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Associations among Sexual Orientation, Psychosis-Spectrum Symptomatology, and
Contextual Mediating Factors

THESIS

submitted in partial satisfaction of the
requirements for the degree of

MASTER OF ARTS
in Psychological Science

by

Maksim Giljen

Thesis Committee:
Professor Jason Schiffman, Chair
Associate Professor Elizabeth Martin
Professor Jessica Borelli

2024

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ABSTRACT OF THE THESIS

Associations among Sexual Orientation, Psychosis-Spectrum Symptomatology, and
Contextual Mediating Factors

by

Maksim Giljen

Master of Arts in

Psychological Science

University of California, Irvine, 2024

Professor Jason Schiffman, Chair

In line with the minority stress model of psychopathology, research suggests that sexual minority individuals are at an increased risk for psychosis-spectrum experiences. Contextual social factors, such as stressful life events and discrimination, have been found to partially explain the relation between sexual minority status and psychosis-spectrum experiences. However, such research is limited, particularly in North American populations and individuals experiencing subclinical symptoms. We conducted a secondary data analysis aimed at understanding how contextual factors related to stress may differ based on sexual minority status and potentially mediate associations between sexual orientation and positive psychosis-spectrum symptomatology and functioning in a U.S. sample. Data were collected as part of the Computerized Assessment of Psychosis-Risk (CAPR) study. Participants in the study were 12–34-year-olds who self-reported sexual orientation ($n_{\text{heterosexual}} = 496$, $n_{\text{sexual minority}} = 269$), perceived stress, negative life events, experiences of everyday discrimination, and childhood trauma/abuse. Participants were assessed on the Structured Interview for Psychosis-Risk

Syndromes and scales of global, social, and role functioning. Sexual minority participants were more likely to be at clinical-high risk for psychosis compared to their heterosexual counterparts. Sexual minority individuals also endorsed greater perceived stress and more frequent everyday discrimination, as well as more negative life events and types of childhood trauma. Sexual minority status was significantly associated with increased positive psychosis-spectrum symptom severity and decreased global, social, and role functioning. These associations were partly attributable to associations between sexual minority status and perceived stress and negative life events respectively. Study findings highlight the role of stress in informing the understanding and assessment of psychosis-risk in sexual minority populations. Future research would benefit from assessing sexual minority-specific mechanisms of stigma and incorporating considerations of intersectional marginalization and associated stressors.

Keywords: Sexual minority, minority stress model, psychosis spectrum, clinical high-risk for psychosis, contextual factors

INTRODUCTION

Contextual Factors in Psychosis Risk

Psychosis-spectrum disorders typically cause significant distress and/or dysfunction for those experiencing symptoms. Schizophrenia has been found to be a leading cause of disability on a global scale, and those with diagnosed psychosis have been found to be at heightened risk for premature mortality and death by suicide (GBD, 2016; Olfson et al., 2015; Palmer et al., 2005). Due to the heavy burden caused by psychosis-spectrum symptomatology, both at the individual level (e.g., distress, impaired functioning) and at institutional levels (e.g., medical system costs) (Desai et al., 2013), developing a clear understanding of vulnerability for psychosis-spectrum experiences is critical for early identification and intervention. As such, early intervention efforts and research targeting mechanisms of risk are particularly critical for alleviating the burden of psychosis-spectrum symptomatology. To this end, a growing body of literature has found that contextual factors, such as identity and environmental stressors, are prominent mediators of psychosis risk (Bridgwater et. al, 2023; Deluca et al., 2022). Such contextual factors are especially relevant for understanding psychosis risk and early intervention efforts in minoritized communities facing increased vulnerability for negative mental health outcomes due to the consequences of systemic marginalization and heightened stress. For example, race and environmental stressors are prominent contextual factors that have been examined for their roles in the development of psychosis-spectrum experiences. Racially minoritized groups have been found to endorse higher rates of subclinical psychosis symptoms associated with marginalizing experiences such as racial discrimination and police victimization (Calkins et al., 2014; Morgan et al., 2009; Wigman et al., 2011). Environmental stressors, such as high neighborhood crime and social isolation, have also been associated with heightened

paranoia (Butter et al., 2017; Vargas et al., 2020; Wilson et al., 2016). Such findings illustrate the value of contextual factors in not only illuminating models of psychosis risk but also informing potential targets of intervention in particularly vulnerable populations.

Sexual Minority Status and Psychosis-spectrum Experiences

Despite growing evidence for the importance of social and cultural context in mediating vulnerability for psychosis, psychosis risk and associated symptomatology remain understudied and poorly understood for many marginalized populations. Sexual minority individuals (i.e., non-heterosexual identifying individuals) comprise one such population. Literature on the association between sexual orientation and psychosis risk is limited, but existing studies suggest that sexual minority status is a significant correlate of risk for psychosis-spectrum experiences. European population studies have found an association between sexual minority status and psychosis-spectrum symptoms (Chakraborty et al., 2011), with non-heterosexual individuals showing a two-to-threefold greater likelihood of reporting positive psychotic experiences (e.g., delusions, hallucinations) than their heterosexual counterparts (Gevonden et al., 2014; Jacob et al., 2021). Research in North America is scarce, but Bolton and colleagues (2011) found that gay and bisexual men in the U.S. were twice as likely as heterosexual men to meet criteria for a psychotic disorder diagnosis. Although further research is needed to better understand psychosis risk and potential underlying mechanisms in sexual minority populations, existing evidence suggests that sexual minority status is associated with a greater likelihood of experiencing psychosis-spectrum symptoms and receiving a psychotic disorder diagnosis.

Minority Stress Model: Social Context as a Mediator of Psychosis Risk

Considering such emerging evidence for differential risk for psychosis on the basis of sexual orientation, it is critical to understand how contextual factors may mediate risk for

psychosis-spectrum symptomatology in sexual minority populations. Potential explanatory factors of psychosis risk in sexual minority populations may be best understood through the lens of minority stress theory. Sexual minority populations have been found to be at increased risk for experiencing various social stressors across the lifespan, including stressful childhood experiences (e.g., sexual abuse, emotional neglect), peer victimization and violence in schools, workplace discrimination, and more frequent lifetime and everyday experiences of discrimination (Garofalo, 1998; Mays & Cochran, 2001; Schneeberger et al., 2014; Toomey et al., 2016; Waldo, 1999). The negative impacts of social stress can be internalized as well, as sexual minority individuals report experiencing self-stigmatization associated with negative mental health outcomes (Williamson, 2000). The minority stress model conceptualizes the impact of such life stressors and differential vulnerability for psychopathology, such as psychosis, by delineating how heterosexism-the social marginalization and stigmatization of sexual minority identity- produces a stressful and invalidating environment that yields negative mental health outcomes (Meyer, 2003). Support for this model in its relation to psychosis risk can be seen in studies in Europe that have found stressful life events, loneliness, and experiences of discrimination explain a significant portion of the variance in the relation between sexual minority status and psychotic symptoms (Gevonden et al., 2014; Jacob et al., 2021; Oh et al., 2022). Furthermore, previous work using a subsample of participants (N = 372) represented in the present study found that when covarying for perceived stress, sexual minority status was no longer significantly associated with increased positive symptom severity and reduced functioning (Giljen et al., 2023). These findings suggest that heightened experiences of stress may help explain differential outcomes in psychosis-spectrum symptomatology associated with sexual orientation.

Understanding the complexity of relations between contextual factors of risk can be particularly relevant for sexual minority individuals at clinical high-risk for psychosis (CHR-p). CHR-p symptoms typically emerge in youth and define a high-risk designation along the psychosis continuum that is characterized by subthreshold positive psychosis-spectrum symptoms that are distressing and/or impairing but are not severe enough to meet criteria for a psychotic disorder diagnosis (McGlashan et al., 2010). In their work within a subsample of the current study's participant pool, Giljen et al. (2023) also found that a greater proportion of sexual minority participants met criteria for CHR-p in comparison to their heterosexual counterparts. As in sexual minority populations, individuals at CHR-p have also been found to experience greater perceived discrimination (Saleem et al., 2014) and report increased experiences of trauma (Stowkowy et al., 2016). As such, heightened stress and contextual factors that confer vulnerability for psychosis may be especially relevant and impactful for sexual minority populations who may be disproportionately vulnerable to negative mental health outcomes due to the consequences of minority stress processes.

Cultural context is also critical to informing the understanding of psychosis risk and minority stress processes in sexual minority populations. Research on the relation between sexual orientation and psychosis-risk is less prevalent in North America, with most findings coming from research conducted in European samples. As such, further research is needed to understand how sexual orientation relates to psychosis-spectrum experiences in North America specifically as perceptions and societal treatment of sexual minority individuals are ultimately shaped by sociocultural context that varies across time and place (Tskhay & Rule, 2015).

Present Study

The present study aimed to improve the field's understanding of sexual minority status in the U.S. as a risk marker for psychosis-spectrum experiences, with particular emphasis on assessing vulnerability in sexual minority populations and identifying potential contextual factors that may influence the relation between sexual orientation and psychosis-spectrum symptomatology. As such, the primary aims of the study were as follows:

Aim 1: Assess whether sexual minority status is associated with meeting criteria for interviewer-rated CHR-p status.

Hypothesis 1: Sexual minority status will be a significant positive statistical predictor of meeting criteria for CHR-p status in comparison to heterosexual identity.

Aim 2: Examine associations between sexual orientation and positive psychosis-spectrum symptoms and global, social, and role functioning.

Hypothesis 2: Sexual minority status will be associated with more severe positive psychosis-spectrum symptom ratings and lower global, social, and role functioning ratings.

Aim 3a: Examine the prevalence of self-reported experiences associated with the minority stress model among sexual minority and heterosexual individuals, including perceived stress, everyday experiences of discrimination, negative life events, and childhood trauma/abuse.

Hypothesis 3a: Sexual minority individuals will report greater endorsement of perceived stress, everyday experiences of discrimination, negative life events, and childhood trauma/abuse compared to their heterosexual counterparts.

Aim 3b: Identify contextual correlates in the relation between sexual orientation and psychosis-spectrum symptomatology.

Hypothesis 3b: Perceived stress, everyday experiences of discrimination, negative life events, and endorsement of childhood trauma/abuse will partially account for the relation between sexual minority status and psychosis-spectrum symptomatology in our sample.

METHOD

Data Collection Procedures

This study was a secondary data analysis of data collected from the Computerized Assessment of Psychosis-Risk (CAPR) study (Mittal et al., 2021). CAPR is an online, multi-site study conducted at six institutions across the U.S.: University of California, Irvine, Northwestern University, University of Georgia, Emory University, Yale University, and Temple University. The aim of CAPR is to develop an accessible, computerized task battery capable of being administered online that can accurately predict when an individual may be at increased risk for developing psychosis. The study's baseline assessment consists of participants completing a clinical interview, computerized task battery, and self-report questionnaires. CAPR also includes 12-month and 24-month follow-up visits in which participants complete select components of the clinical interview and self-report batteries that were administered at baseline. For the purposes of this study, data analysis consisted solely of a cross-sectional analysis of baseline time point data.

Participants

CAPR recruits participants aged 12-34 from across the U.S. Exclusion criteria for the study include a history of traumatic brain injury, tic disorders or neurological disorders, intellectual disabilities, suicidal ideation that poses an imminent risk, meeting for a psychotic disorder diagnosis, and substance use within 6 months prior to assessment that cannot be separated from symptom chronology. The analysis sample ($N = 765$) was divided into sexual minority identifying participants ($n = 269$) and heterosexual participants ($n = 496$). For the

purposes of this study, sexual minority status was defined as identifying with any sexual orientation other than heterosexual. In the analysis sample, 49.6% of participants identified as people of color, and 55.2% of participants indicated sex assigned female at birth. Mean participant age of the sample was 23.6 years old ($SD= 4.19$) (See Table 1 for full sample characteristics).

Participants in the CAPR study were assessed for psychosis-spectrum experiences and non-psychosis spectrum psychopathology using the Structured Interview for Psychosis-Risk Syndromes and the Structured Clinical Interview for DSM-5 respectively. The study sample was highly heterogeneous and included individuals who did not endorse any symptoms of psychosis-risk or past or current psychopathology ($n = 190$), those who have met diagnostic criteria for non-psychotic disorders and/or endorsed subclinical psychosis-spectrum symptoms ($n = 265$), and those who met CHR-p criteria ($n = 310$).

Measures

CAPR collects a wide range of data using clinical interview measures and self-report questionnaires. Questionnaires were used to collect information on demographic characteristics, perceived stress, and experiences of discrimination based on sexual orientation. Clinical interview measures were used to collect information on positive psychosis-spectrum symptoms, functioning (global, social, role), negative life events, and history of childhood trauma/abuse. The present study utilized the following measures from the CAPR study:

Interview Measures

Structured Interview for Psychosis-risk Syndromes (SIPS)

The SIPS employs the Scale of Prodromal Symptoms to rate the severity of positive, negative, and disorganized symptoms along a 7-point scale ranging from absent (0) to severe and

psychotic/extreme (6) (McGlashan et al., 2010; Miller et al., 2003). The SIPS measures five positive symptom domains: unusual thought content/delusional ideas, suspiciousness/persecutory ideas, grandiose ideas, perceptual abnormalities/hallucinations, and disorganized communication. The SIPS was administered by raters who had undergone certification and reliability training from a SIPS-certified trainer (Dr. Jason Schiffman). Symptoms were rated based on participant responses and interviewer observations during the clinical interview. CHR-p diagnostic criteria are defined by severe but subthreshold levels of positive symptoms and/or a decline in global functioning that is accompanied by a diagnosis of schizotypal personality disorder and/or a first-degree family history of psychosis. Multi-site consensus calls are held weekly among CAPR study clinical interviewers to reach agreement on SIPS positive symptom ratings for each participant meeting CHR-p diagnostic criteria. The SIPS has demonstrated excellent cross-cultural inter-rater reliability in diagnosing psychosis-risk syndrome status ($\kappa=0.89$) (Woods et al., 2019). The present analyses focused only on positive psychosis-spectrum symptoms, and a sum positive symptom score was generated for statistical comparison.

Functioning Scales

The Global Assessment of Functioning is a diagnostic interview component included in the SIPS that is used to assess overall functioning for a participant across social, role, and psychological domains of functioning (Aas, 2010). This functioning scale is rated from 1-100, where 1 indicates severely impaired functioning and risk for harm to self or others, while 100 indicates no impairment in functioning and no psychological symptoms. The Global Assessment of Functioning has demonstrated somewhat inconsistent inter-rater reliability ranging from poor to excellent, but most studies have demonstrated satisfactory inter-rater agreement to our knowledge (Grootenboer et al., 2012; Hall, 1995; Hilsenroth et al., 2000; Niv et al., 2007; Rey et

al., 1995; Söderberg et al., 2005). As an indicator of validity, in the present study, global functioning ratings were positively correlated with measures of social ($\rho = 0.597, p < .001$) and role ($\rho = 0.603, p < .001$) functioning.

The Global Functioning Scale: Role (Niendam et al., 2006) and Global Functioning Scale: Social (Auther et al., 2006) are separate interviewer-rated assessments used to evaluate role and social functioning respectively. Functioning ratings on these measures are made on 10-point Likert scales. On the Global Functioning Scale: Role, a score of 10 indicates “Superior Role Functioning” (e.g., Independently maintaining superior functioning in demanding roles), while a score of 1 indicates “Extreme Role Dysfunction” (e.g., Severe disability, minimal role-related activities). On the Global Functioning Scale: Social, a score of 10 indicates “Superior Social/Interpersonal Functioning” (e.g., Superior functioning in a wide range of social and interpersonal activities), while a score of 1 indicates “Extreme Social Isolation” (e.g., no social contact). These scales were developed for use in individuals at CHR for psychosis specifically and have been validated with high inter-rater reliability in prior studies (intraclass rater correlations > 0.90) (Carrión et al., 2019).

Childhood Trauma and Abuse Scale

The Childhood Trauma and Abuse Scale is six-item interview measure used to ask participants about their history of trauma and abuse in 6 domains: psychological bullying, physical bullying, emotional neglect, physical abuse, psychological abuse, and sexual abuse (Janssen et al., 2004). Interviewers only ask about the lifetime occurrence of each type of trauma. For analytic purposes, a sum score was generated for the total number of types of childhood trauma/abuse endorsed. As an indicator of convergent validity in the present analysis sample, the total number of types of childhood trauma/abuse endorsed on the Childhood Trauma and Abuse

Scale was positively correlated with endorsement of negative life events on the Life-Events Scale ($\rho = 0.660, p < .001$).

Life-Events Scale

The Life-Events Scale administered in CAPR is a modified version of the Psychiatric Epidemiology Research Interview Life Events Scale (Dohrenwend et al., 1978) used in the North American Prodrome Longitudinal Study Phase 2 (NAPLS-2) study (Trotman et al., 2014). This version of the Life-Events Scale is a 59-item interview measure that includes significant life events and changes appropriate to the age range of the CAPR sample. Items are categorized as positive or negative events. Participants indicate whether each event has occurred in their lifetime, and they are then asked to provide a subjective stress rating for each endorsed event. Stress ratings are made on a 7-point Likert scale where 1 = “occurred, but was not very stressful” and 7 = “caused me to panic.” For analytic purposes, a sum score was generated for the total number of negative events endorsed. As noted previously, convergent validity for the Live-Events Scale in this study was supported by a significant positive correlation between the total number of negative life events endorsed and endorsement of childhood trauma/abuse on the Childhood Trauma and Abuse Scale ($\rho = 0.660, p < .001$).

Self-Report Measures

Demographics

Participants self-report demographic information, including age, gender identity, sexual orientation, racial identity, and ethnic identity. For indicating sexual orientation, participants were provided with the following options: “Heterosexual or straight,” “Gay or lesbian,” “Bisexual,” “Other,” and a “Write in” option for self-reporting. For the purposes of the present study, heterosexual participants were identified as those who endorsed the “Heterosexual or

straight” response option. Sexual minority participants were identified as those who endorsed “Gay or lesbian,” “Bisexual,” and “Other,” as well as those who chose the “Write in” option and described a sexual orientation other than heterosexual/straight.

Everyday Discrimination Scale

The Everyday Discrimination Scale is a 9-item self-report measure used to assess subjective experiences of discrimination in an individual’s everyday life (Williams et al., 1997). Participants indicate the frequency at which they are exposed to each experience of discrimination. Examples of items include “For unfair reasons, have you ever not been hired for a job?” and “Have you ever moved into a neighborhood where neighbors made life difficult for you or your family?”. Frequency ratings are made on a 6-point Likert Scale: 0 = Never, 1 = Less than once a year, 2 = A few times a year, 3 = A few times a month, 4 = At least once a week, and 5 = Almost every day. If a participant indicates that an experience occurs at least “A few times a year” (2), they are then asked to provide what they believe is the primary reason for the experience (e.g., their gender, race, age, sexual orientation, etc.). In the present study sample, the Everyday Discrimination Scale demonstrated high internal consistency for items measuring frequency of reported everyday discrimination (9 items; $\alpha = 0.873$). For analytic purposes, a sum score was generated for the reported frequency of different everyday experiences of discrimination.

Perceived Stress Scale

The Perceived Stress Scale is a 14-item self-report scale that measures perceived global stress and coping ability in the past month (Cohen et al., 1983). Items are rated on a scale of 0 to 4, where 0=never and 4=very often. Half of the items are coded positively (e.g., “how often have you been upset because of something that happened unexpectedly?”), while the other half are

coded negatively and reverse scored (e.g., “how often have you dealt successfully with irritating life hassles?”). In the present study sample, the Perceived Stress Scale demonstrated high internal consistency among items measuring perceived stress and coping ability (14 items; $\alpha = 0.855$). Item response ratings were summed to create a perceived stress sum score.

Data Analysis

The following statistical analyses were run using SPSS Version 29.0.1.0 software. For all analyses, racialized identity, ethnic identity, age, and sex assigned at birth were included as statistical covariates. Age and sex assigned at birth were included as covariates due to their relevance in the emergence of psychosis-spectrum symptoms (e.g., typical age of onset). Racialized identity and ethnic identity were included as covariates due to their associations with differential psychosis-spectrum symptom outcomes and shared relevance within the minority stress model. Gender identity was not included as a covariate in analyses due to its close association with sexual orientation, as sexual orientation is in part characterized by one’s gender identity.

Statistical benchmarks outlined by Cohen (1969) and Richardson (2011) were used to interpret the magnitude of effect sizes in MANOVA and multivariate regression analyses. Following these guidelines, effect sizes were interpreted as small for $\eta_p^2 \geq 0.01$, medium for $\eta_p^2 \geq 0.06$, and large for $\eta_p^2 \geq 0.14$.

Descriptive Statistics

Descriptive statistics were generated and reported to describe mean positive symptom ratings on the SIPS and functioning scale ratings, as well as mean perceived stress ratings, frequency of experiences of everyday discrimination, negative life events, and types of childhood trauma endorsed.

Chi-squared Test and T-Tests

Chi-squared tests and independent samples t-tests were conducted to assess group differences among demographic characteristics on the basis of sexual orientation.

Logistic Regression

Logistic regression was used to test Hypothesis 1 and determine an odds ratio for sexual minority status as a statistically significant predictor of a participant's likelihood of meeting for CHR-p criteria.

Multivariate Multiple Regression

To test Hypothesis 2 of the study, multivariate multiple regression analysis was conducted to test the statistical significance of sexual orientation as a statistical predictor of positive psychosis-spectrum symptoms and global, social, and role functioning. Sexual orientation was entered into the model as the explanatory variable, with the two categories of heterosexual and sexual minority. The outcome variables in the regression model were severity ratings on the five positive symptoms domains of the SIPS, as well as current global, social, and role functioning scores.

MANOVA

MANOVA was conducted to test Hypothesis 3a and compare sexual minority and heterosexual participants on mean ratings of total perceived stress, frequency of everyday discrimination endorsed, negative life events, and types of childhood trauma/abuse endorsed.

Mediation Analysis

To test Hypothesis 3b of the study, sum scores on the Perceived Stress Scale, Everyday Discrimination Scale, and Life Events Scale were entered into two separate mediation models examining their effects as potential mediators on 1) the relation between sexual orientation and

sum positive symptom scores on the SIPS and 2) the relation between sexual orientation and current global functioning. Mediators were entered into the model simultaneously, and analyses were run using the PROCESS version 4.2 Macros extension for SPSS. Total, direct, and indirect effects were calculated for each model. The statistical significance of indirect effects was determined using bootstrapped 95% confidence intervals.

It is important to note that mediation analyses are traditionally conceptualized as causal models in which an independent variable affects a dependent variable, with proposed mediators providing alternative mechanisms through which the independent variable has its effect. For the purposes of our study, sexual orientation was included as the independent variable in our mediation models. Although sexual orientation is not a true independent variable that can be manipulated, it is a facet of identity that likely precedes the onset of psychosis-spectrum experiences and assessments of current functioning. Several studies have employed mediation analyses using cross-sectional data to assess relations between sexual orientation and psychosis-spectrum symptomatology in the context of mediating psychosocial factors (Gevonden et al., 2014; Jacob et al., 2021; Oh et al., 2022). Such studies, like the present study, ultimately employ mediation as a statistical, measurement-based approach rather than an experimental/causal approach. It is important to note that, despite the precedence of employing mediation in prior studies, all of this work is limited in its ability to draw causal inferences regarding the impact of sexual orientation on psychosis-spectrum symptoms and functioning.

RESULTS

Chi-squared tests revealed statistically significant differences among demographic characteristics between sexual minority and heterosexual participants, including significant

differences among participants' racialized identity ($\chi^2 = 21.6, p = .001$), sex assigned at birth ($\chi^2 = 28.1, p < .001$), and gender identity ($\chi^2 = 142.9, p < .001$) (Table 1).

Aim1: Sexual Minority Status and CHR-p Status

A logistic regression was performed to evaluate sexual minority status as a statistical predictor of meeting criteria for CHR-p status. The logistic regression model was statistically significant ($\chi^2(6) = 54.13, p < .001$). Sexual minority status explained an estimated 9.9% (Nagelkerke R^2) of the variance in CHR-p status. Sexual minority identifying individuals were 3.25 times more likely to meet criteria for CHR-p status than their heterosexual counterparts.

Aim 2: Sexual Minority Status and Psychosis-spectrum Symptomatology

A multivariate multiple regression model with sexual orientation as sole predictor found sexual orientation to be a significant and moderately strong statistical predictor of SIPS positive psychosis-spectrum symptom severity and clinician ratings of global, social, and role functioning ($F(8, 711) = 10.21, p < .001$; Wilk's $\Lambda = 0.897, \eta_p^2 = 0.10$). More specifically, pairwise comparisons indicated that sexual minority status was associated with increased severity of SIPS ratings for unusual thought content/delusional ideas, suspiciousness/persecutory ideas, grandiose ideas, perceptual abnormalities/hallucinations, and disorganized communication, as well as decreased global, social, and role functioning ratings (Table 2). Effect sizes for individual symptom and functioning domain comparisons were largely small to moderate, ranging from η_p^2 of 0.019 to 0.079.

Aim 3a: Sexual Minority Status and Stress

There was a statistically significant, large association between sexual minority status and mean ratings of total perceived stress, frequency of experiences of everyday discrimination, number of negative life events endorsed, and number of types of childhood trauma endorsed

($F(8, 708) = 31.64, p < .001$; Wilk's $\Lambda = 0.848, \eta_p^2 = 0.15$). Sexual minority participants on average reported greater perceived stress, increased frequency of everyday discrimination, more negative life events, and a greater number of types of childhood trauma (Table 3). Effect sizes for measure-specific comparisons based on sexual orientation were small to moderate, ranging from η_p^2 of 0.056 to 0.113.

Aim 3b: Sexual Minority Status and Indirect Effects of Contextual Factors

Mediation models were run in SPSS Process Version 4.2 to test whether the relation between sexual orientation on positive psychosis-spectrum symptoms and global functioning respectively were influenced by perceived stress, negative life events, and experiences of everyday discrimination. Model 1 found a statistically significant, positive total effect of sexual orientation on sum positive symptom scores ($b = 3.04, p < .001$) (Figure 1). There were significant, positive indirect effects of perceived stress ($b = 0.55, 95\% \text{ CI } [0.32, 0.82]$) and endorsement of negative life events ($b = 0.91, 95\% \text{ CI } [0.58, 1.30]$) mediating the association between sexual minority status and positive symptoms. There was no significant mediating effect of experiences of everyday discrimination on the association between sexual orientation and positive symptoms ($b = 0.10, 95\% \text{ CI } [-0.16, 0.37]$). After accounting for the effects of these mediating contextual factors, a significant direct effect of sexual orientation on positive symptoms remained ($b = 1.49, p < .001$).

Similar mediation results were found for Model 2 examining the link between sexual orientation and global functioning (Figure 2). There was a statistically significant, negative total effect of sexual orientation on global functioning ($b = -8.25, p < .001$) (Figure 2). There were significant, negative indirect effects of perceived stress ($b = -2.77, 95\% \text{ CI } [-3.80, -1.80]$) and endorsement of negative life events ($b = -2.78, 95\% \text{ CI } [-3.82, -1.88]$) mediating the association

between sexual minority status and global functioning. There was no significant mediating effect of experiences of everyday discrimination on the association between sexual orientation and global functioning ($b = -0.14$, 95% CI [-0.87, 0.63]). After accounting for the effects of these mediating contextual factors, a significant direct effect of sexual orientation on global functioning remained ($b = -2.56$, $p < .05$).

DISCUSSION

Cultural context is critical to informing the understanding of psychosis risk and minority stress processes in sexual minority populations. However, many questions remain unanswered regarding the understanding of psychosis-spectrum symptomatology and other associated determinants of risk in these populations. The present study explored associations between psychosis-risk symptoms and sexual orientation and found sexual minority status correlated with outcomes related to psychosis-spectrum symptoms and functioning. Sexual minority individuals were more likely to meet CHR-p criteria compared to their heterosexual counterparts. Furthermore, sexual minority status was associated with more severe positive symptoms and reduced global, role, and social functioning. These findings suggest that sexual minority populations display heightened vulnerability for psychosis-spectrum experiences and poorer indicators of functioning. This heightened vulnerability is particularly important to note given that sexual minority individuals are also exposed to greater stress as a result of social marginalization and minoritization. In the current sample, sexual minority participants endorsed greater perceived stress and experiences of everyday discrimination, as well as increased exposure to negative life events and childhood trauma. These differential findings suggest a psychosis-risk profile for sexual minority individuals that aligns with the minority stress model as this group displayed not only more severe psychosis-spectrum symptoms but also increased

risk for stress exposure. Although not tested in this study, associations observed in the current work suggest the possibility that that increased exposure to stress may play a role in the observed increases in psychosis-spectrum symptom severity among sexual minority individuals, although future work incorporating longitudinal assessment of symptom progression and contextual stressors would be required to provide meaningful evidence to support causality.

It is important to consider the ways in which heightened stress in sexual minority populations may inform the assessment of psychosis-spectrum experiences through clinician biases. Findings from this study are situated within the minority stress model in which contextual stressors experienced by sexual minority individuals may confer risk for psychosis. As such, accurately assessing psychosis risk in sexual minority populations requires consideration of how normative experiences of individuals from marginalized communities may be perceived as pathological. Analyses found that associations between sexual orientation and clinician ratings of positive symptom severity and global functioning were partly influenced by perceived stress and experiences of negative life events. These findings suggest the importance of stress in understanding how risk for psychosis might manifest among sexual minority individuals, highlighting the possible influence of context in informing the conceptualization and assessment of risk in marginalized populations. For sexual minority populations facing heightened social and environmental stressors, these findings suggest that assessors may benefit from being mindful of the impacts of minority stress both within and outside the context of psychosis-spectrum symptoms in order to accurately evaluate mental health concerns.

Notably, unlike perceived stress and negative life events, experiences of everyday discrimination did not significantly influence the associations between sexual minority status and psychosis-spectrum symptoms or functioning in our models. However, there are several features

of the Everyday Discrimination Scale and the selection of mediators in these models that should be considered before drawing inferences regarding the role of discrimination in risk for psychosis among sexual minority individuals. The Perceived Stress Scale, Life-Events Scale, and Everyday Discrimination Scale are conceptually related as they measure different facets of stress, with emphasis on personal perceptions of stress and exposure to stressful life events (See Table 4 for inter-measure correlations). As such, it is possible that perceived stress and negative life events accounted for overlapping variation in outcome measures that was captured by everyday discrimination, with the former measures being more influential in the specified models. The Everyday Discrimination Scale also assesses discrimination on the basis of various identities (e.g., racialized identity, gender identity), including but not limited to sexual orientation. As a result, the mediating effect of everyday discrimination may have varied in a model that targeted discrimination on the basis of sexual minority identity specifically. Future models examining psychosis-risk in sexual minority populations should incorporate assessments of external stigma (e.g., discrimination, bullying) and internalized stigma (e.g., negative self-attitudes) as potentially relevant factors to more precisely target minority stress processes in these populations.

Ultimately, analyses in the present study demonstrated that accounting for perceived stress and negative life events only explained a portion of the association between sexual orientation and positive symptom severity and global functioning. A statistically significant direct relation between sexual orientation and symptomatology remained when accounting for the influences of perceived stress and negative life events. These findings highlight the need for a deeper understanding of context surrounding stress and psychosis-risk in sexual minority populations, as there is a significant association between sexual minority status and psychosis-

spectrum symptomatology that may be significantly influenced by a variety of mechanisms related to stress or further contextual considerations that have not been explored. Further work could aim to identify alternative determinants of risk, with particular attention paid to social and environmental factors that may indicate potential targets of therapeutic or psychosocial intervention.

While not the focus of present analyses, it is important to acknowledge that racialized identity was included as a covariate in our statistical models to account for potential shared variation with sexual orientation and more precisely evaluate the contributions of sexual orientation in explaining differences in symptoms, functioning, and contextual factors related to stress. When statistically controlling for the effect of racialized identity, sexual minority status remained a significant statistical correlate of positive symptom severity and reduced functioning, as well as greater endorsement of perceived stress, everyday discrimination, negative life events, and childhood trauma. These findings speak to the importance of sexual orientation as a risk correlate of psychosis-spectrum experiences and heightened life stress, above and beyond other important aspects of a person's identity, such as racialized identity. This is noteworthy considering that racialized identity was significantly associated with everyday experiences of discrimination in our sample and has been associated with heightened risk for psychosis-spectrum symptomatology in existing literature. However, these findings should not be interpreted as diminishing the importance of other facets of identity such as race in informing conceptions of psychosis-risk. It will be useful for future studies to examine relations among various minoritized identities in the context of minority stress in order to inform understanding of intersectional vulnerability and experiences of psychosis-spectrum symptomatology.

Limitations

Although the current study offered a rich and diverse dataset in terms of demographic characteristics, including sexual orientation, it was not designed with the specific intention of evaluating minority stress and identity in sexual minority populations. As such, our analyses did not include measures that evaluated specific facets of sexual minority identity (e.g., sense of community, social support, internalized stigma). Furthermore, while the Everyday Discrimination Scale did include an option for participants to endorse discrimination based on sexual orientation specifically, the items themselves were constructed to assess discrimination more broadly such that participants could endorse any facet of their identity (e.g., race, gender) as being the reason for perceived discrimination.

Our analyses focused on sexual orientation as the primary grouping variable for analyses. However, demographics indicated that many sexual minority individuals in the CAPR sample endorsed additional minoritized identities (e.g., race, gender) that may place them at increased risk of marginalization and therefore impact their risk for psychosis-spectrum experiences in ways that were not fully captured within our models. Race was dichotomized as either White or non-White due to small sample sizes for some racial demographic groups. Future work should aim to recruit larger, more diverse samples that allow researchers to account for racialized and intersecting identities with greater specificity.

As noted in our description of study methodology, the Global Assessment of Functioning used in the present study served as a primary outcome measure of overall psychological, social, and role functioning. Although this scale is an integral component of the SIPS assessment and was associated with our separate measures of social and role functioning at a level that suggests appropriate convergent validity, the psychometric evidence base for its inter-rater reliability remains limited. Our study was limited in its ability to further assess functioning due to the

constraining nature of secondary data analysis. Future studies assessing psychosis-risk and functional outcomes in sexual minority populations should explore additional measures of functioning that demonstrate more consistent inter-rater reliability, as well as measures of functioning that more precisely track changes in functioning across time to better understand symptom progression.

Notably, the present study employed a cross-sectional analysis of baseline time points and did not examine changes in symptomology or psychosis-risk status over time. As such, our statistical models evaluating sexual minority status as a statistical “predictor” of psychosis-spectrum symptoms and functioning in the context of social stress cannot be interpreted in light of temporal precedence nor make any statements about causality. As a result of the nature of the current study’s data, directionality of the association between sexual minority status and psychosis-risk indicators cannot be assumed. However, it should be noted that theoretically, there is little reason to believe that psychosis-spectrum experiences would have a causal role in the development of sexual minority identity. Ultimately, the present work may be most useful when conceptualized as indirect effects models that can be used to inform future longitudinal studies poised to test true mediation models. To this end, it is important to note that while sexual orientation is a facet of identity, an individual’s conscious awareness or recognition of their sexual orientation may not necessarily precede the onset of psychosis-spectrum experiences. As such, future work should explore temporal associations between the emergence of sexual minority identification, associated socially determined stress, and the onset of psychosis-spectrum symptoms to further investigate the role these factors may contribute to one another.

Future Directions

This study demonstrated that sexual minority individuals are more vulnerable to experiencing psychosis-spectrum symptoms and exacerbated life stress, stress that theoretically could result in heightened risk for psychosis. Despite the implications of such findings, much work remains needed to better understand the experiences of sexual minority individuals and how they may confer vulnerability for psychosis. Future work should focus on improving accurate and appropriate assessments of stress in sexual minority populations; for example, assessing stigma (internalized and external) and experiences of discrimination that are unique to such individuals and their queer experiences. This necessitates data collection and study design that go beyond labels of sexual identity and seek to understand and characterize the salient experiences that are associated with sexual minority identification across time.

Community based participatory research may prove particularly fruitful in improving research practices to be more considerate of research questions and measures of risk and symptomatology that feel authentic to the experiences of sexual minority individuals. This approach may also help address potential biases in existing assessment tools that describe experiences that are normative in sexual minority populations but may be perceived as pathological by clinicians. For example, odd and preoccupying feelings of excessive guilt (i.e., unusual thought content) could be better explained by internalized heterosexism in the context of sexual minority identity development. Future research should consider the role of stigma and its impact on clinician ratings and conceptualization of symptoms, in addition to the potential influence of stigma on sexual minority individuals' willingness to openly engage with mental health services and research settings.

Studies should also incorporate considerations of gender identity into research in sexual minority populations as gender identity and sexual identity are closely intertwined and

intersecting. Furthermore, experiences of stigma and stress, and consequently vulnerability for psychosis, may vary based on one's intersection of gender and sexual identities- particularly for those identifying as a sexual minority and/or gender-expansive (e.g., transgender, non-binary). As such, psychosis-risk research should consider how experiences associated with these identities may uniquely and dynamically confer risk for psychosis in the context of minority stress.

CONCLUSION

The current study demonstrated that sexual minority individuals endorsed increased exposure to stress and were rated more severely on measures of psychosis-spectrum symptoms and functioning in comparison to their heterosexual counterparts. Perceived stress and negative life events factored into these associations, supporting the utility of the minority stress model for conceptualizing vulnerability for psychosis in sexual minority populations. The role of stress in the development and assessment of psychosis-spectrum experiences among sexual minority individuals has important implications for potential interventions that focus on addressing the individual and interpersonal consequences of heightened stress. Understanding contextual factors that may confer risk for psychosis in sexual minority populations could benefit from the development of more accurate psychosis-risk assessments while potentially informing affirming care practices that respect the unique experiences and resilience of sexual minority individuals.

Table 1*Demographic Characteristics of Analysis Sample*

	Total Sample (N=765)	Heterosexual (n=496)	Sexual Minority (n=269)
Mean Age (years) ($t = 1.60, p = .11$)	23.6 ($SD = 4.19$)	23.8 ($SD = 4.25$)	23.3 ($SD = 4.06$)
Racialized Identity ($\chi^2 = 21.6, p = .001$)			
American Indian or Alaska Native	0.9%	1.0%	0.7%
Asian	24.4%	28.6%**	16.7%**
Black or African American	15.7%	16.9%	13.4%
White or Caucasian	48.4%	44.2%**	56.1%**
More than one race	8.2%	6.7%**	11.2%**
Unknown/Not reported	2.0%	2.2%	1.5%
Native Hawaiian or Other Pacific Islander	0.4%	0.4%	0.4%
Ethnic Identity			
Hispanic ($\chi^2 = 1.8, p = .181$)	13.7%	12.5%	16.0%
Middle Eastern ($\chi^2 = 0.116, p = .73$)	4.4%	4.6%	4.1%
Sex assigned at birth ($\chi^2 = 28.1, p < .001$)			
Male	37.5%	44.4%**	24.9%**
Female	62.5%	55.6%**	75.1%**
Gender Identity ($\chi^2 = 142.9, p < .001$)			
Male	36.1%	44.4%**	20.8%**
Female	55.3%	55.4%	55.0%
Trans male/Trans man	1.57%	0.0%**	4.5%**
Non-binary/third gender	5.4%	0.2%**	14.9%**
Different identity	1.7%	0.0%**	4.8%**

***indicates a statistically significant comparison at the specified alpha level*

Table 2*Ratings of Positive Psychosis-spectrum Symptoms and Functioning*

	$M_{\text{Heterosexual}}$	$M_{\text{Sexual Minority}}$	η_p^2
	Psychosis-spectrum Symptoms		
Positive Symptom Sum (0-30)	5.13 ($SD = 4.62$)	8.06 ($SD = 4.85$)	0.079**
Unusual Thought Content/Delusional Ideas (0-6)	1.54 ($SD = 1.44$)	2.43 ($SD = 1.55$)	0.073**
Suspiciousness/Persecutory Ideas (0-6)	1.14 ($SD = 1.26$)	1.74 ($SD = 1.50$)	0.042**
Grandiose Ideas (0-6)	0.47 ($SD = 0.93$)	0.77 ($SD = 1.15$)	0.023**
Perceptual Abnormalities/Hallucinations (0-6)	1.10 ($SD = 1.36$)	1.94 ($SD = 1.55$)	0.065**
Disorganized Communication (0-6)	0.88 ($SD = 1.06$)	1.19 ($SD = 1.04$)	0.019**
	Functioning Ratings		
Global Functioning (0-100)	75.02 ($SD = 14.82$)	66.30 ($SD = 14.71$)	0.068**
Social Functioning (0-10)	7.96 ($SD = 1.31$)	7.60 ($SD = 1.31$)	0.024**
Role Functioning (0-10)	8.28 ($SD = 1.55$)	7.80 ($SD = 1.72$)	0.029**

Measure ranges are noted in parentheses next to scale name.

* $p < .05$

** $p < .001$

Table 3*Endorsement of Contextual Factors Related Stress.*

	$M_{\text{Heterosexual}}$	$M_{\text{Sexual Minority}}$	η_p^2
Perceived Stress (0-56)	24.41 ($SD = 8.50$)	29.05 ($SD = 8.11$)	0.056**
Everyday Discrimination (0-45)	10.20 ($SD = 9.95$)	16.62 ($SD = 12.20$)	0.092**
Negative Life Events (0-155)	20.20 ($SD = 14.31$)	28.16 ($SD = 14.85$)	0.080**
Childhood Trauma/Abuse (0-6)	1.45 ($SD = 1.65$)	2.67 ($SD = 1.86$)	0.113**

Measure ranges are noted in parentheses next to scale name.

* $p < .05$ ** $p < .001$

Table 4*Spearman Correlations among Stress-related Self-report Measures*

	1	2	3	4
1. Everyday Discrimination Scale	–	$p < .001$	$p < .001$	$p < .001$
2. Perceived Stress Scale	$\rho = 0.296$	–	$p < .001$	$p < .001$
3. Life Events Scale	$\rho = 0.474$	$\rho = 0.288$	–	$p < .001$
4. Childhood Trauma and Abuse Scale	$\rho = 0.470$	$\rho = 0.364$	$\rho = 0.660$	–

Figure 1

Mediation Model with Effect of Sexual Minority Status on Positive Symptom Sum

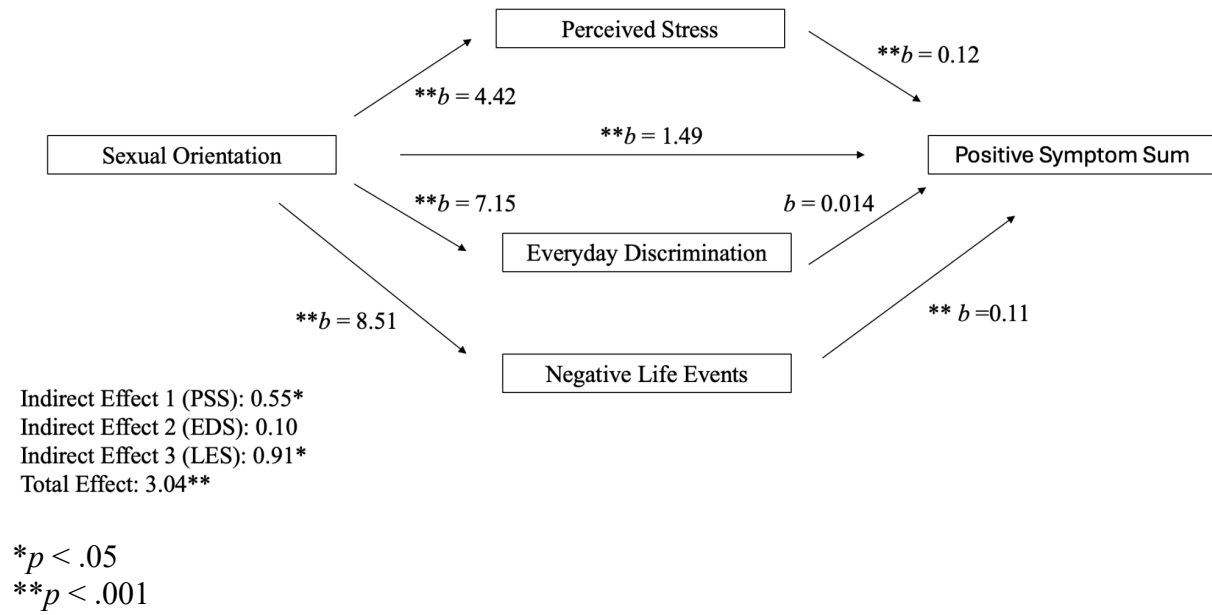
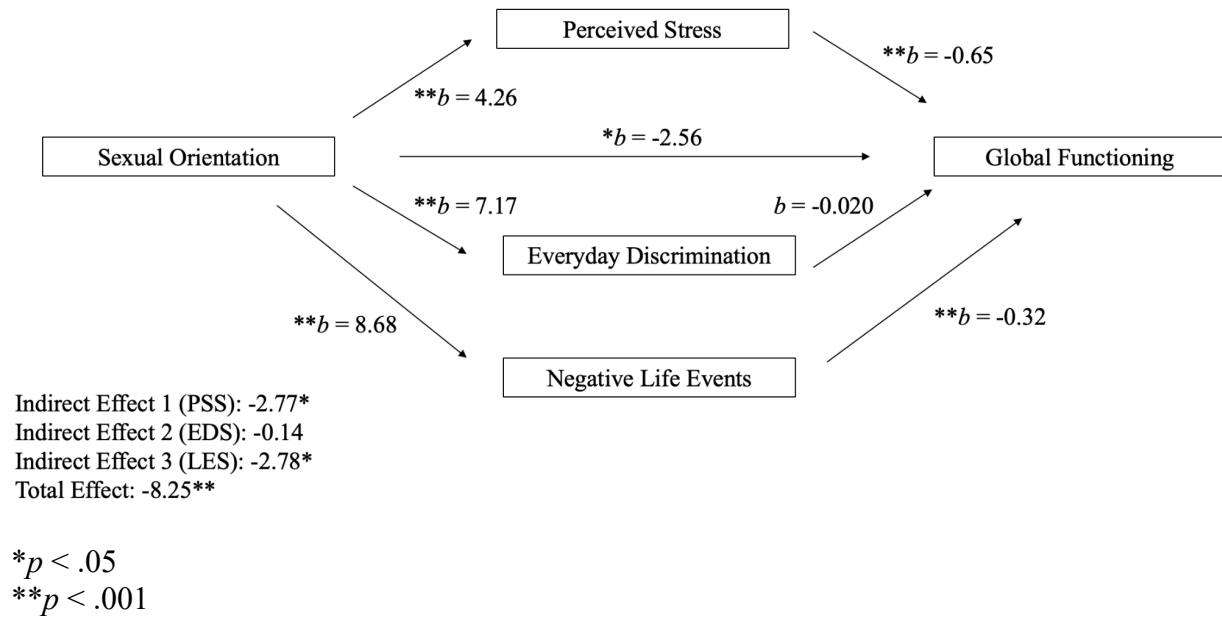


Figure 2

Mediation Model with Effect of Sexual Minority Status on Global Functioning



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