

# Explaining mental health disparities for non-monosexual women: Abuse history and risky sex, or the burdens of non-disclosure?

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Research has found that non-monosexual women report worse mental health than their heterosexual and lesbian counterparts. The reasons for these mental health discrepancies are unclear. This study investigated whether higher levels of child abuse and risky sexual behavior, and lower levels of sexual orientation disclosure, may help explain elevated symptoms of depression and anxiety among non-monosexual women. Participants included 388 women living in Canada (Mean age = 24.40,  $SD = 6.40$ , 188 heterosexual, 53 mostly heterosexual, 64 bisexual, 32 mostly lesbian, 51 lesbian) who filled out the Beck Depression and Anxiety Inventories as part of an online study running from April 2011 to February 2014. Participants were collapsed into non-monosexual versus monosexual categories. Non-monosexual women reported more child abuse, risky sexual behavior, less sexual orientation disclosure, and more symptoms of depression and anxiety than monosexual women. Statistical mediation analyses, using conditional process modeling, revealed that sexual orientation disclosure and risky sexual behavior uniquely, but not sequentially, mediated the relation between sexual orientation, depression and anxiety. Sexual orientation disclosure and risky sexual behavior were both associated with depression and anxiety. Childhood abuse did not moderate depression, anxiety, or risky sexual behavior. Findings indicate that elevated levels of risky sexual behavior and deflated levels of sexual orientation disclosure may in part explain mental health disparities among non-monosexual women. Results highlight potential targets for preventive interventions aimed at decreasing negative mental health outcomes for non-monosexual women, such as public health campaigns targeting bisexual stigma and the development of sex education programs for vulnerable sexual minority women, such as those defining themselves as bisexual, mostly heterosexual, or mostly lesbian.

*Keywords:* Canada, Non-monosexual women, Sexual minority women, Anxiety, Depression, Risky sexual behavior, Sexual orientation disclosure, Child abuse

## 1. Introduction

Several studies have found that bisexual women report higher levels of anxiety, depression, suicidality, and substance abuse than their heterosexual and lesbian counterparts (Bostwick et al., 2010; Cochran et al., 2003; Fredriksen-Goldsen et al., 2010; Hequembourg et al., 2013; Hughes et al., 2010b; Kerr et al., 2013; King et al., 2008; McCabe et

al., 2009; Wilsnack et al., 2008). Research suggests negative stereotypes exist about bisexuality, such as: bisexuality does not exist as a sexual identity or as a sexual orientation; and bisexuals are sexually promiscuous (Herek, 2002; Rust, 2002; Zivony & Lobel, 2014). While identity confusion and risky sexual behavior might be associated with maladjustment, there is another possibility: that the negative social reality created by these stereotypes helps explain the greater prevalence of psychological distress among bisexuals. In the history of homosexuality as psychopathology in North America, it was argued that it would be surprising if homosexual individuals in the 1970s would not be distressed considering the hostile social climate they were living in Marmor (1980). The importance of social climate to a range of mental health outcomes is still relevant. For instance, studies in the United States (Hatzembuehler & Keys, 2013; Hatzembuehler et al., 2011) have found that sexual minority individuals who live in states with policies protective of their rights

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have lower prevalence of suicidality and psychiatric disorders compared to those living in states without such policies.

Research has suggested that, currently, bisexual individuals face more stigma than homosexual individuals (Zivony & Lobel, 2014), which may be related to monosexism (preference for single-gender orientations) (ross2010perceived). For instance, it has been found that heterosexual women hold more negative attitudes towards bisexual than towards lesbian women (Herek, 2002). Due to these stereotypes, it has been assumed that bisexual individuals are subjected to minority stress, in the form of stigma and discrimination (Meyer, 2003), which is in turn hypothesized to relate to their elevated levels of psychological distress. Several studies indicate that there is an association between minority stress, symptoms of depression, suicidality, and substance use among bisexual women (Bostwick, 2012; Lea et al., 2014; Lehavot & Simoni, 2011; McCabe et al., 2010).

Although minority stress may be a good model for bisexual mental health disparities overall, it is conceivable that factors other than stigma and discrimination may be relevant. Some studies have explored the association between childhood adversity, sexual orientation, and mental health (Alvy et al., 2013; Austin et al., 2007, 2008; Drabble et al., 2013; Hequembourg et al., 2013; Lehavot et al., 2012; Rothman et al., 2011; Schneeberger et al., 2014). A meta-analysis demonstrated that bisexual females report higher prevalence for both sexual and parental physical abuse compared to lesbian and heterosexual females (Friedman et al., 2011). Further, there is evidence that exposure to victimization and adversity in childhood and adolescence mediates the association between bisexuality, suicidality, depressive symptoms, and substance use (McLaughlin et al., 2012).

Research has documented a potential link between childhood sexual abuse and adult sexual victimization (Roodman & Clum, 2001), and between childhood sexual abuse and risky sexual behavior in adulthood (Senn & Carey, 2010; Walsh et al., 2013). A recent study found that bisexual females reported more sexual risk behaviors (e.g., use of emergency contraception) than their heterosexual and lesbian counterparts (Tornello et al., 2013). Compared to heterosexual females, both lesbian and bisexual females were more likely to report being forced to have sex with a male. The above-mentioned findings fit with other research suggesting bisexual women are more likely to experience adult sexual victimization than other women (Hequembourg et al., 2013; Hughes et al., 2010a, 2010b; Lehavot et al., 2012; McLaughlin et al., 2012).

A report on bisexual health by the National Gay and Lesbian Task Force (2007) listed sexual health among the top ten health issues relevant to the bisexual community. The report underlined that bisexual women report higher risk sexual behavior than heterosexual women and that they have higher rates of combining substance/alcohol use with sex than both

heterosexual and lesbian women (Miller et al., 2007). In short, there has been a call for research to further explore sexual risk among bisexual women.

Sexual orientation disclosure may be positively associated with physical and mental health (Durso & Meyer, 2013; Juster et al., 2013). Research has documented, however, that bisexual women are less likely than lesbian women to disclose their sexual orientation to healthcare providers (Durso & Meyer, 2013). In this study, at one year-follow-up, the researchers found that concealment of sexual orientation was associated with poor psychological wellbeing. As previously discussed, bisexual women may be more stigmatized than lesbian women, which, in turn, could be the reason they are less likely to disclose (Ross et al., 2010). For instance, a qualitative study found that bisexual individuals mainly reported negative experiences with mental health service providers (Eady et al., 2011).

Recent research has indicated “mostly heterosexual” and “mostly lesbian” represent distinct sexual orientations, groups distinguished from “heterosexual” and “lesbian” by the presence of some same-sex or other-sex orientation, respectively, and from “bisexual” by less same-sex or other-sex orientation, respectively (Savin-Williams & Vrangalova, 2013). Data have suggested that these women’s reported rates of childhood abuse, risky sexual behavior, and substance abuse are similar to bisexual women’s (Alvy et al., 2013; Austin et al., 2008; Corliss et al., 2009; Hughes et al., 2010b; Loosier & Dittus, 2010; McCabe et al., 2012). Although the reasons for these similarities are still unclear, mostly heterosexual and mostly lesbian women, as bisexual women, may experience marginalization and low levels of social support (Corliss et al., 2009; Hughes et al., 2010b).

Sexual orientation, defined as an internal mechanism directing sexuality (Bailey, 2009), typically refers to a combination of cognitive, behavioral, and affective components (Savin-Williams & Vrangalova, 2013). Research has found that outcomes may be sensitive to which dimension of sexual orientation is used to classify individuals (McCabe et al., 2012; Savin-Williams, 2009). Therefore, the current study included both self-identification and behavior as indices of sexual orientation.

The purpose of the current research was three-fold. First, we aimed to explore the association between female sexual orientation, childhood abuse, risky sexual behavior, depression, and anxiety. We expected non-monosexual women to report higher levels of depression and anxiety, childhood abuse, and risky sexual behavior than monosexual women. Further, we expected that childhood abuse would moderate depression, anxiety, and risky sexual behavior, and that risky sexual behavior would mediate the association between sexual orientation, depression and anxiety. Second, we aimed to examine the link between sexual orientation disclosure, depression, and anxiety. We expected higher levels of sex-

ual orientation disclosure among lesbian women than non-monosexual women, and that sexual orientation disclosure would mediate the relationship between sexual orientation, depression, and anxiety. Third, we aimed to determine whether there would be sequential mediation between sexual orientation, sexual orientation disclosure, risky sexual behavior, depression, and anxiety. We expected that lower levels of sexual orientation disclosure would be associated with higher levels of risky sexual behavior, in turn associated with higher levels of anxiety and depression.

## 2. Method

### 2.1. Participants

Participants were 388 women (Mean age = 24.40,  $SD = 6.40$ , Range = 18–66), of whom 188 self-defined their sexual orientation as heterosexual, 53 as mostly heterosexual, 64 as bisexual, 32 as mostly lesbian, and 51 as lesbian. The majority (63%) reported English as their first language, with 18% reporting French and 19% reporting “other.” Most endorsed English-Canadian as their main cultural affiliation (63%), 13% endorsed French-Canadian, and 24% endorsed “other.” Seventy-five percent of participants were Canadian nationals and most (90%) were currently living in an urban setting. Most of the participants were from a middle-class background (76%), with 15% reporting a lower class background and 9% an upper class background. More than half of the sample reported being non-religious (56.3%); 13.4% were Catholic, 5.7% were Jewish, 5.2% were Protestant, and 19.4% reported religion as “other.” The vast majority of participants (71%) were students; of the overall sample, 78% reported that they have completed or are currently completing a university degree, 15% reported that they have completed or are currently completing a post-graduate degree, and around 7% reported a high-school degree or less.

### 2.2. Procedures

Data for the current study were collected through an online confidential survey developed by the authors: *Women’s Experiences of Sexuality and Intimacy*. This survey took, on average, 1.5 h to complete and included questions about demographics, substance abuse, childhood abuse, sexual orientation/identity/behavior, sexual/romantic/emotional attractions, sexual arousal/desire/orgasm, and symptoms of depression and anxiety. The survey was available in both English and French. Of the women who started the survey, the completion rate was 70%. Eleven percent of the participants answered the survey in French. The Concordia University Human Research Ethics Committee approved all procedures.

Participants responded between April 2011 (start of data collection) and February 2014 (end of data collection). Forty-seven percent of the participants answered the survey through the Psychology Participant Pool at Concordia

University in Montreal and received course credit for their participation. The remaining 53% were a diverse group of women recruited through the community. These women were entered into a draw to win \$250. The survey was advertised on Craigslist and Kijiji, which are both websites that post classified advertisements locally. The study was regularly advertised on these two websites in both English and French in Montreal, Ottawa, Toronto, and Vancouver. An advertisement for the study was also posted once in two free weekly newspapers in Montreal. Between April 2011 and until the end of 2012, fliers advertising the survey were also regularly posted around all of the four university campuses in Montreal and around the city of Montreal, generally. On two occasions, the study was advertised to Montreal university students not part of the Participant Pool at Concordia University by classroom announcement in courses on gender and sexuality. The study was also posted once to the listserv of the Sexual and Gender Identity Section of the Canadian Psychological Association. Finally, the study was advertised by contacting LGBTQ student groups at universities across Canada.

In order to avoid biasing recruitment towards any one sexual orientation group to the greatest extent possible, the original study protocol was devised with the intention to only advertise for “women to participate in a questionnaire-based study addressing sexual orientation and identity, sexual and emotional experiences, sexual desire and arousal, and mental health.” However, halfway through data collection, the advertisements posted on Craigslist and Kijiji were changed to specify that we were “looking for women who self-identify as non-heterosexual” in order to boost the number of sexual minority women. Interested women were directed to send an email to express their interest, at which point they were given a participant code and a link to the survey.

### 2.3. Measures

#### 2.3.1. Mental health outcomes

*2.3.1.1. The Beck Depression Inventory-II (BDI-II) (Beck et al., 1996).* The BDI-II is a 21-item self-report inventory designed to assess depression. Each item, reflecting a depressive symptom, is rated on a 4-point scale, ranging from 0 to 3. Participants are instructed to pick the statements that best describe how they have been feeling during the past two weeks. The BDI-II has excellent internal consistency, test-retest reliability, convergent and divergent validity in both clinical and community samples (Beck et al., 1996; Steer & Clark, 1997). The Cronbach’s alpha was 0.93 for the current study.

*2.3.1.2. The Beck Anxiety Inventory (BAI) (Beck et al., 1988; Beck & Steer, 1990).* The BAI is a 21-item self-report inventory designed to assess state anxiety. Each item, reflecting a symptom of anxiety, is rated on a 4-point scale,

ranging from 0, “not at all,” to 3, “severely.” Participants are instructed to indicate to which extent they have been bothered by each symptom during the last week. The BAI has excellent internal consistency, test-retest reliability, convergent validity, and divergent validity in both clinical and community samples (Beck & Steer, 1990; Creamer et al., 1995). The Cronbach’s alpha was 0.94 for the current study.

## 2.4. Included variables

### 2.4.1. Sexual orientation

Self-identification included the question: “What is your sexual orientation?” Participants were given seven options: heterosexual, mostly heterosexual, bisexual, mostly lesbian, lesbian, asexual, and unsure. None chose “asexual.” The 11 who chose “unsure” were excluded due to low sample size.

In order to increase power, we combined heterosexual and lesbian women into a monosexual category ( $n = 239$ ), whereas mostly heterosexual, bisexual, and mostly lesbian women were combined into a non-monosexual category ( $n = 149$ ). This approach has not previously been used in research. Traditionally, in diverse types of studies, mostly heterosexual and mostly lesbian women have been placed into heterosexual or lesbian categories, respectively, comparing those two groups to bisexual women (Austin et al., 2007; Chivers et al., 2007; Kerr et al., 2013; King et al., 2008; McLaughlin et al., 2012).

Our research approach was based on three lines of reasoning. First, studies have indicated non-monosexual women face mental health disparities compared to both heterosexual and lesbian women, and that mostly heterosexual and mostly lesbian women may be more similar to bisexual than to monosexual women (Alvy et al., 2013; Austin et al., 2008; Corliss et al., 2009; Hughes et al., 2010b; Loosier & Dittus, 2010; McCabe et al., 2012). Second, a meta-analysis found that bisexuality moderated the relationship between sexual orientation and childhood physical abuse; the differences between bisexual and heterosexual individuals were larger than those between gay/lesbian and heterosexual individuals (Friedman et al., 2011). Third, it has been argued that society tends to value a dichotomous understanding of sexuality; that is, one is either homosexual or one is heterosexual (Ross et al., 2010; Rust, 2002). On a structural level, the lesbian and heterosexual groups are the same, due to their single-gender orientation, while the mostly lesbian, bisexual, and mostly heterosexual groups are the same, due to their dual-gender orientation.

### 2.4.2. Sexual behavior

Sexual behavior was assessed by participants’ responses to the questions: “Do you have sex with male partners?” and “Do you have sex with female partners?” Participants who positively endorsed both questions ( $n = 85$ ) were coded as

evinced “bisexual behavior,” whereas those who endorsed sex only with males or only with females ( $n = 293$ ) were coded as evincing “monosexual behavior.” Sexual behavior was defined as: “Any activity of a sexual nature. It can be done exclusively for the pleasure inherent in sexual gratification and orgasm, or to achieve an intimate bond with another person. It can include any type of genital stimulation.” Ten participants reported not having sex and were excluded from analyses in which exposure to sexual behavior was included.

### 2.4.3. Child abuse

Child abuse was assessed with the categorical question: “Do you have a history of child abuse?” Those who answered “yes,” specified which type(s): Sexual, emotional, and/or physical. Due to low sample sizes, statistical analyses were conducted based only on “yes” versus “no.”

### 2.4.4. Risky sexual behavior

Risky sexual behavior was assessed with the question: “Do you engage in risky sexual behavior?” Risky sexual behavior was defined as having unprotected sex and/or sex with unknown individuals. Answers were on a 7-point scale, from 0, “never,” 1, “rarely” (between 1% and 20% of sexual contacts), 2, “fairly often” (between 21% and 40% of sexual contacts), 3, “often” (between 41% and 60% of sexual contacts), 4, “usually” (between 61% and 80% of sexual contacts), 5, “almost always” (between 81% and 99% of sexual contacts), to 6, “always.”

### 2.4.5. Sexual orientation disclosure

Sexual orientation disclosure was assessed with four categorical questions: “Are you open about your sexual orientation with 1) family, with 2) friends, with 3) acquaintances, with 4) colleagues?” Their answers were summed into one continuous variable. With all four variables included, Cronbach’s alpha was 0.69. As the ‘friends’ item had an item-total correlation of 0.19, we dropped this item; the resulting 3-item scale had Cronbach’s alpha of 0.75. Of note, 97.6% of participants reported being open with their friends, meaning that this item did not serve as a useful indicator of disclosure in this sample.

## 2.5. Outliers and missing data

There was no missing data for the BDI-II, BAI, child abuse, or sexual orientation disclosure. There were two missing data points for risky sexual behavior, coded as “999.” Outliers were identified for the BDI-II, BAI, risky sexual behavior, and sexual orientation disclosure in accordance with recommendations outlined by Tabachnick & Fidell (2013). Univariate outliers (2 for the BDI-II, 2 for the BAI, 13 for risky sexual behavior, and 0 for sexual orientation disclosure)

were Winsorized to within plus or minus 3.3 standard deviations. Multivariate outliers were screened using Mahalanobis distance, and none were found.

### 3. Results

#### 3.1. Demographics

There were no age differences between the groups ( $p = .51$  based on sexual orientation;  $p = .55$  based on sexual behavior). The groups did not differ in English or French language fluency (based on sexual orientation,  $p = .59$  and  $p = .08$ , respectively; based on sexual behavior,  $p = .90$  and  $p = .18$ , respectively). The groups did not differ in cultural affiliation (English-Canadian, French-Canadian, "other"),  $\chi^2(2) = 3.52$ ,  $p = .17$  (based on sexual orientation),  $\chi^2(2) = 0.50$ ,  $p = .78$  (based on sexual behavior), or in nationality (Canadian versus "other"),  $\chi^2(1) = 0.53$ ,  $p = .47$  (based on sexual orientation), and  $\chi^2(1) = 0.13$ ,  $p = .72$  (based on sexual behavior). However, monosexual women reported living longer in an urban setting than non-monosexual women ( $M_{monosexual} = 19.82$  years;  $M_{non-monosexual} = 17.75$  years),  $t(1,386) = 2.11$ ,  $p = .04$  (*ns* based on sexual behavior,  $p = .74$ ). The monosexuals reported being more religious than the non-monosexuals,  $\chi^2(1) = 6.46$ ,  $p = .01$  (based on sexual orientation),  $\chi^2(1) = 4.51$ ,  $p = .03$  (based on sexual behavior).

The monosexual group reported higher socioeconomic background (SES) than the non-monosexual group ( $M_{monosexual} = 1.97$ ;  $M_{non-monosexual} = 1.87$ ), Welch's  $F(1, 303.64) = 4.03$ ,  $p = .05$  (*ns* based on sexual behavior). Further, the monosexuals were more educated than the non-monosexuals ( $M_{monosexual} = 5.88$ ;  $M_{non-monosexual} = 5.63$ ), Welch's  $F(1, 265.25) = 5.05$ ,  $p = .03$  (based on sexual orientation;  $M_{non-bisexual} = 5.90$ ;  $M_{bisexual} = 5.47$ ), Welch's  $F(1, 104.22) = 7.62$ ,  $p = .01$  (based on sexual behavior).

#### 3.2. Preliminary analyses

##### 3.2.1. Child abuse

Chi-square analysis indicated non-monosexual women were more likely to report childhood abuse (33.6%) than monosexual women (15.5%),  $\chi^2(1) = 17.24$ ,  $p < .001$ . Further, women with bisexual behavior were more likely to report child abuse (37.6%) than women without bisexual behavior (18.1%),  $\chi^2(1) = 14.46$ ,  $p < .001$ .

##### 3.2.2. Risky sexual behavior

One-way ANOVA revealed that non-monosexual women reported more risky sexual behavior than monosexual women ( $M_{non-monosexual} = 0.96$ ;  $M_{monosexual} = 0.63$ ),  $F(1, 384) = 7.04$ ,  $p < .01$ . Further, women with bisexual behavior reported more risky sexual behavior than women without bisexual behavior ( $M_{bisexual} = 1.13$ ;  $M_{non-bisexual} = 0.65$ ),  $F(1, 374) = 10.42$ ,  $p < .01$ .

##### 3.2.3. Sexual orientation disclosure

One-way ANOVA revealed that non-monosexual women reported being less open about their sexual orientation than lesbian women ( $M_{non-monosexual} = 1.69$ ;  $M_{lesbian} = 2.37$ ),  $F(1, 198) = 16.20$ ,  $p < .001$ . Further, women with bisexual behavior reported being less open than women without bisexual behavior ( $M_{bisexual} = 1.71$ ;  $M_{non-bisexual} = 2.35$ ),  $F(1, 376) = 25.04$ ,  $p < .001$ .

##### 3.2.4. Mental health outcomes

One-way ANOVA showed that non-monosexual women reported more symptoms of depression than monosexual women ( $M_{non-monosexual} = 13.46$ ;  $M_{monosexual} = 10.90$ ),  $F(1, 386) = 5.74$ ,  $p < .01$ , and more symptoms of anxiety than monosexual women ( $M_{non-monosexual} = 17.91$ ;  $M_{monosexual} = 14.00$ ),  $F(1, 386) = 8.75$ ,  $p < .01$ . Further, women with bisexual behavior reported more symptoms of depression than women without bisexual behavior ( $M_{bisexual} = 15.13$ ;  $M_{non-bisexual} = 10.79$ ),  $F(1, 376) = 12.42$ ,  $p < .001$ , and more symptoms of anxiety than women without bisexual behavior ( $M_{bisexual} = 19.32$ ;  $M_{non-bisexual} = 14.32$ ),  $F(1, 376) = 10.19$ ,  $p < .01$ .

#### 3.3. Mediation and moderation analyses

Statistical mediation and moderation analyses were conducted using the PROCESS macro for SPSS (Hayes, 2013). PROCESS calculates a bias-corrected and accelerated bootstrapped confidence interval for the size of each indirect effect (5000 resamples used in the current study). Significant mediation is indicated by a confidence interval that does not contain zero.

##### 3.3.1. PROCESS model 1—child abuse as a moderator

Child abuse did not moderate the relationship between sexual orientation and depression,  $R_{ch}^2 = .0008$ ,  $F(1, 384) = 0.34$ ,  $p = .56$ ; sexual orientation and anxiety,  $R_{ch}^2 = .0040$ ,  $F(1, 384) = 1.60$ ,  $p = .21$ ; sexual behavior and depression,  $R_{ch}^2 = .0002$ ,  $F(1, 374) = 0.07$ ,  $p = .80$ ; or sexual behavior and anxiety,  $R_{ch}^2 = .0018$ ,  $F(1, 374) = 0.69$ ,  $p = .41$ .

##### 3.3.2. PROCESS model 7—child abuse as a moderator and risky sexual behavior as a mediator

See Fig. 1 for the hypothesized relationships. Childhood abuse did not moderate the relationship between sexual orientation and risky sexual behavior, unstandardized coefficient = 0.21,  $p = .48$ , 95% CI [-0.38, 0.80], or between sexual behavior and risky sexual behavior, unstandardized coefficient = 0.07,  $p = .84$ , 95% CI [-0.58, 0.71]. There was also no indication of moderated mediation (conditional indirect effect); risky sexual behavior as a mediator of the association between sexual orientation/sexual behavior and depression/anxiety was not related to child abuse.

### 3.3.3. PROCESS model 4—simple mediation with risky sexual behavior and sexual orientation disclosure as independent mediators

See Fig. 2 for an illustration. Risky sexual behavior and sexual orientation disclosure both mediated the relation between sexual orientation/behavior and depression/anxiety (Table 1 for risky sexual behavior; Table 2 for sexual orientation disclosure). Further, risky sexual behavior and sexual orientation disclosure uniquely fed into depression and anxiety.

### 3.3.4. PROCESS model 6—sequential mediation

See Fig. 3 for an illustration. Sexual orientation disclosure was not directly associated with risky sexual behavior, unstandardized coefficient =  $-0.09$ ,  $p = .12$ , 95% CI  $[-0.21, -0.02]$ , and the model for sequential mediation was not significant for depression or for anxiety (see Table 3). Although the sequential mediation model was not significant, it is worth noting that the lower bound of the confidence interval was close to zero.

## 4. Discussion

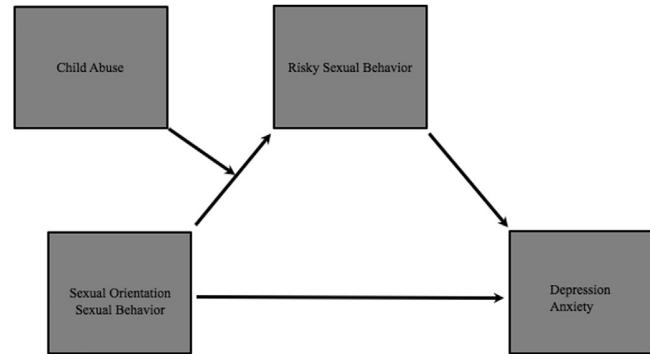
### 4.1. Association between female sexual orientation, childhood abuse, risky sexual behavior, and mental health

In the first study to assess how childhood adversity may explain sexual orientation disparities in mental health, childhood sexual abuse and physical abuse were shown to be partial mediators of the association between sexual orientation and mental health disparities (McLaughlin et al., 2012). In line with past research (Friedman et al., 2011), we found that non-monosexual women reported more childhood abuse than monosexual women. However, childhood abuse did not moderate the relation between sexual orientation and mental health, suggesting that the mental health of non-monosexual women may not necessarily interact with the presence of a childhood abuse history.

Research has found that childhood sexual abuse is associated with risky sexual behavior in adulthood (Arriola et al., 2005; Paolucci et al., 2001; Walsh et al., 2013) and that this association may be stronger for bisexual than for lesbian women (Hequembourg et al., 2013). Although there may be a link between childhood sexual abuse and risky sexual behavior, one study including heterosexual and mostly heterosexual women found that even if the mostly heterosexual women reported more childhood sexual abuse and more risky sexual behavior than did heterosexual women, childhood sexual abuse did not mediate the relationship between sexual orientation and sexual risk behaviors (Austin et al., 2008). Our findings reflect those of Austin et al. (2008): we found that non-monosexual women reported both more childhood abuse and higher levels of risky sexual behavior than monosexual women but that childhood abuse did

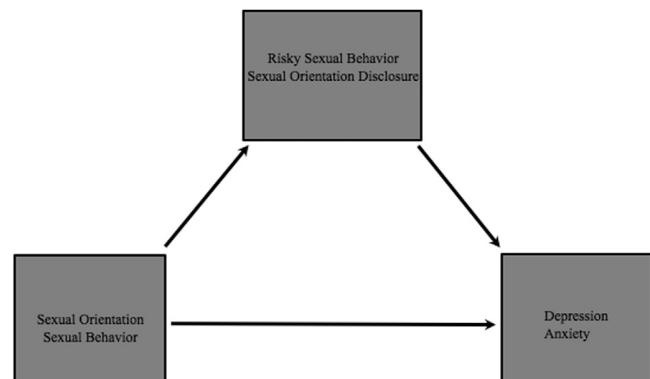
**Figure 1**

Theoretical model depicting moderating and mediating relationships between sexual orientation/behavior, child abuse, risky sexual behavior, and depression/anxiety.



**Figure 2**

Theoretical model depicting simple mediating relationships between sexual orientation/behavior, risky sexual behavior, sexual orientation disclosure, and depression/anxiety.



not moderate the association between sexual orientation and risky sex.

### 4.2. Risky sexual behavior as a mediator of mental health

It was found that risky sexual behavior mediated the relation between sexual orientation and mental health. Although recent research has found that mental health mediates the link between childhood sexual abuse and sexual risk for both heterosexual and homosexual groups (Sweet et al., 2013), to the best of our knowledge, this is the first study to assess how sexual risk may explain sexual orientation disparities in mental health. In other words, previous research had explored the pathway from mental health to sexual risk but not from sexual risk to mental health (Meade & Sikkema, 2005).

Although it is unclear why sexual risk would mediate the relation between sexual orientation and mental health,

it is possible that risky sexual behavior may be a symptom of some forms of psychopathology associated with depression and anxiety. For instance, the diagnostic criteria for borderline personality disorder include impulsive sex, anxiety, and dysphoria (American Psychiatric Association, 2013). Sexual risk taking has been associated with externalizing behaviors among adolescent girls (Starr et al., 2012). Further, it has been found that emotion dysregulation is linked to risky sexual behavior, in turn related to adult sexual victimization (Messman-Moore et al., 2010). In addition, risky sexual behavior has been linked to substance use problems (Walsh et al., 2013), which is associated with poor mental health among sexual minorities (Goldbach et al., 2013). Bisexual women have been found to report the highest rates of heavy/hazardous drinking (Hughes et al., 2010b; Wilsnack et al., 2008), and to be more likely to combine substance/alcohol use with sex than both heterosexual and lesbian women (Miller et al., 2007). In conclusion, it is conceivable that risky sexual behavior, in addition to its link with depression and anxiety, may mediate a range of mental health outcomes through an association with adult sexual victimization and/or alcohol use, we recommend that future studies assess mediation models in which risky sexual behavior, adult sexual victimization, and alcohol use are all included.

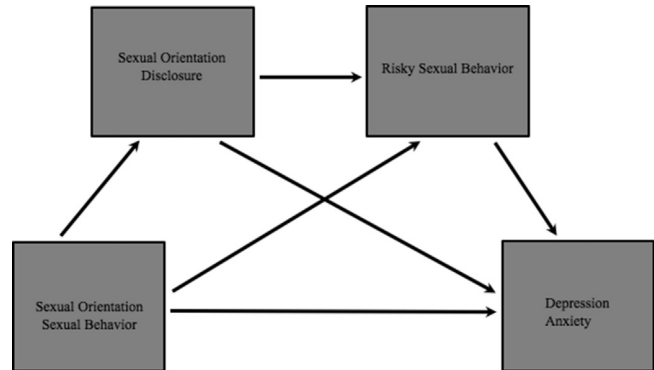
#### 4.3. Sexual orientation disclosure as a mediator of mental health

The fact that sexual orientation disclosure mediated mental health concurs with other research indicating concealment may increase risks of psychological distress (Durso & Meyer, 2013). Further, recent research has found that disclosed sexual minority individuals have fewer psychiatric symptoms and lower levels of stress hormones than non-disclosed sexual minority individuals (Juster et al., 2013). In his minority stress model, Meyer (2003) suggests that sexual orientation concealment is part of a proximal process in which sexual minorities hide their sexuality in an effort to cope with “their stigmatizing attribute.” However, as he points out, hiding part of the self can become stressful and may lead to negative mental health outcomes. Although the current study did not inquire about fear of discrimination and stigma, the observation that lesbian women were more open than non-monosexual women may be a reflection of a Canadian social climate in which homosexuality is well recognized and protected by social policies, such as equal marriage rights.

Recent research in the United States has found that bisexual individuals face prejudice from both heterosexual and homosexual individuals, and that close to 15 percent do not trust that bisexuality is a legitimate sexual orientation (Friedman et al., 2014). The authors argue that the stigma faced by bisexual people may lead to them hiding their sexuality, in turn resulting in social isolation and negative mental health outcomes. The doubts surrounding the existence of bisexual-

**Figure 3**

*Theoretical model depicting sequential mediating relationships between sexual orientation/behavior, risky sexual behavior, sexual orientation disclosure, and depression/anxiety.*



ity are not only evident in research studies, but also depicted in the media (Denizet-Lewis, 2014).

#### 4.4. Sequential mediation

Although sexual orientation disclosure was not directly associated with risky sexual behavior and the sequential mediation model was not statistically significant, the confidence intervals suggest that the study may have lacked sufficient power to detect these smaller effects. Future studies, especially those with larger samples, should continue to explore potential links between sexual orientation disclosure and sexual health, in addition to mental health. The observation that bisexual women are less likely to disclose their sexual orientation to healthcare providers than lesbian women (Durso & Meyer, 2013) could mean that they are receiving less culturally competent sexual health education, which may increase their sexual risk.

#### 4.5. Limitations

The finding that childhood abuse did not moderate anxiety, depression, or risky sexual behavior may be a reflection of study limitations, such as collapsing sexual, emotional, and physical abuse into one general abuse category, which may have masked differential effects of the three types of abuse. In a study including childhood sexual, physical, and psychological abuse, along with neglect, all were associated with female adult risky sexual behavior (Senn & Carey, 2010). However, when controlling for the other forms of abuse, it was found that only childhood sexual abuse was uniquely associated with adult risky sexual behavior. Further, a meta-analysis investigating the link between female childhood sexual abuse and adult revictimization found that studies which used more inclusive definitions of childhood

**Table 1***Indirect and direct effects for the simple mediation model including risky sexual behavior.*

	Unstandardized coefficient	t (df)	p	95% CI
<b>Sexual orientation → depression, mediated by risky sex (Estimate = 0.44, 95% CI [0.11, 1.02])</b>				
Sexual orientation → depression	1.97	1.85 (383)	.0651	–0.12, 4.06
Sexual orientation → risky sex	0.33	2.65 (384)	.0083	0.09, 0.58
Risky sex → depression	1.31	3.06 (383)	.0024	0.47, 2.15
<b>Sexual orientation → anxiety, mediated by risky sex (Estimate = 0.53, 95% CI [0.12, 1.23])</b>				
Sexual orientation → anxiety	3.26	2.46 (383)	.0142	0.66, 5.87
Risky sex → anxiety	1.59	2.98 (383)	.0031	0.54, 2.63
<b>Sexual behavior → depression, mediated by risky sex (Estimate = 0.62, 95% CI [0.21, 1.38])</b>				
Sexual behavior → depression	3.49	2.82 (373)	.0051	1.06, 5.93
Sexual behavior → risky sex	0.48	3.23 (374)	.0014	0.19, 0.77
<b>Sexual behavior → anxiety, mediated by risky sex (Estimate = 0.77, 95% CI [0.23, 1.67])</b>				
Sexual behavior → anxiety	4.05	2.56 (373)	.0108	0.94, 7.16

**Table 2***Indirect and direct effects for the simple mediation model including sexual orientation disclosure.*

	Unstandardized coefficient	t (df)	p	95% CI
<b>Sexual orientation<sup>a</sup> → depression, mediated by sexual orientation disclosure (Estimate = 1.42, 95% CI [0.50, 2.90])</b>				
Sexual orientation → depression	0.88	0.50 (197)	.6194	–2.61, 4.37
Sexual orientation → sexual orientation disclosure	–0.67	–4.02 (198)	.0001	–1.00, –0.34
Sexual orientation disclosure → depression	–2.10	–2.92 (197)	.0040	–3.53, –0.68
<b>Sexual orientation → anxiety, mediated by sexual orientation disclosure (Estimate = 1.02, 95% CI [–0.10, 2.51])</b>				
Sexual orientation → anxiety	2.08	0.96 (197)	.3368	–2.18, 6.35
Sexual orientation disclosure → anxiety	–1.51	–1.72 (197)	.0876	–3.25, 0.23
<b>Sexual behavior → depression, mediated by sexual orientation disclosure (Estimate = 1.11, 95% CI [0.46, 2.18])</b>				
Sexual behavior → depression	3.23	2.58 (375)	.0104	0.76, 5.69
Sexual behavior → sexual orientation disclosure	–0.64	–5.00 (376)	.0001	–0.89, –0.39
<b>Sexual behavior → anxiety, mediated by sexual orientation disclosure (Estimate = 0.77, 95% CI [0.23, 1.67])</b>				
Sexual behavior → anxiety	3.71	2.32 (375)	.0207	0.57, 6.86

<sup>a</sup> The analyses conducted with sexual orientation as a variable included only lesbian women ( $n = 51$ ). This approach was based on the consideration that sexual orientation disclosure is not relevant to heterosexual women.

abuse yielded smaller effect sizes than studies with narrower definitions (Roodman & Clum, 2001).

Further, it is possible that childhood abuse was not found to interact with mental health because the childhood abuse rates reported by the lesbian women may have been more similar to those reported by the non-monosexual than the heterosexual women (Austin et al., 2007). If the lesbian women included did in fact experience similar levels of childhood abuse as the non-monosexual women, this could imply that our mediation analyses may have been compromised due to the previously documented link between childhood abuse, risky sex, and mental health. In short, combining lesbian with heterosexual women should have decreased group differences. However, despite these potential limitations, we found that non-monosexual women reported both more risky sex and symptoms of depression and anxiety.

This was an initial study including only depression and anxiety as measures of mental health. Future studies could expand the mental health domain by including more indices of mental health, such as suicidality, treatment experience, help seeking, and resilience. In addition, lifetime sexual be-

havior was not measured. Future research may further unpack the link between sexual behavior and mental health by measuring both current and lifetime sexual behavior.

This study oversampled sexual minority women and is limited by non-probability sampling. Further, the fact that participants were collapsed into two categories may have masked or exaggerated differences between the different sexual orientation groups. Although it may be valid to combine lesbian and heterosexual women in a liberal setting, such as Montreal, this research approach may not be valid in places less protective of sexual minority rights.

## 5. Conclusions

Results of this study support a growing body of research documenting mental health disparities, higher reported levels of childhood adversity, sexual health concerns, and greater sexual orientation concealment among non-monosexual women. Findings suggest that higher levels of risky sexual behavior and lower levels of sexual orientation disclosure may in part explain why non-monosexual women report poorer mental health than their monosexual



**Table 3**

95% BC confidence intervals of the indirect effect of the mediators for depression and anxiety.

Indirect effect key		Effect	Boot SE	BC 95% bootstrapped CI <sup>a</sup>
<b>Sexual orientation<sup>c</sup> → Depression</b>				
Total		2.04	0.66	0.92, 3.56
Ind. 1	Sexual orientation → sexual orientation disclosure → depression	1.30	0.58	0.41 <sup>b</sup> , 2.76
Ind. 2	Sexual orientation → sexual orientation disclosure → risky sex → depression	0.06	0.10	-0.10, 0.33
Ind. 3	Sexual orientation → risky sex → depression	0.67	0.36	0.06 <sup>b</sup> , 1.53
<b>Sexual behavior → Depression</b>				
Total		1.58	0.49	0.80, 2.74
Ind. 1	Sexual behavior → sexual orientation disclosure → depression	1.01	0.41	0.38 <sup>b</sup> , 2.04
Ind. 2	Sexual behavior → sexual orientation disclosure → risky sex → depression	0.07	0.06	-0.01, 0.24
Ind. 3	Sexual behavior → risky sex → depression	0.50	0.27	0.12 <sup>b</sup> , 1.21
<b>Sexual orientation → Anxiety</b>				
Total		1.81	0.83	0.37, 3.70
Ind. 1	Sexual orientation → sexual orientation disclosure → anxiety	0.90	0.66	-0.19, 2.49
Ind. 2	Sexual orientation → sexual orientation disclosure → risky sex → anxiety	0.08	0.13	-0.13, 0.41
Ind. 3	Sexual orientation → risky sex → anxiety	0.83	0.49	0.02 <sup>b</sup> , 1.96
<b>Sexual behavior → Anxiety</b>				
Total		1.88	0.59	0.89, 3.24
Ind. 1	Sexual behavior → sexual orientation disclosure → anxiety	1.18	0.50	0.38 <sup>b</sup> , 3.26
Ind. 2	Sexual behavior → sexual orientation disclosure → risky sex → anxiety	0.09	0.07	-0.01, 0.32
Ind. 3	Sexual behavior → risky sex → anxiety	0.62	0.35	0.14 <sup>b</sup> , 1.53

<sup>a</sup> BC confidence intervals are bias-corrected.

<sup>b</sup> Significant mediation.

<sup>c</sup> The analyses conducted with sexual orientation as a variable included only lesbian women ( $n = 51$ ). This approach was based on the consideration that sexual orientation disclosure is not relevant to heterosexual women (Herek, 2010).

counterparts. Contrary to expectations, childhood abuse did not moderate the relation between sexual orientation and mental health nor between sexual orientation and risky sexual behavior. In general, results were stronger when sexual behavior rather than self-identified sexual orientation was used as a variable, supporting other data suggesting that research findings relevant to sexual orientation may be sensitive to which dimension of sexual orientation is used (McCabe et al., 2012; Savin-Williams, 2009).

## 6. Implications

The findings of this research highlight targets for preventive interventions aimed at decreasing negative mental health outcomes for non-monosexual women, such as public health campaigns targeting bisexual stigma. The fact that non-monosexual women may face mental health disparities indirectly through lower levels of sexual orientation disclosure and higher levels of sexual risk, underline the importance of improving the social climate for women who are in-between the end-points of the sexual orientation continuum.

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