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Trans-diagnostic Psychopathology Factors and Sexual Minority Mental Health: Evidence of Disparities and Associations with Minority Stressors

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Abstract

Research on mental health disparities between sexual minority individuals and heterosexuals has traditionally taken a disorder-by-disorder approach. Recently developed trans-diagnostic approaches provide a new method to frame such investigations; however, trans-diagnostic factors have yet to be applied to sexual minority mental health disparities research. The current study applied this methodology to investigate mental health disparities between lesbian, gay, bisexual, and heterosexual individuals in a large national probability sample ($N = 34,653$). Twelve-month diagnoses of 13 common mood, anxiety, substance use, and personality disorders were modeled, and multi-group analysis indicated a sexual orientation-invariant trans-diagnostic latent structure. Significant disparities at the latent trans-diagnostic factor level were observed; these factor-level disparities are manifested as observed mental disorder disparities. Gender differences typically seen in trans-diagnostic research were not present between sexual minority women and men. Trans-diagnostic internalizing and externalizing factors were then used as outcomes in a minority stress framework and were positively predicted by lifetime history of sexual orientation-related minority stressors (i.e., discrimination and victimization). Implications for using trans-diagnostic approaches to frame intervention efforts, supplement disorder-by-disorder disparities methodologies, and synthesize piecemeal disparities literatures are discussed.

Keywords

disparities; internalizing-externalizing; trans-diagnostic; sexual minorities; discrimination

Previous research has demonstrated striking mental health disparities between sexual minority individuals and heterosexuals. These disparities cut across various forms of psychopathology, with sexual minorities reporting mood (e.g., major depressive disorder, dysthymic disorder), anxiety (e.g., generalized anxiety disorder, agoraphobia, panic disorder), and substance use disorders (e.g., alcohol, tobacco, marijuana, and illicit drug abuse and dependence) at significantly elevated levels (Case et al., 2004; Cochran, Ackerman, Mays, & Ross; 2004; Cochran, Keenan, Schober, & Mays, 2000; Cochran & Mays, 2000, 2006; Cochran, Sullivan, & Mays, 2003; Conron, Mimiaga, & Landers, 2010; Drabble & Trocki, 2005; Herek & Garnets, 2007; Meyer, 2003; Sandfort et al., 2001). These

mental health disparities are not well understood, and a recent report by the Institute of Medicine (2011) highlighted the critical public health need to determine their origins and ameliorate them.

The Current Approach to Disparities

Researchers have made notable progress in documenting sexual orientation-related mental health disparities, typically by taking a disorder-by-disorder approach. That is, disparities have been documented separately in major depressive disorder, alcohol dependence, and so on. Congruent with classification systems such as *DSM-5*, this approach is based upon the premise that mental disorders are meaningful, distinct units of psychopathology that occur in nature reliably and are construct valid. Insofar as this assumption is tenuous, the utility of a solely disorder-by-disorder approach to mental health disparities research is drawn into question.

Psychopathology researchers have increasingly come to the realization that current classification systems often do not fit the observed data well, and the parsing of psychopathology into discrete units appears not to be optimal (Krueger & Eaton, 2010). Rather, high and diffuse patterns of comorbidity are observed much more frequently than should occur by chance alone (Eaton, South, & Krueger, 2010; Trull & Durrett, 2005; Watson, 2005), with nearly half of individuals who meet diagnostic criteria for a mental disorder in a 12-month period also meeting criteria for at least one additional mental disorder (Kessler, Chiu, Demler, & Walters, 2005). The current disorder-by-disorder approach fails to capture these comorbidity patterns, which could be informative in understanding elevated rates of psychopathology in sexual minorities. The result of the disorder-by-disorder approach is identification of putatively “separate” disparities in, say, major depressive disorder and generalized anxiety disorder, without accounting for their potentially important overlap. This results in a piece-meal literature that is difficult to synthesize into a coherent whole. In terms of treatment, high rates of comorbidity within individual clients obscures what intervention approach might be optimal.

A Trans-diagnostic Approach

Given the limitations of using a solely disorder-by-disorder approach to disparities, alternative approaches that cut across diagnostic boundaries could be informative. Indeed, such *trans-diagnostic* approaches have gained increasing traction in the psychopathology literature, which suggests two latent factors underlie the covariance of many common mental disorders, referred to as *internalizing* and *externalizing* (Kendler et al., 2003, 2011; Krueger et al., 1998; Krueger, 1999; Slade & Watson, 2006; Vollebergh et al., 2001; Wright et al., 2013; for reviews, see Eaton, South, & Krueger, 2010; Krueger & Markon, 2006). The internalizing factor accounts for comorbidity among mood and anxiety disorders, and the externalizing factor accounts for comorbidity among substance use disorders as well as antisocial personality disorder and impulsivity-related conditions. Although trans-diagnostic conceptualizations of psychopathology have been present in the literature for decades (Achenbach & Edelbrock, 1978, 1984; Wolf et al., 1988), they have only found wide application in the adult psychopathology literature in the last decade.

These studies of multivariate comorbidity patterns suggest that many of the disorders with elevated prevalence rates in sexual minorities can be conceptualized as manifestations of underlying trans-diagnostic factors. While some researchers have laudably moved beyond the solely categorical, disorder-by-disorder approach by treating summed endorsed symptoms as dimensions (e.g., Ueno, 2010), or grouping disorders into conceptually similar groups such as “mood disorders” (e.g., Meyer, 2003), no studies formally applied latent comorbidity modeling to sexual minority mental health disparities. This is unfortunate, particularly given that trans-diagnostic have been shown to account for multivariate mental health disparities across the lifespan/age cohorts (Eaton, Krueger, & Oltmanns, 2011), various race/ethnic groups in the United States and abroad (Eaton et al., 2013a), and gender (Kramer, Krueger, & Hicks, 2008). The latter finding, with women showing significantly higher internalizing factor levels, and men showing significantly higher externalizing factor levels, have helped explain gender disparities in mood, anxiety, and substance use disorders (Eaton et al., 2012). No studies have examined the role of trans-diagnostic factors in understanding sexual orientation-related mental health disparities.

Linking Trans-diagnostic Factors to Environmental Influences

The minority stress model (Meyer, 1995, 2003) states that lesbian, gay, and bisexual individuals, by nature of their status as minorities in society, experience stressors that have deleterious impacts on their physical and mental health. Such predictions have been supported by subsequent empirical study (e.g., Hatzenbuehler, 2011; Hatzenbuehler et al., 2010; Mays & Cochran, 2001; McLaughlin, Hatzenbuehler, & Keyes, 2010). This is another area in which the application of trans-diagnostic factors could be informative: as outcome variables predicted by minority stressors. For instance, if it can be established that sexual minorities have significantly higher trans-diagnostic factor levels than heterosexuals—which manifest as disparities in observed mental disorders—one might investigate the stressors that give rise to these elevated factor levels. One could also treat these trans-diagnostic factors as targets of intervention directly (Barlow et al., 2011, in press). This is a non-trivial issue, given previous research indicating that latent trans-diagnostic factors can *fully mediate* the relationship between some life stressors and mental disorders (Keyes et al., 2012). Stated another way, it may be the case that minority stressors cause elevations in latent, trans-diagnostic symptomatology, that then manifest as higher rates of particular mental disorders. There has been very limited work in this area, with only one study investigating how sexual orientation-related forms of victimization could impact trans-diagnostic factors of “mental health problems” and “substance use” (Lehavot & Simoni, 2011). Further research is critical to determine how trans-diagnostic factors might benefit the search for etiologies of observed mental health disparities.

The Current Study

The current study is the first to examine the trans-diagnostic factors underlying common mental disorders (i.e., internalizing, externalizing) in sexual minority individuals, using 13 diagnoses in a large national probability sample. Specific questions addressed were: (1) Are trans-diagnostic factors the same in sexual minority and heterosexual individuals? (2) Are disparities present in trans-diagnostic factors? (3) What do trans-diagnostic factor disparities

mean? (4) Are gender differences seen in sexual minority trans-diagnostic factors? (5) How do trans-diagnostic factors relate to sexual orientation-based minority stressors?

Method

Participants

Data were from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). NESARC's design has been described previously (Grant & Dawson, 2006). Briefly, the NESARC was a representative national probability sample of the civilian, non-institutionalized United States population aged 18 to 98, assessed over two waves: Wave 1 initial assessment from 2001–2002 ($N = 43,093$; response rate: 81% of those eligible) and Wave 2 reassessment of Wave 1 participants from 2004–2005 ($N = 34,653$; 86.7% of the eligible original sample; 70.2% cumulative response rate). The current study used Wave 2 data only, because sexual orientation and related victimization experiences were not assessed at Wave 1. Wave 2 was 48% female, and participants self-identified as 70.9% non-Hispanic/Latino White, 11.6% Hispanic or Latino, 11.1% non-Hispanic/Latino African-American, 4.3% non-Hispanic/Latino Asian/Pacific Islander/Hawaii Native, and 2.2% American Indian/Alaska Native. Hispanic/Latino, African-American, and young adults were oversampled. Survey design variables (e.g., weights) ensured representativeness of the age, racial/ethnic, and gender distribution of the United States based on the 2000 Census. The research protocol, including informed consent, received full ethical review and approval from the United States Census Bureau and Office of Management and Budget.

Sexual Orientation

Sexual orientation was assessed via the prompt, “Which of the categories best describes you?” Participants self-selected “heterosexual/straight” ($n = 19,489$ women; 14,109 men), “gay/lesbian” ($n = 145$ lesbians; 190 gay men), or “bisexual” ($n = 161$ bisexual women; 81 bisexual men). Data from 478 participants who selected “not sure” or “unknown” were excluded. To ensure adequate disorder prevalence and covariance coverage for latent structure modeling, groups were collapsed into lesbian/bisexual women ($n = 306$), gay/bisexual men ($n = 271$), and total sexual minority individuals (lesbian/gay/bisexual individuals; $n = 577$).¹ Of this sample of sexual minority individuals, 365 identified as non-Hispanic/Latino White, 93 as Hispanic or Latino, 90 as non-Hispanic/Latino African-American, 15 as American Indian/Alaska Native, and 14 as non-Hispanic/Latino Asian/Pacific Islander/Hawaii Native. Distributions of these race/ethnicity categories in sexual minority versus heterosexual sub-samples were similar: 63% versus 58%, 16% versus 18%, 16% versus 19%, 3% versus 2%, and 2% versus 3%, respectively.

Psychopathology

A structured diagnostic interview designed for administration by experienced lay interviewers, the Alcohol Use Disorder and Associated Disabilities Interview Schedule—

¹Sexual orientation can be defined in multiple ways, including self-reported attraction, behavior, and identity. Although this empirical example is intended to be illustrative rather than definitive, analyses were conducted separately using self-reported attraction, behavior, and identity variables to define the sub-population of sexual minority individuals. Given the highly correlated nature of these three variables in this large sample, results did not differ notably, and self-identity results are presented in the current study.

DSM-IV Version (AUDADIS-IV; Grant et al., 1995; Grant et al., 2003), was used to assess *DSM-IV* disorders. I examined 13 diagnoses: major depressive, dysthymic, generalized anxiety, panic, and posttraumatic stress disorders; social and specific phobias; antisocial and borderline personality disorders; and alcohol, marijuana, nicotine, and other drug dependence diagnoses. Diagnoses were past-12-month diagnoses, excepting antisocial and borderline personality disorders, which were assessed as lifetime disorders in keeping with *DSM-IV* definitions. Other drug dependence ($\alpha = .77$) was calculated by collapsing relatively infrequent forms of drug dependence (i.e., cocaine, hallucinogens, heroin, opioids, sedatives, solvents, stimulants, tranquilizers, and any other drug not assessed) into a single variable with sufficient variance for latent variable modeling. AUDADIS-IV diagnostic reliabilities are generally good (e.g., kappas = .40 to .65; Grant et al., 2003, 2005; Hasin et al., 2005), with test-retest estimates similar to other structured interviews (e.g., the DIS, CIDI; Wittchen, 1994).

Discrimination and Victimization

Lifetime history of perceived sexual minority status-related victimization was assessed via six items assessed using the following prompt: “How often ... because you were assumed to be gay, lesbian, or bisexual?” Items assessed experiencing *discrimination* (1) in your ability to obtain health care or health insurance coverage, (2) when you got health care, (3) in public (e.g., on the street, in stores, in restaurants), and (4) in any other situation (e.g., obtaining a job, on a job, getting admitted to a school or training program, in courts, or by the police), and also experiencing *victimization* by being (1) called names, and (2) made fun of, picked on, pushed, shoved, hit, or threatened with harm. Response options were: “never,” “almost never,” “sometimes,” “fairly often,” and “very often.” For additional information, see McLaughlin, Hatzenbuehler, and Keyes (2010).

Analyses

Analyses were conducted in Mplus version 6 (Muthén & Muthén, 2013). A weighted least squares estimator (WLSMV) was used in confirmatory factor analytic measurement models; a robust maximum likelihood estimator (MLR), using Monte Carlo numeric integration, was used in the structural equation models that incorporated discrimination and victimization. All analyses applied NESARC’s design variables, modeled diagnoses as binary, and modeled discrimination and victimization item responses as ordinal. The comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean squared error of approximation (RMSEA) were used to evaluate model fit. CFI/TLI values .95, and RMSEA values .06, suggest good model fit (Hu & Bentler, 1999).

Approach—Analyses focused on three statistical questions, broadly speaking. First, what is the latent structure of comorbidity in sexual minority individuals? Because no study has examined trans-diagnostic factors formally in sexual minorities, the appropriateness of a two-factor internalizing-externalizing comorbidity model needed to be established. Second, how similar are the comorbidity structures of sexual minority and heterosexual individuals? This is a question of *factorial invariance*, or, in simpler terms, statistical “sameness.” Factorial invariance analyses determine whether or not the same latent comorbidity structures (i.e., with identical parameter estimates) are present in sexual minorities and

heterosexuals, and its establishment is necessary to interpret differences in trans-diagnostic factors across sexual orientation groups. Third, how do past minority stressor experiences relate to current trans-diagnostic factor levels? This question investigates the direction and magnitude of associations between discrimination/victimization experiences and subsequent internalizing and externalizing factor levels. The first two questions are confirmatory factor analytic, and they deal with what are referred to *measurement models* of latent factors. The third question is a form of structural equation modeling, linking a trans-diagnostic measurement model to minority stressor experiences through regression.

Results

Measurement Models

Comorbidity structure in sexual minorities—The structure of the 12-month diagnoses included herein has been previously established in the full NESARC sample, across women and men, and across ethnic groups (Eaton et al., 2011, 2012, 2013a, 2013b; Keyes et al., 2012). Guided by these findings and previous research in other samples, I tested a two-factor internalizing-externalizing trans-diagnostic model. Internalizing was indicated by: major depressive, dysthymic, generalized anxiety, panic, and posttraumatic stress disorders; borderline personality disorder; and social and specific phobias. Externalizing was indicated by alcohol, marijuana, nicotine, and other drug dependence diagnoses as well as antisocial and borderline personality disorders.² Latent factors were allowed to correlate. This internalizing-externalizing structure fit sexual minority individuals' multivariate diagnostic data very closely (CFI = .994, TLI = .992, RMSEA = .002). For comparison, a one-factor “general psychopathology” model—where all 13 disorders loaded on a single factor—did not provide acceptable fit (CFI = .943, TLI = .934, RMSEA = .005). The internalizing-externalizing trans-diagnostic model and its parameters are depicted in Figure 1.

Trans-diagnostic factor invariance and disparities across sexual orientation groups—I next conducted two-group confirmatory factor analyses to investigate internalizing and externalizing factor mean differences between: (1) lesbian/bisexual women and heterosexual women, (2) gay/bisexual men and heterosexual men, (3) sexual minority individuals and heterosexual individuals, (4) lesbian/bisexual women and gay/bisexual men, and (5) heterosexual women and heterosexual men.

To interpret factor mean differences across groups, multi-group models require establishment of invariance (see Gregorich, 2006). Testing invariance of diagnostic models requires methodology that is appropriate for categorical indicators, and I thus followed the approach delineated by Millsap and Yun-Tein, (2004), which produces two competing models. The *freely estimated* (non-invariant) model parameterized factor loadings and thresholds to be freely estimated across sexual minority and heterosexual groups; factor means were fixed to zero in both groups, and scaling factors were fixed to unity in both

²Borderline personality disorder was parameterized to cross-load on internalizing and externalizing based on previous research (Eaton et al., 2011; James & Taylor, 2008). Its loading on externalizing was non-significant in the final model, but I retained this parameter for congruence with previous research in this and other samples.

groups. The *invariant* model parameterized factor loadings and thresholds to be equal across groups; factor means were fixed to zero in heterosexuals and freely estimated in the sexual minority group, and scaling factors were fixed to unity in heterosexuals and freely estimated in the sexual minority group. The freely estimated (CFI = .992, TLI = .990, RMSEA = .008) and invariant (CFI = .991, TLI = .990, RMSEA = .008) models showed nearly identical fit with only a trivial difference of .001 in CFI. Simulation research has suggested a CFI decrease of .01 to reject an invariant model (Cheung & Rensvold, 2002), which was not evidenced here, indicating the invariant model should not be rejected. Further, the invariant model showed superior parsimony to the freely estimated model, with 11 fewer freely estimated parameters.

Given the invariance results, I parameterized a sexual orientation-invariant model in subsequent multi-group analyses. Factor means were fixed to zero in the heterosexual groups as a reference metric, and sexual minority groups' factor means are given as *z*-score deviations from these values. The sexual minority group showed higher internalizing ($z = .55, p < .001$) and externalizing ($z = .82, p < .001$) factor levels than heterosexuals. Lesbian/bisexual women showed higher levels of internalizing ($z = .57, p < .001$) and externalizing ($z = .58; p = .05$) than heterosexual women (CFI = .987, TLI = .985, RMSEA = .013). Gay/bisexual men showed higher levels of internalizing ($z = .62, p < .001$) and externalizing ($z = .80, p < .001$) than heterosexual men (CFI = .990, TLI = .990, RMSEA = .010).

Next, because previous research has found significant gender differences in transdiagnostic factor means in general population data (regardless of sexual minority status), I compared the factor levels of lesbian/bisexual women (fixed to zero) to gay/bisexual men's internalizing ($z = -.25$) and externalizing ($z = .23$) levels, which were not significantly ($p > .05$) different. This stood in contrast to the significant, and larger, gender differences seen between heterosexual women's (fixed to zero) and men's internalizing ($z = -.36, p < .001$) and externalizing ($z = .28, p < .001$) levels.

Discrimination and Victimization Predicting Trans-diagnostic Factor Levels

What drives these observed trans-diagnostic factor disparities between sexual minority and heterosexual individuals? The minority stress model predicts that environmental stressors should positively associate with internalizing and externalizing trans-diagnostic factor levels. I tested the hypothesis that *lifetime* perceived sexual minority status-related discrimination and victimization would show positive associations with *12-month* internalizing and externalizing trans-diagnostic factor levels within sexual minority individuals. To test this, in the total sample of sexual minority individuals, I estimated a series of structural equation models, wherein the internalizing and externalizing factors (analyzed separately due to software limitations) were regressed on gender, age, and one discrimination or victimization item per analysis. Further, I estimated a latent discrimination/victimization variable, representing the multivariate shared variance among the discrimination and victimization items, by parameterizing a measurement model all six items loaded on one latent factor (mean of zero, variance of unity). This latent discrimination/victimization factor was used to predict internalizing and externalizing. Because internalizing and externalizing factors had a variance of unity, multiple regression

coefficients of internalizing or externalizing regressed on the discrimination/victimization factor can be interpreted as standardized coefficients.

Predicting internalizing—Female gender was generally associated with significantly higher levels of internalizing, ranging from .43 to .49 *SD* increases across regression equations (Table 1). Age showed near-significant negative associations. Generally, a one-point increase on the five-point Likert-type frequency rating of lifetime discrimination and victimization items was associated with a non-trivial (and often significant or near-significant) increase in 12-month internalizing levels. These increases ranged from .15 to .20 *SD* increases in internalizing level per one-point increase in discrimination or victimization frequency. The composite discrimination/victimization latent variable predicted internalizing significantly ($p = .02$), with a one-*SD* increase in the discrimination/victimization factor being associated with a .19 *SD* increase in internalizing, controlling for age and gender.

Predicting externalizing—Female gender was not significantly associated with levels of externalizing (Table 1). Age was typically non-significantly negatively associated with externalizing. Most regression coefficients for discrimination and victimization frequency were near zero. That said, one-point increases in lifetime discrimination in “any other situation (e.g., obtaining a job, on a job, getting admitted to a school or training program, in courts, or by the police)” was predictive of a .25 *SD* ($p = .014$) increase in 12-month externalizing. The composite discrimination/victimization factor also predicted externalizing significantly ($p = .016$), with a one-*SD* increase in the discrimination/victimization factor being associated with a .25 *SD* increase in externalizing, controlling for age and gender.

Discussion

This study is the first to document sexual orientation-related mental health disparities at the level of trans-diagnostic factors to my knowledge. Indeed, both trans-diagnostic factors modeled showed mean-level differences between the sexual minority and heterosexual groups. In all comparisons, for both internalizing and externalizing, sexual minority individuals had significantly higher factor levels on average. This was true when lesbian, gay, and bisexual individuals were grouped together and compared to heterosexuals generally. The same pattern of elevated means was observed when sexual minority women were compared to heterosexual women, and when sexual minority men were compared to heterosexual men. The magnitude of these differences was notable, ranging from over .5 *SD* to over .8 *SD*. This indicates that observed mental health disparities in individual disorders are also mirrored in multivariate comorbidity patterns and levels.

These trans-diagnostic factors demonstrated factorial invariance across sexuality groups, suggesting that the *same* factors underlie multivariate comorbidity in lesbian, gay, and bisexual individuals as in heterosexual individuals. This suggests that there is no sexual orientation-related bias at the level of trans-diagnostic structures, and that the same latent structures can be effectively used to capture comorbidity patterns across groups. The establishment of invariance is not solely of statistical interest; it has notable implications for the meaning of disparities. Because between-group factorial invariance was demonstrated,

we can infer that disparities in trans-diagnostic factor levels manifest as, and account for, observed prevalence rate disparities in particular mental disorders (Gregorich, 2006; Kramer, Krueger, & Hicks, 2008). Thus, findings such as disparities in major depressive, dysthymic, and generalized anxiety disorders are special cases of a multivariate disparities approach. Observed disparities in particular disorders can be conceptualized as reflections of coarser, less differentiated disparities seen at the level of broad, trans-diagnostic factors.

It is noteworthy that trans-diagnostic factors represent more than simply an alternative description of disorders or diagnoses present. First, they are dimensional, and such continuous conceptualizations of psychopathology have stronger psychometric properties than do categorical diagnoses. A recent set of meta-analyses, for instance, found average increases of 15% in reliability and 37% in validity for continuous versus discrete measures of psychopathology (Markon, Chmielewski, & Miller, 2011). Second, although dimensional, trans-diagnostic factors are not the same as the number of diagnoses an individual receives or a summation of their endorsed symptoms. Rather, trans-diagnostic factors represent something related but unique: an accounting of multivariate comorbidity. In simpler terms, they each represent a core psychiatric phenomenon that saturates multiple diagnoses to varying extents. Thus, while multiple studies have identified disparities in the putatively distinct disorder diagnoses that reflect these latent factors, and a smaller number of studies have used dimensional symptom counts, the identification of differences in comorbidity and core trans-diagnostic psychopathological phenomena herein is novel in sexual minority mental health research. Finally, research has shown that the links between particular disorders (e.g., major depressive disorder) and important outcomes like suicide are driven by this trans-diagnostic variance and not by disorder-specific variance (Eaton et al., 2013b). In other words, trans-diagnostic factors account for associations between disorders and at least some critical outcomes for sexual minority mental health research. With these points taken together, the current findings of trans-diagnostic factor disparities present implications different from those of disorder-specific disparities findings.

Gender Differences

In general population-based research, without regard to sexual orientation, women consistently show significantly higher internalizing factor levels, and lower externalizing factor levels, than men (Eaton et al., 2012; Hicks et al., 2007; Kramer, Krueger, & Hicks, 2008). As such, I investigated possible gender differences. The current study replicated these trans-diagnostic factor gender differences in heterosexual adults; however, no significant gender differences between sexual minority women and men were observed. While the non-significance of these differences is due in part to statistical power—the heterosexual groups have much larger sample sizes than the sexual minority groups—the magnitude of the gender differences was also attenuated in sexual minority individuals. This was particularly true for the internalizing factor, where the gender difference was reduced by 31% in sexual minority individuals. The reason for this attenuation of gender differences is unclear, but a reasonable explanation is the higher overall trans-diagnostic factor levels in sexual minority individuals. The increased internalizing factor level in sexual minority men compared to heterosexual men, and the increased externalizing factor level in sexual minority women compared to heterosexual women, may have mitigated the typically observed pattern of

gender differences. The pathways underlying the notably attenuated gender difference seen in sexual minority individuals represent a worthwhile topic for further study. Further, these results highlight the importance of modeling gender explicitly when possible, and ensuring adequate sampling of both sexual minority women and men, so as to develop a better understanding of potential associations between gender and mental health.

Trans-diagnostic Factors and Sexual Orientation-Related Minority Stressors

One compelling theoretical explanation for these increased trans-diagnostic factor levels in sexual minorities is the minority stress model (Meyer, 1995, 2003), which posits that lesbian, gay, and bisexual individuals experience stressors given their position as societal minorities that have deleterious effects on mental health. The internalizing-externalizing model provides an empirically derived framework of potential psychiatric outcomes that cuts across diagnoses, serving as key constructs to index mental health disparities within a minority stress theoretical framework. Toward those ends, I attempted to integrate these approaches—and clarify some potential origins of latent factor disparities—by investigating the potential impact of *lifetime* sexual minority status-related discrimination and victimization on *current* (past 12-months) internalizing and externalizing factor levels within sexual minority individuals. Given the possible temporal distance between some experienced lifetime discrimination/victimization and 12-month psychopathology, the attenuated power associated with this modestly sized sample of sexual minority individuals, a focus on effect sizes, rather than statistical significance, for interpretation of these likely subtle effects appears warranted.

In general, these minority stressors served as positive predictors of the internalizing and externalizing factors. For internalizing, a one-unit (ordinal) increase in the frequency of reported lifetime history of discrimination or victimization was associated with increases in 12-month factor levels. For instance, for lifetime discrimination in “any other situation,” an increase from endorsing frequencies of “never” to “almost never” was associated with a .20 *SD* increase in internalizing factor levels. An increase from endorsing “never” to “very often” lifetime discrimination in “any other situation” was associated with nearly a full standard deviation increase in 12-month internalizing factor levels. When the discrimination and victimization items were treated as indicators of a composite discrimination/victimization latent variable, the association, a similar significant positive predictive pattern was seen. Although causal interpretations of such data must be made with caution, these findings suggest that exposure to these minority stressors is associated with increases in sexual minority individuals’ level of the undifferentiated internalizing factor, which, in turn, manifests as increased rates of mood and anxiety disorders.

The minority stress items generally showed much smaller effects when predicting the externalizing factor. However, the composite discrimination/victimization latent variable predicted externalizing levels well. A one-*SD* increase in the composite latent variable was associated with a one-quarter *SD* increase in latent externalizing levels.

Implications

Research implications—Trans-diagnostic factors have yet to be integrated into sexual minority mental health research, but these findings highlight their potential. While such disparities are commonly investigated via a disorder-by-disorder methodology, the present results suggest that such an approach, while meaningful on one level, may overlook important information about disparities. This is particularly true because trans-diagnostic factors represent something more than just the number of disorders present or dimensional symptom count variables: They are unique comorbidity constructs, which appear to be at the core of various forms of psychopathology.

Linking trans-diagnostic factors to important constructs and phenomena in sexual minority mental health may prove an informative research avenue. Take for instance the previous finding that trans-diagnostic factors account for the variance linking individual disorders with outcomes such as suicide (Eaton et al., 2013b). Given that suicide, and its associations with psychopathology, are major topics of focus for sexual minority researchers (e.g., Cochran & Mays, 2000; Hatzenbuehler, 2011), this issue alone highlights the potential utility of trans-diagnostic factors. Understanding the associations with other important sexual orientation-related variables, such as internalized homophobia and aggression, could also be informative. In addressing these and other issues, disorder-by-disorder and trans-diagnostic factor approaches can complement one another, and, depending on the goals of the researcher, one may be a more worthwhile level of analysis than the other. Overall, though, findings from the current and previous studies highlight the importance of understanding disparities at multiple levels of analysis, from discrete symptoms and related behaviors, to disorder diagnoses, to broad trans-diagnostic factors, to best characterize the mental health of sexual minority individuals.

Overall, these trans-diagnostic factors can synthesize the piecemeal disorder-by-disorder disparities literature into a unified framework and support predictions about disparity patterns. For instance, when disorders are manifestations of the same underlying factor, it is not surprising that group disparities in their prevalence rates would move in tandem with each other. For instance, because lesbians show higher levels of externalizing than heterosexual women, we should expect *a priori* that lesbians would report higher prevalence rates of tobacco and alcohol use disorders, as these two disorders are manifestations of the trans-diagnostic externalizing factor. A contrary finding would suggest these disorders reflect different biopsychosocial etiological pathways in lesbians than in heterosexual women, which would conflict with previously studied populations and be a worthwhile focus of inquiry. As such, these factors also support hypothesis generation.

The application of trans-diagnostic factors to sexual minority mental health research appears timely. The *DSM-5* “meta-structure” organization of many internalizing and externalizing disorders now reflects these disorder groupings and disorder interrelations generally (Regier, Kuhl, & Kupfer, 2013). Additionally, given a move away from funding disorder-specific research at the National Institute of Mental Health via the Research Domain Criteria (RDoC) initiative, a trans-diagnostic approach seems a worthwhile avenue of inquiry, particularly because these factors may be closer to the biological substrates favored by RDoC, such as

genes, than are categorical disorders. For example, additive genetic effects on psychopathology appear to have the majority of their impacts at the trans-diagnostic factor level (Kendler et al. 2003, 2013). On a broader level, it is critical for mental health disparities researchers to incorporate the most current conceptualizations of psychopathology into their inquiries to produce generalizable findings across related disorders and to ensure congruence with the trajectory of modern psychopathological theory and research.

Clinical implications—Trans-diagnostic factors represent important targets for efforts to ameliorate and prevent sexual orientation-related mental health disparities. First, these constructs can help frame clinical assessment endeavors. Assessment of trans-diagnostic factors provides a dimensional means by which sexual minority individuals' likelihood of experiencing future disorders can be screened, for instance, given that these factors have been shown to drive patterns of lifetime disorder manifestation and stability (Eaton, Krueger, and Oltmanns, 2011; Kessler et al., 2011). For instance, broadband symptoms measures such as the Mood and Anxiety Symptom Questionnaire (MASQ; Watson et al., 1995a, 1995b) can be used to evaluate the mixed mood-anxiety experiences at the core of internalizing psychopathology. Indeed, Buckby, Yung, Cosgrave, and Killackey (2007) found the more trans-diagnostic MASC to have superior sensitivity and specificity compared to more disorder-specific measures, such as the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Given that the results of the current study suggest that sexual minority individuals on average have high levels of comorbidity and heterogeneous manifestations of psychopathology compared to heterosexuals, these sorts of dimensional assessments of core trans-diagnostic phenomena may be particularly useful to characterize these individual's experiences with mental disorder.

With regard to intervention, trans-diagnostic factors appear to be worthwhile foci of treatment efforts. On an explanatory level, these factors help clarify why a single psychotherapeutic approach like cognitive behavioral therapy is effective for both mood and anxiety disorders (Nathan & Gorman, 2007)—that is, because they appear to be reflections, in part, of the same core construct. Such findings suggest that these sorts of treatments may have diffuse impacts due to their effects on core psychopathology constructs like trans-diagnostic factors. Thus, some treatment researchers are beginning to focus their efforts on explicitly broadband, trans-diagnostic treatments, rather than these factors' manifestations as individual disorders. Such approaches may provide generalized benefits that cut across disorder boundaries (Barlow et al., in press). For instance, Barlow and colleagues (2011) have recently developed the *Unified Protocol for Transdiagnostic Treatment of Emotional Disorders*, which includes modules that target the common themes of internalizing psychopathology, including emotional awareness, cognitive appraisals, emotional and behavioral avoidance, and exposure-based approaches. Similar to psychotherapeutic interventions, many psychopharmacological medications, such as SSRIs, impact multiple putatively distinct disorders (Goldberg et al., 2011), suggesting they may address underlying trans-diagnostic phenomena as well. Indeed, a study by Tang and colleagues (2009) found that the SSRI paroxetine (Paxil) reduced trait neuroticism (which is highly related to the internalizing factor; Griffith et al., 2010) as well as depressive symptoms, and controlling

for this neuroticism change reduced the effect of paroxetine on depression to no better than placebo.

In terms of sexual minority mental health specifically, individual-level intervention might thus benefit from application, and development, of appropriate trans-diagnostic treatment. This is particularly true given the diffuse nature of sexual minority individuals' elevated rates of disorders, and the potential efficiency of trans-diagnostic approaches to psychopathology conceptualization and treatment. In other words, a single broadband treatment may impact the core of trans-diagnostic comorbidity and thus provide a comparatively straightforward means to ameliorate various forms of related disorders simultaneously, versus a more traditional, tailored disorder-by-disorder, or symptom-by-symptom, approach. Such individual-level intervention efforts, however, must be supplemented with broader, population-level changes to reduce these disparities as well. On a population intervention level, public policies that reduce the (frequently legal) discrimination sexual minority individuals face (e.g., Hatzenbuehler, Keyes, & Hasin, 2009), and interventions that reduce victimization (e.g., bullying), are indicated as important means of addressing mental health disparities at the trans-diagnostic level as well.

Limitations

This study is not without its limitations. First, NESARC lacked data on some sexual minority populations (e.g., asexual individuals) and gender minorities (e.g., transgender individuals), precluding their inclusion. The percentage of individuals identifying as lesbian, gay, or bisexual was perhaps lower than expected based on some estimates, although the NESARC is a representative probability sample of the United States population as a whole. Second, there is accumulating evidence that additional trans-diagnostic factors (e.g., psychosis or thought disorder factors) are necessary to understand the comorbidity of additional, less common mental disorders, such as schizophrenia, which were not modeled in the current report (Keyes et al., 2013; Kotov, 2011; Markon, 2010; Wright et al., 2013). Third, the cross-sectional nature of the data was also a limitation, as directionality of effects could not be clarified definitively, and third-variable explanations cannot be ruled out. Fourth, the NESARC data from Wave 2 are now approximately a decade old, and investigation of these topics in more recent data will be informative. Finally, given data limitations, I could only model two of the multitude of stressors minority populations face. Even with these limitations, the current study was the first to document sexual orientation-related mental health disparities in trans-diagnostic factors and to demonstrate that elevated rates of particular disorders observed in sexual minority individuals are reflections of their elevated latent factor levels.

Overall Summary

The current study introduced the application of trans-diagnostic factors to questions of sexual orientation-related mental health disparities. Studies of these disparities between sexual minority individuals and heterosexuals have traditionally taken a disorder-by-disorder approach, but emerging, empirically-supported conceptualizations of psychopathology, such as transdiagnostic comorbidity factors, provide compelling new avenues for research and practice. In this first comprehensive application of trans-diagnostic factors to questions of

sexual minority mental health disparities and minority stress, several findings emerged. The trans-diagnostic latent structure of psychopathology was invariant across sexual orientation, but sexual minority individuals had higher average internalizing and externalizing factor levels, accounting for observed prevalence rate disparities. Trans-diagnostic factor level differences typically observed between women and men without regard to orientation were only present in heterosexuals; sexual minority women and men showed similar levels, presenting an intriguing topic for future research. These 12-month factors were positively predicted by lifetime history of sexual orientation-related minority stressors of discrimination and victimization experiences, suggesting an important etiological pathway for further investigation. Such trans-diagnostic approaches can be used to supplement existing approaches to disparities research, providing a broad and informative level of analysis to characterize the mental health of sexual minority individuals.

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Figure 1.

The internalizing-externalizing latent structure of common mental disorders in sexual minority individuals.

Note. Values are standardized estimates from model using all sexual minority individuals.

MDD: major depressive disorder. Dysth: dysthymic disorder. GAD: generalized anxiety disorder. Panic: panic disorder. Social: social phobia. Spec: specific phobia. PTSD: posttraumatic stress disorder. BPD: borderline personality disorder. ASPD: antisocial personality disorder. Nic: nicotine dependence. Alc: alcohol dependence. Marij: marijuana dependence. Drug: other drug dependence. All diagnoses are 12-month. Arrows without numbers indicate unique variances, including error.

Table 1

Multiple regression coefficients for gender, age, and lifetime discrimination/victimization items predicting 12-month transdiagnostic internalizing (top) and externalizing (bottom) factor levels in sexual minority individuals ($n = 577$).

Predictor of Internalizing	Gender	SE	p	Age	SE	p	Disc/Vict	SE	p
Discrimination items									
When obtaining health care or insurance	.43	.18	.014	-.02	.01	.052	.17	.12	.138
When receiving health care	.43	.18	.018	-.02	.01	.055	.14	.10	.171
In public	.46	.17	.008	-.01	.01	.079	.15	.07	.037
In any other situation	.45	.21	.029	-.02	.01	.147	.20	.11	.067
Victimization items									
Being called names	.49	.18	.176	-.01	.01	.070	.17	.07	.017
Made fun of, picked on, pushed, shoved, etc.	.46	.20	.017	-.02	.01	.110	.16	.10	.102
Discrimination/victimization latent variable	.53	.13	<.001	-.01	.005	.003	.19	.08	.020
Predictor of Externalizing									
Discrimination items									
When obtaining health care or insurance	-.21	.35	.536	-.03	.02	.118	-.05	.16	.758
When receiving health care	-.21	.33	.514	-.03	.02	.103	-.05	.14	.694
In public	-.19	.33	.574	-.03	.02	.066	.09	.08	.283
In any other situation	-.17	.32	.600	-.03	.02	.074	.25	.10	.014
Victimization items									
Being called names	-.15	.34	.656	-.03	.02	.054	.13	.11	.242
Made fun of, picked on, pushed, shoved, etc.	-.20	.33	.553	-.03	.02	.072	.07	.11	.558
Discrimination/victimization latent variable	.24	.18	.172	-.02	.01	.001	.25	.10	.016

Note: Regression coefficients are unstandardized. Gender was dummy coded such that the gender coefficient represents factor level change given female gender. Disc/Vict is the regression coefficient for the discrimination or victimization item or latent variable. Factor means were fixed to zero; thus, intercepts are zero. Factor variances were fixed to one, so regression coefficients for items represent change predicted in internalizing/externalizing factor level (in standard deviation units) for a one-unit increase in the predictor variable. For the latent predictor variables, coefficients represent change predicted in internalizing/externalizing factor level (in standard deviation units) for a one-standard deviation increase in the latent discrimination/victimization variable.