women. *Archives of Sexual Behavior*, *38*(5), 866–872. http://dx.doi.org/10.1007/s10508-008-9467-1 Medline:19280331

Seal, B.N., & Meston, C.M. (2007). The impact of body awareness on sexual arousal in women with sexual dysfunction. *Journal of Sexual Medicine*, *4*(4 Pt 1), 990–1000. http://dx.doi.org/10.1111/j.1743-6109.2007.00525.x Medline:17627744

Trapnell, P.D., Meston, C.M., & Gorzalka, B.B. (1997). Spectatoring and the relationship between body image and sexual experience: Self-focus or self-valence? *Journal of Sex Research*, *34*(3), 267–278. http://dx.doi.org/10.1080/00224499709551893

Tutzauer, F. (2003). On the sensible application of familywise alpha adjustment. *Human Communication Research*, *29*(3), 455–463. http://dx.doi.org/10.1111/j.1468-2958.2003.tb00848.x

Vitousek, K.B., & Hollon, S.D. (1990). The investigation of schematic content and processing in eating disorders. *Cognitive Therapy and Research*, *14*(2), 191–214. http://dx.doi.org/10.1007/BF01176209

Weaver, A.D., & Byers, E.S. (2006). The relationships among body image, body mass index, exercise, and sexual functioning in heterosexual women. *Psychology of Women Quarterly*, *30*(4), 333–339. http://dx.doi.org/10.1111/j.1471-6402.2006.00308.x

Wertheim, E.H., Koerner, J., & Paxton, S.J. (2001). Longitudinal predictors of restrictive eating and bulimic tendencies in three different age groups of adolescent girls. *Journal of Youth and Adolescence*, *30*(1), 69–81. http://dx.doi.org/10.1023/A:1005224921891

Wiederman, M.W., & Hurst, S.R. (1998). Body size, physical attractiveness, and body image among young adult women: Relationships to sexual experience and sexual esteem. *Journal of Sex Research*, *35*(3), 272–281. http://dx.doi.org/10.1080/00224499809551943

Wiederman, M.W., Pryor, T., & Morgan, C.D. (1996). The sexual experience of women diagnosed with anorexia nervosa or bulimia nervosa. *International Journal of Eating Disorders*, *19*(2), 109–118. http://dx.doi.org/10.1002/(SICI)1098-108X(199603)19:2<109::AID-EAT1>3.0.CO;2-R Medline:8932549

World Health Organization. (2002). *The world health report 2002: Reducing risks, promoting healthy life*. Geneva: World Health Organization.