

ABSTRACT

Title of thesis: THE ROLE OF SELF-ESTEEM IN THE
RELATIONSHIP BETWEEN SEXUAL MINORITY
STATUS AND DEPRESSIVE SYMPTOMS

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Sexual minority (SM) youth have been found to experience higher rates of depression and depressive symptoms compared with heterosexual youth. It has been suggested that there are mediators in the pathway between stigma-related stress and psychopathology, such as self-esteem. This study was interested in investigating whether self-esteem is a mediator between SM status by romantic attraction and the outcome depressive symptoms during the transition from adolescence to adulthood, and whether sex moderated this mediation. Results showed that those who were both-sex attracted had significantly higher depressive symptoms than their opposite-sex attracted counterparts ($\beta=0.04, p=0.049$). Further, findings showed that self-esteem is a mediator in the pathway between both-sex attraction and depressive symptoms ($p=0.007$). Although females were found to have higher depressive symptoms than males, no significant interaction with sexual minority status was found. These results can have implications for possible interventions to reduce depressive symptomatology for sexual minority groups transitioning into adulthood.

THE ROLE OF SELF-ESTEEM IN THE RELATIONSHIP BETWEEN SEXUAL
MINORITY STATUS AND DEPRESSIVE SYMPTOMS

By

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Chapter 1: Introduction

***Sexual minority is synonymous with LGB here and will be used interchangeably dependent on the language of the literature being referred to.**

Sexual minority* youth have been found to experience higher rates of depressive symptoms compared with heterosexual youth; these depressive symptoms disparities have been seen to continue into adulthood (1, 2). A diagnosis of major depressive disorder involves having had two or more major depressive episodes, characterized by depressed mood and loss of interest in activities for 2 weeks or more, with at least five clinical symptoms, some of which include “depressed mood most of the day”, “fatigue or loss of energy”, and “feelings of worthlessness or excessive guilt”(3). In 2013, 6.7 percent of all U.S. adults aged 18 or older and 10.7 percent of adolescents aged 12-17 had at least one major depressive episode in the past year (4). There are significant societal and personal costs of depression including higher mortality rates with over 15 percent of people with depression committing suicide; complications for chronic disease patients, with depression serving as a co-morbidity to diseases such as diabetes, cancer, and heart disease; increased workplace costs; and associated substance abuse problems (5). Mental disorders typically have younger ages of onset compared to chronic physical disorders, which usually have risks that increase with age and peak later in life (6). One of the Healthy People 2020 objectives is to reduce the proportion of adolescents who experience major depressive episodes, which is a leading health indicator and highlights it as a high priority health issue (7). As well, both Healthy People 2020 and the Institute of Medicine have expressed the need for more research focusing on sexual minorities and health

disparities in order to improve the health status of this group (8, 9). Therefore, it is imperative to investigate the reasons for and contributors to depression and depressive symptoms, particularly in high-risk populations during critical time periods, such as sexual minorities during adolescence and within the transition into young adulthood.

Studies have also found that particular sexual minority subgroups such as bisexuals are more likely to experience depressive symptoms than their homosexual or heterosexual counterparts (1, 10). However, what is not entirely known is why this difference within the subgroups of sexual minorities exists. As well, it has been suggested through the psychological mediation framework proposed by Hatzenbuehler (11) that sexual minorities experience more stigma-related stress that influences social/interpersonal, coping/emotion regulation, and cognitive issues that mediate the relationship between the stigma-related stress and psychopathology such as depression. One of the concepts within cognitive processes that has been explored as a mediator is the idea of self-schemas and self-esteem, though its role as a mediator has been mixed in previous studies (12, 13) and its role particularly in the association between sexual minority status and depressive symptoms is lacking.

Background

Depression and sexual minority status

Research conducted thus far on the subject of depressive symptomatology in sexual minority youth has shown that they tend to have higher rates of depressive symptoms than their heterosexual counterparts (1, 2). Regarding the effect of sex, there have been mixed findings in terms of whether the relationship between sexual minority status and depression/depressive symptoms differs by sex, where some studies have

found that sex does have an effect while others have not (1, 2). One study that did find significant effects of sex observed that sexual minority females had significantly higher depressive symptoms when compared to sexual minority males as well as to heterosexual males and females (1). With regard to specific sexual minority subgroups, it has been seen that bisexuals have higher risk for different outcomes including depressive symptomatology and other mental health outcomes than heterosexuals and in some studies, their risk is even higher than that of homosexuals (1, 10, 14). Since sexual minority within-group differences have been observed, it is important to study why certain subgroups seem more susceptible and to analyze them in subgroups as well as by sex when possible.

Theoretical frameworks: depression and sexual minority status

The minority stress model suggested by Meyer (15) states that factors associated with being in a minority position such as stigma, prejudice, and discrimination contribute to creating a stressful social environment that leads to mental health issues. While the minority stress framework focuses on stress and emphasizes the experiences unique to LGB individuals that differ from that of heterosexuals, more recently another framework that takes a different approach has been suggested based on research that has examined the broader psychological processes that can influence mental health in both LGB and heterosexual individuals. This framework conceptualized by Hatzenbuehler (11) entitled the psychological mediation framework suggests that the general psychological processes that influence psychopathology in heterosexuals are the same that affect LGB individuals; however, because of stigma-related stress, LGB individuals are more susceptible. Within this framework, it is believed that stigma-related stress leads to more issues related to social/interpersonal, emotion/regulatory, and cognitive problems that act

to mediate the association between stigma-related stress and psychopathology such as depression and depressive symptoms (11).

Self-esteem as a mediator of sexual minority status and depressive symptoms

Within the category of cognitive mediators in the psychological mediation framework is the idea of self-schemas and self-esteem, in which self-esteem refers to how a person feels about and values him/herself. Mediation requires that the mediator first be associated with the exposure as well as the outcome. Findings show that self-esteem is associated with sexual minority status, where sexual minority individuals tend to have lower self-esteem as compared to heterosexuals (16-18). As well, self-esteem has been found to be associated with depressive symptoms, where low self-esteem is associated with and a predictor of depression; this has been proposed in theory and shown in application (19-24). Some studies have been conducted that examine self-esteem as a mediator between aspects related to sexual minority status and psychological outcomes, including depression; these have confirmed mediation (16, 25). However, limitations found among these studies include small sample size, grouping of sexual minority subgroups into one category, not being representative, not having a comparison group, and using cross-sectional analyses.

Objectives

The current study has three aims: 1. To compare the outcome of depressive symptoms between different groups based on romantic attraction; 2. To examine the role of self-esteem as a mediator in the relationship between sexual minority status and depressive symptoms; and 3. To investigate whether sex moderates differences in terms of the outcome as well as in self-esteem as a mediator. Based on previous studies and

knowledge, I hypothesized that: 1. Sexual minority groups, particularly those who are both-sex attracted, would have higher depressive symptoms than those who are opposite-sex attracted; 2. Self-esteem would mediate the relationship between sexual minority status and depressive symptoms, and 3. Females, especially sexual minority females, would have higher depressive symptoms, and self-esteem would mediate the association between sexual minority status and depressive symptoms differently in females compared to males.

To my knowledge, it does not appear that studies have been done with the exact aims that have been proposed here regarding self-esteem as a mediator between sexual minority status and depressive symptoms, while considering other aspects such as sex and different subgroups of sexual minorities. Though depressive symptoms have been examined based on sexual minority status in the same data set I propose to use (1, 26, 27), the aspects of self-esteem as a potential mediator and in conjunction, the role of sex, will be a different approach. As well, the use of an established temporal sequence between exposure, mediator, and outcome will contribute by giving more valid findings with respect to mediation analysis, and the use of a nationally representative data set will lend to the generalizability of the results. The independent variable of interest in this study is sexual minority status measured through romantic attraction, which is measured when participants are adolescents. This study is a prospective study in that the outcome variable is measured at a later point in time, when participants are adults. Therefore, findings from the study will provide information about the particular relationships of interest during a critical time period during the transition from adolescence into adulthood.

Chapter 2: Methods

Data source

The study will be conducted as secondary analysis of data from the National Longitudinal Study of Adolescent to Adult Health (Add Health); detailed descriptions of the study are available elsewhere (28). In brief, the data from this source is nationally representative and consists of multiple waves of data beginning with a cohort of adolescents in grades 7-12 during the 1994-95 school year. Add Health participants were selected based on systematic sampling methods and implicit stratification that provided a sample of 80 high schools and 52 middle schools in order to generate a sample representative of U.S. schools. An in-school questionnaire was given to the nationally representative sample of students, and a sample of students was randomly chosen for a series of in-home interviews to make up a core sample. In-home interviews were conducted during multiple waves of the parent study, including at the time of the initial wave, and approximately 1, 6, and 12 years following Wave I.

Inclusion/exclusion criteria

The current study uses data from Waves I-III, where participants who had valid sampling weights that were appropriate for this study were included. Participants who did not complete in-home interviews from all three waves were excluded from analyses, as well as those who had missing data on the romantic attraction items, on the depressive symptoms items from Waves I and III that were used to construct the outcome variables, and those who had missing items on the self-esteem measure.

Measures

Romantic attraction/sexual minority status (independent variable) Individuals were categorized into one of three groups based on their sex and answers to two questions asked at Wave I during the in-home survey conducted through audio computer-assisted self-interview (ACASI). These questions asked, “Have you had a romantic attraction to a female?” and “Have you had a romantic attraction to a male?” Possible responses were “no”, “yes”, “don’t know”, as well as a possibility for the participant to refuse to answer. Participants were put into the following categories: a) “same-sex attracted” if they reported being romantically attracted to only one sex and if that sex matched their own, b) “both-sex attracted” if they reported being romantically attracted to both sexes, and c) “opposite-sex attracted” if they reported being romantically attracted to only one sex and if that sex was the opposite of their own. Those who are same-sex attracted or both-sex attracted are considered sexual minorities and when combined made up the group “sexual minority” used in some analyses. Participants were excluded if they answered “don’t know” or refused to answer either of these two questions, or if for both questions they answered “no”, indicating no romantic attraction to either females or males. Opposite-sex attracted was used as the reference group, and so dummy variables were created for the other two groups.

Depressive symptoms (dependent variable) Depressive symptoms for this study was based on Wave III, approximately six years after Wave I when participants were ages 18-27. Depressive symptoms was measured using the CES-D scale (29). In this instance, the CES-D was used to measure depressive symptoms but not to provide a diagnosis of depression. The CES-D scale traditionally consists of 20 items, but Wave III of Add

Health included questions to comprise a 9-item CES-D scale, which has been used in studies prior that have used the data set and in the study of sexual minorities (1, 26). Previously, Add Health Wave I had used a 19-item CES-D scale, and it has been found that the 9-item CES-D correlates 0.96 with the 19-item CES-D and therefore has high criterion validity (30). The Cronbach alpha for the 9-item CES-D used has been found to be 0.8 within the Add Health data set in Wave III (1, 26). Participants were asked to think about the past seven days and how often various statements were true during those seven days. Example statements included “you were bothered by things that usually don’t bother you” and “you had trouble keeping your mind on what you were doing”. Possible answers were measured on a 4-point Likert scale, including the choices “never or rarely”, “sometimes”, “a lot of the time” or “most of the time or all of the time”. It was possible for the participant to refuse, to answer don’t know, or for the question to be considered “not applicable”. For measurement on the scale and for analysis, the answers to each item are associated with a number ranging from 0 (“never or rarely”) to 3 (“most of the time or all of the time”). The score on the CES-D scale was analyzed as a continuous variable where scores from the 9 items were averaged with a higher score indicating higher depressive symptoms. Participants were excluded if they did not complete all nine items from the scale.

Change in depressive symptoms (dependent variable) An alternate dependent variable that was analyzed was change in depressive symptoms. Like the other dependent variable, this was interested in depressive symptoms in Wave III but controlled for depressive symptoms in Wave I in order to provide stronger evidence for causality. The same CES-D 9-item scale that was used in Wave III was used to measure depressive

symptoms in Wave I, instead of the full 19-item CES-D scale that was available in Wave I in order to stay consistent with the outcome variable. When analyzing change in depressive symptoms as the outcome, the average CES-D score from Wave I was controlled for in regression models with the average CES-D score from Wave III serving as the outcome in order to generate this variable. Participants were excluded if they did not complete all nine items from the CES-D scale in Wave I.

Self-esteem (mediator) The current study assessed self-esteem in Wave II of Add Health. Wave II was conducted approximately one year after Wave I, where participants in the current study were ages 11-21. The measure used consists of six items to establish a scale that has been found to have a Cronbach alpha of 0.86 in Add Health for this particular wave (14). These six items are based on the widely used and accepted Rosenberg Self-Esteem Scale (RSE) (31), which typically uses 10 items to assess self-esteem. It has been stated in a study of item response theory analysis of the RSE scale that “in view of the uniformity of the item content and the consequently strong discrimination parameters of the 10 items, it is likely that the RSE Scale could be shortened without compromising the measurement of global self-esteem” (32). This suggests the acceptability of using the six-item scale as opposed to the 10-item scale, along with the fact that previous studies have set a precedent for use of this self-esteem measurement in the Add Health data set (14, 33). The self-esteem items use a 5-point Likert scale that ranges from strongly agree to strongly disagree, asking participants to rate their agreement/disagreement regarding statements about having many good qualities, having a lot to be proud of, liking yourself just the way you are, feeling you are doing things just about right, feeling socially accepted, and feeling loved and wanted

(example format for statement: “You feel loved and wanted”). Data was reverse coded so that the higher the score, the higher the self-esteem. The values for each of the items were averaged to create a single continuous variable.

Covariates Possible covariates of interest in the study included age, sex, and race/ethnicity. These variables are widely accepted as covariates of depressive symptoms and they have been found to be significantly associated with sexual orientation in a previous study using Add Health data (1).

Age Age at baseline was used for analysis. Age at Wave I was calculated according to recommendations by Add Health to generate the participant’s birthday using the month and year of birth reported by the participant and to use ‘15’ for the day, since participants were not asked this information in the interview (34). The variable was generated based on this information and the date of their interview; age was used continuously. At Wave I, participants were ages 11-20.

Sex A sex variable was created using data from Wave III. Though data was available in Wave I, it has been reported that there were participants who were incorrectly categorized for sex and that the data from Wave III was more accurate (34). In analyses that controlled for sex, male was used as the reference group.

Race/ethnicity A race/ethnicity variable was created based on a series of questions from the Wave I interview asking participants to mark whether they were of Hispanic or Latino origin and their race, where they could mark White; Black or African American; American Indian or Native American; Asian or Pacific Islander; or other. For the race question, participants were allowed to choose more than one answer. In the current study, one race/ethnicity variable was created, with the categories consisting of Hispanic;

White, non-Hispanic; Black/African American, non-Hispanic; Asian/Pacific Islander, non-Hispanic; and other, which includes those who chose American Indian or Native American, other, or more than one race and are therefore considered multi-racial. Three participants were found to have missing data on race/ethnicity from Wave I but had completed these items in Wave III; in order to include them in analysis, their answers to the items in Wave III were used as a substitute for the missing data. White, non-Hispanic was used as the reference group in analyses and therefore dummy variables were created for the other groups.

Data analysis

Linear regression models were used to evaluate the relationship between romantic attraction and depressive symptoms, as well as in evaluating the role of self-esteem as a possible mediator. To start, an analysis was done to analyze the association between romantic attraction and depressive symptoms. Univariate exploratory analysis and descriptive analysis was performed to observe the distributions of the different variables of interest; ANOVA and chi-square tests were used to test the significance of differences between groups for continuous variables and categorical variables, respectively. Bivariate analysis was conducted to see which variables were independently associated with the outcome. Multivariable-adjusted linear regression was run using both depressive symptoms in Wave III and change in depressive symptoms as outcomes with an interest in whether the sexual minority romantic attraction groups were significant predictors while controlling for the covariates, since they have been identified as confounders in the literature and their inclusion in the model was based on theoretical considerations. When running the analyses, an indicator variable was created in which those who met the

inclusion criteria for the current study were coded as 0, while those who did not meet the criteria were coded as 1. The domain statement was used in coding to be able to only analyze results in the sample of interest, since participants who did not meet inclusion criteria had to be included to generate accurate results using the sampling weights.

To test the role of self-esteem as a mediator in the analysis, mediation analysis as described by Baron and Kenny (35) was used. Using this method, there are four steps that are followed: 1. Show that the causal variable is correlated with the outcome; 2. Show that the causal variable is correlated with the mediator; 3. Show that the mediator affects the outcome; and 4. Show that the effect of the causal variable on the outcome is zero when controlling for the mediator. Based on these four steps, three linear regression models were tested, with steps three and four being analyzed using the same model: 1) Romantic attraction was assessed as a predictor of depressive symptoms; 2) Romantic attraction was assessed as a predictor of self-esteem; 3) Self-esteem was assessed as a predictor of depressive symptoms; 4) Romantic attraction was checked to see if it was still significantly associated with depressive symptoms in the full model. In the last model, if self-esteem was significant and the path between romantic attraction and depressive symptoms was reduced or no longer significant, then there was evidence for full mediation. If the first few steps were significant but the full model including the mediator resulted in romantic attraction still being statistically significant, then this gave evidence for partial mediation. Though this method by Baron and Kenny gives information about a variable being a mediator, it does not test the statistical significance of the mediator relationship. Sobel's test (36) was used to test for the significance of the effect via the mediator self-esteem, which gives information as to whether the indirect

effect in the pathway through self-esteem was significantly different from zero. All the linear regression models controlled for the same covariates included in the original multivariable-adjusted linear regression model.

To determine the role of sex, interaction was tested. With interaction, interaction terms were created to test the interaction between sex and the different sexual minority romantic attraction groups. If there were significance for any of the interaction terms, moderated mediation would be tested similarly to how mediation was conducted for the whole sample, but for the specific subgroup.

All statistical analyses were completed using SAS 9.3 (SAS Institute Inc, Cary, North Carolina). The only test completed not using SAS 9.3 was Sobel's test, which was calculated using a web-based source (37). This study was done using secondary data analysis, and therefore research on human subjects was not conducted. An exempt IRB application was submitted and approved by the University of Maryland, College Park IRB committee.

Chapter 3: Results

Participants

The number of subjects who completed in-home interviews in each of the three waves were as follows: Wave I: $n=20745$; Wave II: $n=14738$; and Wave III: $n=15197$. The starting sample size for the current study was $n=14322$, which is the number of people who completed Wave III and who had the valid sampling weights that were appropriate for this study based on the wave the outcome variable is from and the study design (Wave III, cross-sectional sampling weights). Participants were further excluded if they did not complete all three in-home interviews ($n=3493$), or if they had missing data needed to construct the romantic attraction variable ($n=1416$), depressive symptoms variable for Wave I ($n=15$), self-esteem variable from Wave II ($n=17$), and/or depressive symptoms variable for Wave III ($n=42$). This resulted in a final sample size of $n=9339$ (see Figure 1 for a visual representation of the steps to generate the final sample).

Descriptive data

The distribution and frequencies of variables of interest between romantic attraction groups are shown in Table 1. As well, a comparison of these same variables was made between the sexual minority group (consisting of both-sex and same-sex attracted individuals) and non-sexual minority group (opposite-sex attracted individuals); these results can be seen in Table 2. In unadjusted comparisons between the three romantic attraction groups, there were significant differences in depressive symptoms in Wave I ($p<.0001$), depressive symptoms in Wave III ($p=.0012$), self-esteem ($p<.0001$), age ($p<.0001$), and being female ($p<.0001$) in at least one pair of groups. Race was not

significant when comparing the romantic attraction groups. In unadjusted comparisons between the sexual minority group and non-sexual minority group, there were significant differences in all of the analyzed variables, including depressive symptoms in Wave I ($p < .0001$), depressive symptoms in Wave III ($p = .047$), self-esteem ($p = .0001$), age ($p = .002$), being female ($p < .0001$), and race ($p = .041$).

Relationship between sexual minority status and depressive symptoms

Bivariate analysis was run with the outcome depressive symptoms in Wave III, as well as with the outcome change in depressive symptoms, which controlled for Wave I depressive symptoms. Results can be seen in Table 3. For both outcomes analyzed, it was found that neither same-sex attraction nor both-sex attraction were significant. Analysis was run to see whether grouping the same-sex and both-sex attracted individuals into one sexual minority category would make a difference. For the outcome depressive symptoms in Wave III, it was found that being a sexual minority was a significant predictor ($p = 0.047$). However, with the outcome change in depressive symptoms, sexual minority status was not a significant predictor. In addition, being female ($p < .0001$) was a significant predictor of depressive symptoms in Wave III, while age at Wave I ($p < .0001$) and being female ($p < .0001$) were significant predictors of change in depressive symptoms.

Multivariable-adjusted linear regression was run to see whether same-sex attraction and/or both-sex attraction were significant in predicting depressive symptoms in Wave III and/or change in depressive symptoms when controlling for age, sex, and race (see Table 4). Although some of these variables were not significantly associated with the outcome, they were controlled for in the analysis because, as previously

mentioned, previous findings and literature has identified them as confounders. Both-sex attraction was a significant predictor ($\beta= 0.04$, $p=0.049$) of depressive symptoms in Wave III, with higher depressive symptoms compared to opposite-sex attracted individuals. Combining the sexual minorities into one group did not provide a significant predictor for depressive symptoms in Wave III. None of the romantic attraction predictors were significant in predicting the outcome change in depressive symptoms in the analysis. Considering that there was no significance with the outcome of change in depressive symptoms, all subsequent analyses were conducted using the outcome depressive symptoms at Wave III.

Self-esteem as a mediator between sexual minority status and depressive symptoms

Self-esteem was analyzed as a potential mediator in the relationship between sexual minority status and depressive symptoms in Wave III. Specifically, since both-sex attraction was the only sexual minority group seen to be a significant predictor of depressive symptoms in Wave III, the analyses was done for this specific relationship. As previously mentioned, Baron and Kenny's mediation analysis method was used. The first step and regression model tested the relationship between the causal variable, both-sex attraction, and the outcome, depressive symptoms in Wave III; this indicated that both-sex attraction was a significant predictor of the outcome ($\beta= 0.04$, $p=0.049$). The second step and regression model was conducted to test the relationship between the potential mediator, self-esteem, and the causal variable, both-sex attraction. It was found that both-sex attraction was statistically significant in the model ($\beta= -0.10$, $p=0.003$). The third step and regression model was conducted to test the relationship between the potential mediator, self-esteem, and the outcome, depressive symptoms in Wave III, while

controlling for both-sex attraction. It was found that self-esteem was a significant predictor of depressive symptoms in Wave III ($\beta = -0.05$, $p < .0001$). The fourth step in mediation analysis using the same regression model as step three found that both-sex attraction was no longer statistically significant when accounting for self-esteem ($\beta = 0.04$, $p = 0.08$); this gave evidence towards full mediation. To test whether this difference was statistically significant, Sobel's test was conducted. Sobel's test showed that the indirect effect of both-sex attraction on depressive symptoms in Wave III in the pathway through self-esteem was significantly different from zero ($p = 0.007$), verifying mediation (see Figure 2).

The effects of sex

Multivariable-adjusted linear regression as shown in the models testing the relationship between romantic attraction groups and depressive symptoms found that being female was a significant predictor of depressive symptoms in Wave III ($\beta = 0.07$, $p < .0001$), as well as a predictor of the outcome change in depressive symptoms ($\beta = 0.05$, $p < .0001$). Specifically, females were found to have average CES-D scores that were higher than was found in males. Since a difference was observed by sex, multivariable-adjusted linear regression models were run with interaction terms testing the significance of being both female and a sexual minority. Interaction terms were created for those who were both female and both-sex attracted, as well as those who were both female and same-sex attracted. However, this did not yield any significant findings. Interaction terms were then created to test the interaction between being a male and a sexual minority among the two groups to see if that had any significance; like with females, there were no significant findings. Based on these results, moderated mediation by sex was not tested.

Chapter 4: Discussion

The current study found that self-esteem is a mediator in the relationship between sexual minority status in both-sex individuals and depressive symptoms. Although this relationship has been tested in similar but not identical ways in previous studies, to my knowledge research had not been conducted on this topic in a large nationally representative sample, with multiple sexual minority subgroups, and using longitudinal data. In one study that tested Hatzenbuehler's psychological mediation framework, researchers found a mediation effect of self-concept (a measure inclusive of self-esteem and clarity of self) in the association between harassment for sexual minority status and depression ($\beta = .03, p < 0.01$), as well as between sexual minority status itself and depression ($\beta = .01, p < 0.01$) (16). However, this study combined individuals in both-sex and same-sex relationships into one group and this group consisted of a small sample of only 40 individuals. As well, they did not consider the role of sex in their analysis and did not use longitudinal data in conducting the mediation analysis. As well, another study found that self-esteem fully mediated the relationship between internalized heterosexism and psychological distress in sexual minority women using a Web-based survey using an internet sample (38). The current study found similar results to this study by linking a form of sexual minority related stress to psychopathology through self-esteem, but differed by having a sexual majority comparison group, using longitudinal data, and including males in analysis. Therefore, the current study was able to improve on previous studies by providing certain methodological improvements that lend more information to what has been found regarding self-esteem as a mediator in the relationship set by the psychological mediation framework. Based on these results, it appears that for those who

are both-sex attracted, self-esteem is in the pathway to the outcome of depressive symptoms. Interventions can be developed that target this group and that are intended to increase self-esteem in order to reduce depressive symptomatology during the transition into young adulthood.

In the current study, it was found that those who were both-sex attracted in adolescence had higher depressive symptoms in young adulthood than those who were opposite-sex attracted. But, the relationship between both-sex attraction and depressive symptoms was close to being not significant ($p=.049$) and the difference in depressive symptoms between the both-sex attracted and opposite-sex attracted group was very small ($\beta=0.04$). Based on these details, in reality the difference in average depressive symptoms is relatively small and therefore it is possible that it is not as meaningful as compared to if there were a larger difference. This may be due to how depressive symptoms was measured, in which the average score on the CES-D scale was taken, providing a small range for possible scores (between 0 and 3). Though quantitatively it appears that the difference in depressive symptoms is small, nevertheless there was a difference detected and this difference is consistent with findings from other studies that have shown that those who are both-sex attracted or bisexual have higher depressive symptoms than their opposite-sex attracted and sometimes same-sex attracted counterparts (1, 10, 14). As well, it is difficult to know how quantitative changes on this scale translate to the manifestation of depression in terms of health, functioning, and well-being; though it is a small difference on the scale, it may have more meaning in a real-life setting. Based on these considerations, it may be best to interpret findings cautiously, but acknowledge that there are differences between groups that could have

public health significance. It may be useful for future studies to use a different measure of depressive symptoms or depression that would allow for easier interpretation of results, such as one that was validated to have a dichotomous outcome.

Although this finding associating both-sex attracted individuals with higher depressive symptoms has been shown in numerous studies, it is not entirely understood why both-sex attracted and bisexual individuals have higher depressive symptoms than even their same-sex attracted and homosexual counterparts. It has been suggested however that a possible reason for the difference is that bisexuals may feel that they do not entirely fit into either the heterosexual or homosexual communities and therefore do not receive the support they need or have a strong sense of belonging, which can increase minority-related stress (10, 39). As well, both the heterosexual and homosexual communities stigmatize bisexuals, where they are the victims of stereotypes and negative attitudes. Some of these negative attitudes include being seen as “in denial” about their sexual orientation and being deemed not loyal in the sense that they are untrustworthy and unable to remain monogamous (40, 41); these experiences can influence psychopathology such as through increases in depressive symptoms. Findings from the current study lend knowledge into a possible pathway that leads to both-sex attracted individuals having higher depressive symptoms and that can be targeted in interventions. Previous studies that are available that have identified other mediators between sexual minority status stressors and psychopathology often do not separate sexual minority subgroups, and therefore it is difficult to identify reasons for the differences between the subgroups. More research should be done in the future regarding this topic and to evaluate differences between sexual minority subgroups, as well as the possible

development of interventions to improve the acceptance and experiences for both-sex attracted and bisexual individuals.

Though findings were significant in both-sex attracted individuals with the outcome depressive symptoms measured in Wave III, there was no significance in the outcome change in depressive symptoms. This suggests that for all romantic attraction groups, there was no significant difference between them in terms of change in depressive symptoms from adolescence to young adulthood. This finding may be due to the fact that between the different groups, the trends in depressive symptoms during this developmental time period appear to be the same. In one study of depressive symptoms trajectories by sexual orientation, it was found that over time, levels of depressive symptoms stayed relatively stable for each group (1). Based on this finding, it is reasonable that no significant difference was found between groups in the current study if the majority of people did not change in their level of depressive symptoms between Wave I and Wave III.

Due to the knowledge that males and females differ in rates of depressive symptoms and depression, this study aimed to see whether males and females did differ in the relationship between romantic attraction/sexual minority status and depressive symptoms. Although it was confirmed that females have higher depressive symptoms than males, there was no significant interaction between sex and sexual minority status. Based on examination of the literature, previous studies have shown that there are interactions between sex and sexual minority status, where some studies find that female sexual minorities have higher depressive symptoms while others find male sexual minorities have higher depressive symptoms. In terms of male sexual minorities having

higher depressive symptoms, sexual minority males have been found to be more likely to encounter certain situations than female sexual minorities that could contribute to depressive symptoms. Gay men are at greatest risk for person crimes and are more likely than lesbians and bisexuals to be harassed because of their sexual orientation (42). Sexual minority-related victimization has been found to mediate the relationship between sexual minority status and depressive symptoms (43). As well, gender roles and sexuality are more rigid for males than for females, where males who do not conform are seen more negatively (44); sexual minority males who may not fit within the confines of these stricter roles may have to endure situations that lead to higher psychological issues, such as through victimization. As for higher depressive symptoms found amongst sexual minority females, it has been suggested that this could be due to a strong need for affiliation during this developmental period, along with peer victimization due to one's sexual minority status, which can lead to "stronger emotional reactions" (1). It is possible that interaction was not significant in the current study due to issues such as smaller sample sizes among the sexual minority romantic attraction groups. Based on previous findings that suggest that there is interaction between sex and sexual minority status, future studies should investigate this topic further in order to determine what groups are at greatest risk and to be able to come to more of a consensus.

There are multiple strengths of this study, some of which build upon studies that have been done previously. First, one of the primary strengths was the use of a longitudinal data set in order to establish a clear temporal relationship between exposure, mediator, and outcome. It has been suggested that cross-sectional analysis of mediation, though commonly done, yields biased results (45, 46); by using longitudinal data, it will

make the mediation analysis more valid. As well, by examining relationships over time, findings provided information related to the transitioning between critical time periods, such as from adolescence into young adulthood. In a study of trajectories of depressive symptoms among sexual minority subgroups and heterosexuals, most groups were found to have increased depressive symptoms during this time period (1); this highlights it as a critical period for study. Second, the study analyzed the relationships of interest between groups according to sexual minority subgroups based on romantic attraction, rather than grouping sexual minorities into one group for all analyses. Differences have been found within subgroups of sexual minorities regarding the outcome of depressive symptoms as well as with self-esteem (1, 14, 18), thereby providing evidence that it is best to analyze subgroups separately as there is variation within the broader group. Third, since the current study is being conducted using data that is nationally representative, findings from it will yield results that will be generalizable to a large population. Fourth, both depressive symptoms and change in depressive symptoms were analyzed as outcomes, where the latter would have provided more evidence for causality. Though there were no significant findings with the latter outcome, it does provide important information that suggests sexual minorities do not differ from opposite-sex attracted individuals in change in depressive symptoms during this time period but do have higher depressive symptoms in adulthood.

In addition to the strengths of the study, there are also some limitations. First, the CES-D scale used to measure the outcome depressive symptoms does not give a clinical diagnosis of depression. It has been found that those who score high on the CES-D scale often do not fit the criteria for an actual diagnosis of depression (47, 48). Therefore, no

inferences can be made regarding depression as an outcome and findings are limited to depressive symptoms only. Second, those who refused to answer the romantic attraction items, answered “don’t know” to either item, or did not report attraction to either males or females had to be excluded from analysis. The decision to not respond to these items may be due to a non-response bias, and it is possible that there was a response bias where participants answered in a way that they thought would be acceptable by the researchers and society. As well, since these individuals could not be included in the analysis since they could not be appropriately categorized, it is unknown how they would exactly contribute to the findings. However, an analysis was run to see how these individuals differed from those who did answer the romantic attraction questions in terms of the outcome depressive symptoms. It appears that those who were excluded for this particular reason did not significantly differ from those who were opposite-sex attracted in the depressive symptoms outcome, but did differ significantly from both-sex and same-sex attracted individuals in pairwise comparisons. Therefore, it seems possible that those who were excluded would have either attenuated findings or not influenced them very much in terms of finding significant differences by sexual minority status. Third, though romantic attraction was used as a way to categorize individuals, it cannot be implied that romantic attraction is an indicator of actual sexual identity or behavior (14). However, as a measure of sexual orientation, romantic attraction has been found to be the most stable over time compared to other measures, and was found to be fairly consistent with sexual behavior later on (39). Considering this study involved the use of longitudinal data, it is conceptually important that this measure does not change considerably over time and therefore the use of romantic attraction was appropriate. As well, recognition of

one's same-sex attractions has psychological implications including the need to cope with feelings that are outside the "norm" of society (14); even if individuals are not participating in sexual behavior or identifying outwardly in a way that is consistent with their romantic attractions, it can still have meaningful effects. Fourth, the number of individuals in the sexual minority subgroups was greatly smaller than the number of opposite-attracted individuals, which could have influenced results, particularly with the stratified analysis. It would be beneficial in future studies to have a large sample size for sexual minorities while having a comparison group as well.

Chapter 5: Conclusion

Findings from this study have implications for possible interventions to reduce depressive symptoms in sexual minorities during the transition into adulthood. The current study found that both-sex attracted individuals had higher depressive symptoms than opposite-sex attracted individuals, where self-esteem mediated the relationship; based on these results, it may be useful for future interventions to try to increase self-esteem and feelings of self-worth in this particular group. As with other studies, the current study found that females have higher depressive symptoms than males. However, no significant interaction was found between sex and sexual minority status. Future research should aim to gather samples that include larger numbers of sexual minorities while including a comparison group and to test the usefulness of self-esteem focused interventions in these specific groups.

Appendix

Figures

Figure 1: Flowchart of exclusion criteria used to generate final sample

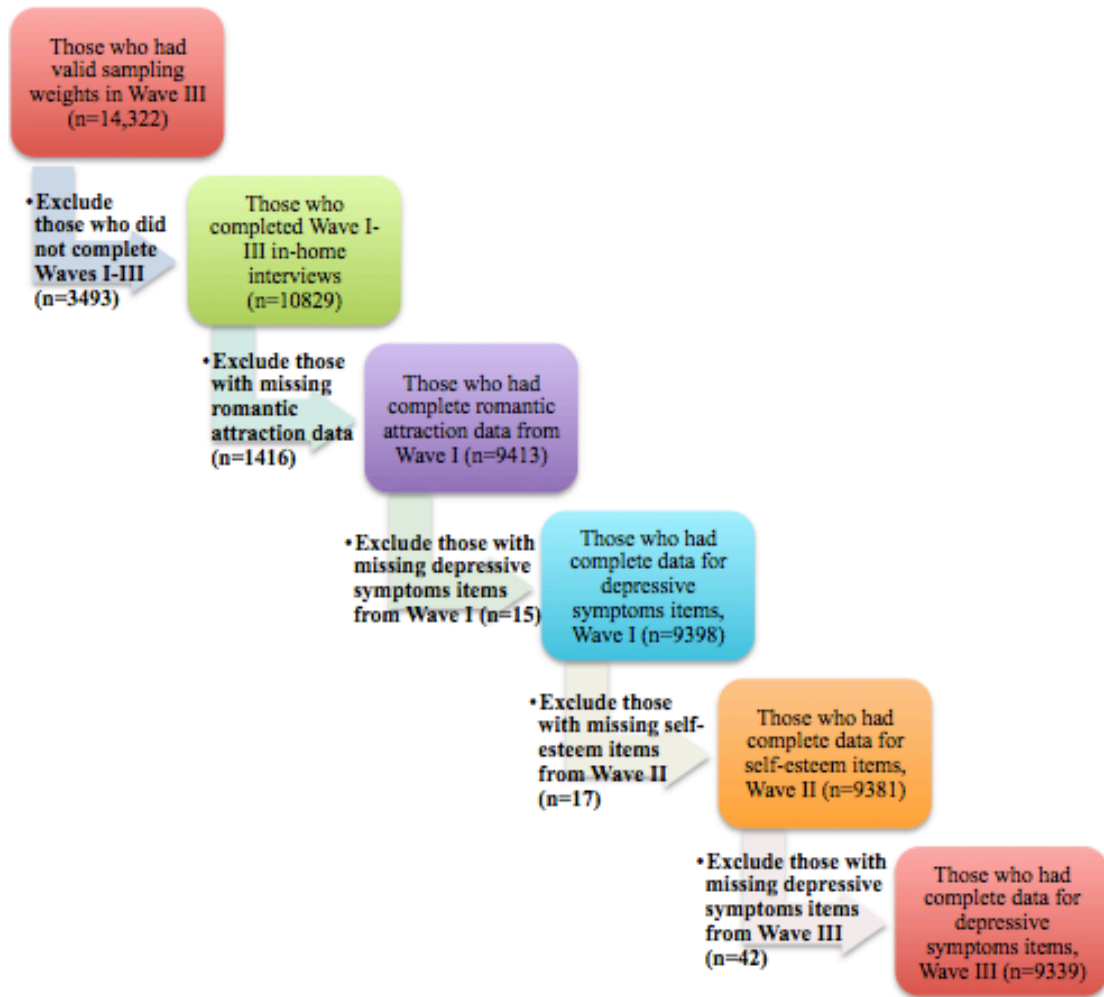
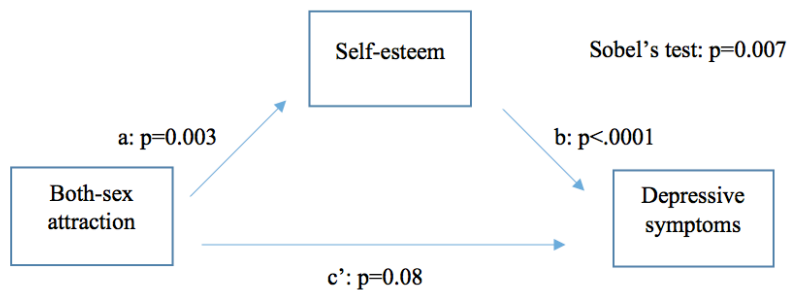


Figure 2: Mediation between both-sex attraction and depressive symptoms in Wave III by self-esteem



Tables

Table 1: Univariate analysis for variables by romantic attraction group

	Opposite-sex attracted (n=8752; 93.7%)	Same-sex attracted (n=98; 1.0%)	Both-sex attracted (n=489; 5.2%)	ANOVA p-value (continuous) or Chi-square p-value (discrete)
Age Wave I (mean)	15.1 (SE=0.11)	15.3 (SE=0.21)	15.4 (SE=0.15)	<.0001
Sex (% female)	54.4%	63.3%	38.9%	<.0001
Hispanic	15.7%	22.5%	19.0%	0.13
Non-Hispanic White	54.3%	40.8%	49.4%	
Non-Hispanic Black	18.7%	21.4%	19.0%	
Non-Hispanic Asian	6.1%	8.2%	5.7%	
Non-Hispanic Other	5.2%	7.1%	6.8%	
CES-D Wave I	0.90 (SE=0.01)	1.07 (SE=0.05)	0.96 (SE=0.02)	<.0001
Self-esteem Wave II	4.19 (SE=0.01)	3.84 (SE=0.08)	4.10 (SE=0.04)	<.0001
CES-D Wave III	0.88 (SE=0.01)	0.96 (SE=0.05)	0.91 (SE=0.02)	0.0012

Table 2: Univariate analysis for variables by sexual minority status

	Non sexual minority (n=8752)	Sexual minority (n=587)	ANOVA p-value (continuous) or Chi-square p-value (discrete)
Age Wave I (mean)	15.1 (0.1)	15.4 (0.1)	0.002
Sex (% female)	54.4%	42.9%	<.0001
Hispanic	15.7%	19.6%	0.041
Non-Hispanic White	54.3%	48.0%	
Non-Hispanic Black	18.7%	19.4%	
Non-Hispanic Asian	6.1%	6.1%	
Non-Hispanic Other	5.2%	6.8%	
CES-D Wave I	0.90 (0.01)	0.97 (0.02)	<.0001
Self-esteem Wave II	4.19 (0.01)	4.06 (0.03)	0.0001
CES-D Wave III	0.88 (0.01)	0.92 (0.02)	0.047

Table 3: Bivariate analysis with outcomes change in depressive symptoms and depressive symptoms at Wave III

Variable	Change in depressive symptoms (SE)	P-value	Depressive symptoms Wave III (SE)	P-value
Reference: Opposite-sex attracted				
Same-sex attracted	0.04 (0.05)	0.42	0.07 (0.05)	0.15
Both-sex attracted	0.02 (0.02)	0.37	0.03 (0.02)	0.16
Sexual minority	0.02 (0.02)	0.23	0.04 (0.02)	0.047
Age Wave I	-0.01 (0.00)	<.0001	-0.01 (0.00)	0.06
Female	0.05 (0.01)	<.0001	0.07 (0.01)	<.0001
Reference: Non-Hispanic White				
Hispanic	0.01 (0.02)	0.52	0.01 (0.02)	0.57
Non-Hispanic Black	0.02 (0.02)	0.11	0.02 (0.02)	0.15
Non-Hispanic Asian	-0.03 (0.03)	0.26	-0.02 (0.02)	0.24
Non-Hispanic Other	0.01 (0.03)	0.66	0.02 (0.02)	0.26

Table 4: Multivariable-adjusted analysis with outcomes change in depressive symptoms and depressive symptoms at Wave III comparing romantic attraction groups

Variable	Change in depressive symptoms; estimate (SE)	P-value	Depressive symptoms Wave III; estimate (SE)	P-value
Reference: Opposite-sex attracted				
Same-sex attracted	0.04 (0.04)	0.42	0.07 (0.05)	0.17
Both-sex attracted	0.03 (0.02)	0.15	0.04 (0.02)	0.049
Age Wave I	-0.01 (0.00)	0.0004	-0.005 (0.003)	0.11
Female	0.05 (0.01)	<.0001	0.07 (0.01)	<.0001
Reference: Non-Hispanic White				
Hispanic	0.01 (0.02)	0.41	0.02 (0.02)	0.35
Non-Hispanic Black	0.01 (0.02)	0.45	0.03 (0.02)	0.14
Non-Hispanic Asian	-0.02 (0.02)	0.44	-0.01 (0.02)	0.54
Non-Hispanic Other	0.01 (0.02)	0.49	0.03 (0.02)	0.16

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