Investigating differential item functioning among borderline personality disorder diagnostic criteria and internalizing/externalizing domains based on sexual orientation

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Abstract

Borderline Personality Disorder (BPD) is more frequently diagnosed among sexual minority (SM) populations. SM populations also report higher levels of internalizing and externalizing psychopathology, two core domains of clinical problems that are highly comorbid with BPD. Contextual factors (e.g., group-specific norms) might affect endorsement of BPD items for reasons other than an underlying liability to experience BPD, internalizing or externalizing psychopathology. Therefore, BPD items may be 'easier' to endorse (i.e., be associated with lower indicator thresholds) for SM populations relative to non-SM populations. We tested this hypothesis in a large, nationally representative sample of the US population (*N*=35,723, SM *n*=1,150) using an item response theory approach. Several BPD indicators demonstrated differential item functioning of indicator thresholds, though these results varied based on impairment and sex. Endorsement of impulsive sex and chronic suicidality were consistently associated with lower indicator thresholds among SM groups; lower BPD, internalizing and externalizing factor levels were necessary for item endorsement for SM individuals. Chronic suicidality and impulsivity criteria may conflate BPD-related variance with SM-specific factors, potentially non-pathological SM group norms, and minority stress processes. Implications for equitable diagnosis and future research on the BPD syndrome in SM populations are discussed.

Keywords: *borderline personality disorder, sexual minority, diagnostic bias, Hierarchical Taxonomy of Psychopathology (HiTOP), differential item functioning, LGBT health*

General Scientific Summary: We found that two commonly measured indicators of Borderline Personality Disorder (BPD), impulsive sex and chronic suicidality were 'easier' to endorse irrespective of co-occurring clinical problems in sexual minority adults relative to heterosexual adults. This is suggestive of bias and may indicate that sexual minority specific group norms and social contexts are confounded with the assessment of these indicators in BPD.

Investigating differential item functioning among borderline personality disorder diagnostic criteria and internalizing/externalizing domains based on sexual orientation

Borderline personality disorder (BPD) is an impairing psychiatric disorder characterized by affective lability, interpersonal difficulties, recurrent suicidality, and impulsive behaviors (American Psychiatric Association, 2013). Sexual minority (SM) individuals (i.e., individuals who identify as gay, lesbian, bisexual, or otherwise not exclusively attracted to or have sexual contact with the same gender) are more likely to be diagnosed with BPD than heterosexual individuals (Reuter et al., 2016; Rodriguez-Seijas et al., 2021b, 2021a). SM individuals may be more likely to be diagnosed with BPD due to clinician bias (Rodriguez-Seijas et al., 2021b, in press). However, another unexplored factor that might relate to SM individuals' elevated BPD prevalence is differential properties of measure(s) used to diagnose BPD based on SM status, herein discussed as criterion bias.

Criterion bias can be understood as variance within a criterion variable that can be attributed to sources other than the construct of interest (e.g., Donovan & Drasgow, 1999). Criterion bias for SM individuals may stem from the conflation of SM group-specific norms, or other factors, with BPD psychopathology. Historically, personality disorders like BPD are thought to arise from intra-individual deficits (Rodriguez-Seijas, Rogers, & Asadi, 2023). However, from a social-contextual perspective, multiple factors outside of intraindividual deficits may influence why SM groups are more often diagnosed with BPD (Goldhammer et al., 2019; Porter, 2023; Rodriguez-Seijas, Rogers, & Asadi, 2023). As an illustration, one item used in epidemiological surveys as an indicator of the impulsivity criterion of BPD is “Have you gotten into sexual relationships quickly or without thinking about the consequences?” (Grant et al., 2011). Dating app usage among SM individuals is common. Use of such apps can facilitate

casual sexual relationships (Goedel & Duncan, 2015) and also serve as a safe online space that may otherwise be difficult to access offline due to heterosexism and stigma (Chan, 2023). Evidence also suggests that casual sex in SM communities may be motivated by community belongingness (Jaffe et al., 2021). In other words, motives other than impulsive action (e.g., affiliation, social connection) may be related to differences in group norms, and these might be related to extra-individual factors like environmental stigma. Relying on the impulsive sex item as a measure of impulsivity in BPD confounds relatively normative experiences of dating as an SM person with the BPD phenotype, thereby contaminating the assessment of that BPD impulsivity criterion.

BPD indicators, therefore, may be more readily endorsed by SM individuals but not similarly reflective of the presence of or severity of underlying psychopathology that one might expect among heterosexual persons. This would indicate that BPD indicators function and reflect constructs differently among SM individuals in their relationships with underlying psychopathology relative to non-SM individuals. It is possible that SM individuals' endorsements of BPD indicators show differential item functioning (DIF) in their associations with forms of psychopathology when compared with heterosexuals. We primarily focus on DIF in the context of difficulty parameters—which concerns the level of psychopathology present for an individual to then endorse an indicator/diagnostic criterion. DIF has yet to be examined in BPD diagnostic criteria based on SM status.

Previous research has examined the relationships between BPD criteria and the internalizing and externalizing psychopathology domains in SM populations (Rodriguez-Seijas et al., 2021a), but has not examined DIF in BPD criteria relative to the internalizing and externalizing factors. Rodriguez-Seijas and colleagues (2021a) found that BPD indicators were

more commonly endorsed by SM relative to non-SM individuals. Further, when they accounted for internalizing and externalizing factor levels, disparities in BPD indicator endorsement based on SM status were attenuated. They found that endorsement of a BPD criterion, therefore, was related to higher internalizing and externalizing psychopathology than non-endorsement, such that item endorsement was related to underlying internalizing and externalizing factor levels. This effect differed from indicator to indicator. Some indicators were more likely to be endorsed by SM individuals relative to non-SM individuals regardless of underlying internalizing and externalizing factor levels (Rodriguez-Seijas et al., 2021a). Thus, some indicators might be less reflective of assumed underlying psychopathology yet they are more frequently endorsed for SM relative to non-SM individuals. This would be an example of DIF. Using an item response theory approach, therefore, we could examine *how* BPD indicators were endorsed in relation to the internalizing and externalizing factor levels, which may clarify patterns of group-specific endorsement biases in BPD criteria.

Examining internalizing and externalizing factor levels relative to BPD indicator endorsement is important, given that (1) internalizing and externalizing levels are higher in SM populations relative to non-SM populations (Eaton, 2014; Rodriguez-Seijas et al., 2019) and (2) BPD is best understood as an indicator of both the internalizing and externalizing psychopathology domains (Eaton et al., 2011). BPD is highly comorbid with internalizing and externalizing disorders; prevalence rates exceed 70% for mood, anxiety, and substance use disorder diagnoses in individuals with BPD (Tomko et al., 2014). Therefore, it is pertinent to examine BPD criteria as they relate to the internalizing and externalizing domains as these represent the underlying psychopathology domains that pervade the BPD phenotype. Lastly, examining the psychometric properties of (borderline) personality disorder criteria in SM

populations is particularly relevant given evidence that biased items used in the assessment of personality pathology can inflate maladaptive personality trait levels across groups (Asadi et al., 2023), with implications for the accurate assessment and identification of BPD and other personality disorders in SM populations.

The Current Study

We examined DIF in BPD diagnostic criteria based on SM status using a large nationally representative sample. Our primary aim was to examine DIF of BPD indicators relative to co-occurring internalizing and externalizing psychopathology factors, which is a novel approach. As a secondary aim, we also examined DIF in BPD diagnostic criteria relative to latent BPD, the more conventional approach to DIF testing. We will focus on the internalizing and externalizing as the main analyses, while highlighting where the latent BPD analyses converge with the internalizing and externalizing models.

First, we examined DIF for BPD indicators endorsed with and without indicator-level impairment. Previous research from the National Epidemiologic Survey on Alcohol and Related Conditions III (NESARC-III; Grant et al., 2014) has found that the magnitude of SM disparities in endorsement of BPD criteria is influenced by whether impairment is taken into consideration (Rodriguez-Seijas et al., 2021a). Specifically, disparities were attenuated among SM individuals when impairment associated with the indicator was accounted for (Rodriguez-Seijas et al., 2021a). Other investigations have argued that BPD indicators may be endorsed for reasons other than psychopathology, such as differences in group norms based on sexual orientation (Rodriguez-Seijas, Rogers, & Asadi, 2023). Group norms are not inherently pathological, and differences in how SM individuals behave in response to their environments relative to heterosexual individuals may not elicit distress and impairment the same way that clinical

problems would. An example from Rodriguez-Seijas and colleagues (2021a)'s investigation was that identity shifts across contexts as an indicator of identity disturbance in BPD no longer showed differences in endorsement after accounting for symptom-level impairment. Identity shifts across contexts might arise from a desire to keep one's stigmatized identity concealed to prevent victimization or other harms that arise from the disclosure of their sexual minority status. This is different from identity disturbance as a criterion of BPD in DSM-5, which is due to an unstable sense of self versus an adaptive response to avoid stigma from one's environment (see Rodriguez-Seijas, Rogers, & Asadi, 2023).

Therefore, we would expect a higher level of internalizing, externalizing, and BPD symptom levels required to endorse the item for 'true' identity disturbance versus the more normative identity concealment to avoid stigma which is less related to BPD phenomenology. Thus, we examined indicator-level impairment as a potential modifier of the relationship between SM status and BPD indicator endorsement in relation to the internalizing and externalizing psychopathology factors. We hypothesized that accounting for indicator-level impairment would reduce differences in indicator difficulties between SM groups and non-SM groups, such that less DIF would be present once indicator-level impairment is accounted for.

Second, we were interested in examining differences in how BPD symptoms related to internalizing, externalizing and latent BPD across gender/sex. BPD is diagnosed more frequently in women than men, and bias has been hypothesized as one potential source of this disparity (Skodol & Bender, 2003). Further, there is evidence of differences in BPD symptom expression by gender/sex (Sharp et al., 2014), and previous work has found DIF in BPD diagnostic criteria by sex in the NESARC-II (Hoertel et al., 2014). This may indicate that BPD 'looks' different in women and men (Hoertel et al., 2014). Given evidence of gender/sex differences in BPD

symptoms (Bozzatello et al., 2024; Qian et al., 2022), further research is warranted to examine how they may relate to internalizing, externalizing and latent BPD separately in men and women.

Given our aim was to examine DIF relative to sexual orientation, we stratified by sex as an additional analysis to account for the known gender disparity within the BPD diagnosis and BPD symptom endorsement. By stratifying for sex, we account for sex-specific patterns of symptom endorsement when examining DIF for sexual orientation for internalizing, externalizing and latent BPD. We stratified by sex (as opposed to including sex as a covariate) as our aim is not to partial out variance attributed to sex to arrive at a sex 'unconfounded' measure of how BPD symptoms relate to internalizing, externalizing, and latent BPD (see Beltz et al., 2019 for discussion on the problems with including sex as a covariate and best practices for testing sex differences in clinical data)

Methods

Sample

The present sample was drawn from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III; Grant et al., 2014). The race of the NESARC-III sample was largely White (69.5%), followed by Black (16.7%), Asian (4.4%), Pacific Islander (0.6%), Native American (1.7%) and multiracial (1.65%). For ethnicity, nearly a fifth of the sample identified as Hispanic (19.4%) regardless of race. Our sample overlaps with that of Rodriguez-Seijas and colleagues (2021a) and used identical groupings to determine sexual orientation (e.g., anyone who identifies as gay, bisexual, or lesbian). Sexual orientation was determined by a self-report asking individuals for an identity-based definition of sexual orientation, response options were heterosexual, lesbian/gay, bisexual, not sure, or unknown. The full NESARC-III sample was primarily heterosexual (96.2%), followed by lesbian/gay (1.6%) or bisexual (1.6%);

individuals who responded to the sexual orientation item with “not sure” or “unknown” were excluded from the analytic sample. Gender identity was not assessed in the NESARC-III study, participants were asked “What is your sex?”; 56.3% of the sample reported being men and 43.7% reported being women.

The present study was deemed exempt from a university research ethics board review and was analyzed in accordance with a date access agreement from the NESARC-III study. We do not have permission to share the raw data, however, interested investigators can apply for access through the NESARC-III study website (https://www.niaaa.nih.gov/niaaa-data-use-agreement). We have uploaded all R scripts and model output on the Open Science Framework (https://osf.io/cfy6g/; Asadi & Rodriguez-Seijas, 2023), and study measures can be found on the NESARC-III study website (https://www.niaaa.nih.gov/research/nesarc-iii/questionnaire). Study analyses and hypotheses were not preregistered.

Measures

Borderline Personality Disorder (BPD) Diagnostic Criteria

BPD was assessed by a structured clinical interview using the Alcoholism Alcohol Use Disorder and Associated Disabilities Interview Schedule, DSM-5 Version (AUDADIS-5; Grant et al., 2011). The BPD diagnostic criteria assessment in AUDADIS-5 uses 18 indicators to assess the nine DSM-5 diagnostic criteria for BPD (see Table 1). Some of the diagnostic criteria are assessed with a single indicator (e.g., one indicator for paranoia), whereas others with up to four indicators (e.g., four indicators for identity disturbance). Response options are dichotomous, indicating presence or absence of an indicator. Rodriguez-Seijas and colleagues (2021a) report BPD indicator endorsement by sexual orientation in the NESARC-III. Impairment associated

with the endorsed BPD indicator is measured by an additional item requiring the participant to endorse whether the criterion caused them problems with work, school, family, or other people.

[Insert Table 1]

Internalizing and Externalizing Psychopathology

We used interviewer-assessed lifetime diagnoses, as measured by the AUDADIS-5 (Grant et al., 2011) as indicators of internalizing and externalizing latent factors. Lifetime mental health disorders are more temporally relevant to BPD symptoms, which are thought to represent enduring patterns of behavior, emotion, and cognition from childhood into adulthood. The lifetime diagnoses selected were consistent with other investigations into dimensional models of psychopathology in the NESARC samples (Eaton et al., 2011, 2012; Rodriguez-Seijas et al., 2019, 2021a).

The internalizing factor was modeling using agoraphobia, social anxiety disorder, specific phobia, major depressive episode, persistent depressive disorder, and post-traumatic stress disorder. The externalizing factor was modeled using antisocial personality disorder, alcohol use disorder, tobacco use disorder, cannabis use disorder, and all other substance use disorders elapsed into an ‘other’ substance use disorder variable. Test-retest reliability for AUDADIS-5 disorders ranged from good for substance use disorders to fair-to-good for mood and anxiety disorders (Grant et al., 2015).

The internalizing-externalizing structure of psychopathology is largely invariant across timeframe of assessment, sample type, and whether domains are modelled using symptom counts or binary DSM diagnoses (Ringwald et al., 2022). This internalizing-externalizing structure has also been found invariant across sexual orientation in the NESARC-II (Eaton, 2014), though the invariance of the internalizing and externalizing factors as separate unidimensional factors in the

NESARC-III has yet to be supported. We examined the invariance of the internalizing and externalizing factors, as detailed below.

Analysis

Internalizing, Externalizing, and BPD Invariance

We used a similar approach to Eaton (2014) for testing the invariance of internalizing, externalizing, and latent BPD across SM status. As we are dealing with dichotomous indicators, there is no metric or scalar variance, just simultaneous threshold and loadings invariance (see Wu & Estabrook, 2016). We compared a baseline model with the following parameters for SM and non-SM groups: thresholds and loadings freely estimated, factor variance set to 1, factor scale set to 1, factor means set to 0. We then compared the baseline model to a model where thresholds and factor loadings were constrained simultaneously for SM and non-SM groups, factor variances set to 1 for SM and non-SM groups, factor scale set to 1 for non-SM and freely estimated for SM, and factor mean set to 0 for non-SM and freely estimated for SM. A nested chi-square test was used to compare differences in model fit with and without equality constraints.

Item Response Models

We used two-parameter item response theory (IRT) approach to estimate unidimensional multigroup confirmatory factor models. In a two-parameter IRT framework, the discrimination and difficulty parameters are allowed to vary for each indicator[1]. Higher discrimination suggests that the endorsement of that indicator better differentiates between lower and higher latent trait levels in a narrow range than indicators with lower discrimination values. That is, the indicator does a good job of *discriminating* based on the underlying latent trait.

[1]Discrimination parameters are analogous to factor loadings and difficulty parameters are analogous to item thresholds in classical test theory.

The difficulty parameter represents the level of the latent trait needed for an item/indicator to be endorsed with a 50% probability (i.e., the item threshold). For example, taking the item "Have you gotten into sexual relationships quickly or without thinking about the consequences?" as an indicator of the externalizing factor, equal difficulty across SM versus non-SM groups assumes that both groups would exhibit the same latent externalizing level for an equal probability of endorsing that indicator. DIF in the difficulty parameter would mean one group exhibits lower levels of externalizing for the same probability of endorsing that item relative to the other group. This would suggest that the item is then *'easier'* to endorse for one group relative to the other. A lower threshold among SM individuals might be related to systematic group-specific differences in the indicator's endorsement (e.g., group norms) thus making the indicator 'easier' to endorse irrespective of the underlying psychopathology domains (e.g.., externalizing). DIF can result in consequences for accurate clinical assessment, where bias embedded within diagnostic criteria may lead to overdiagnosis or underdiagnosis in certain groups. Though we report findings related to the discrimination parameter, our primary research question is best answered by focusing on DIF in the difficulty parameters based on SM status.

DIF Testing Procedure

Model Constraining and Testing. Models were estimated based on a tetrachoric correlation matrix, using the weighted least squares mean and variance adjusted (WLSMV) estimator with delta parameterization. For identification, we fixed the factor variance and factor scale to 1 for SM and non-SM groups. Models were estimated in Mplus version 8.6, with model automation and compilation completed in the MplusAutomation package in R (Hallquist & Wiley, 2018).

We estimated separate internalizing and externalizing factors. The internalizing and externalizing indicators were consistent with previous studies in the NESARC (Eaton et al., 2012; Rodriguez-Seijas et al., 2019, 2021a). However, we did not model them together in a single model nor their covariance, since these dimensions are known to overlap (R. F. Krueger, 1999) and covarying them would complicate the interpretation of the results. Examining internalizing and externalizing separately allows for simpler interpretations by deriving BPD indicator parameters relative to the 'core' of internalizing (propensity to experience negative affect) and externalizing (propensity to impulsive action and disinhibition). As internalizing and externalizing are unidimensional when modelled separately (e.g., Krueger et al., 2002; Krueger & Finger, 2001), we also chose to model them separately to meet the assumptions of item response theory methods.

To proceed with DIF testing, we first constrained indicator loading and threshold parameters for all internalizing and externalizing indicators to equality between SM and non-SM groups. We constrained these parameters to ensure that the internalizing and externalizing factors were comparable across groups. We then included each BPD indicator as an unconstrained indicator of the internalizing or externalizing factors; 36 models were parameterized representing a model for each of the 18 BPD diagnostic criterion indicators for internalizing and externalizing respectively. See Figure 1 for example of the parameterized factor models.

[Insert Figure 1]

Model difference testing was conducted by examining the chi-square difference test values based on WLSMV estimation in the DIFFTEST function of Mplus. Chi-square difference tests are highly sensitive to sample size and may detect relatively small differences in large samples such as the NESARC-III. Due to the large numbers of models estimated and

oversensitivity of chi square difference tests in large samples, we relied on the False Discovery Rate correction to control for Type I error with multiple comparisons (Benjamini & Hochberg, 1995). We used a False Discovery Rate correction of 0.05 to adjust the threshold for significance testing obtained for each set of analyses, which comprised 18 *p* values that were adjusted. We used a $\Delta df = 1$ DIF testing procedure similar to other investigations of DIF in psychopathology indicators from NESARC data (Hoertel et al., 2014; McMahon et al., 2019).

Discrimination DIF. The baseline model with the freely estimated BPD indicator factor loading was compared with a constrained model with the factor loading constrained to equality between SM and non-SM groups. Factor means were set to zero for SM and non-SM groups in both the baseline and constrained models. BPD indicator thresholds were freely estimated for SM and non-SM groups. A significant decrement in model fit from the baseline to constrained model would indicate the discrimination parameter differed between SM and non-SM individuals (i.e., DIF).

Difficulty DIF. After testing for discrimination DIF, we tested for difficulty DIF. The baseline model with a freely estimated indicator threshold was then compared to a model where the BPD indicator threshold was set to equality across SM and non-SM groups. Factor loadings were constrained to equality for difficulty DIF testing, unless discrimination DIF analyses suggested DIF for that specific factor loading. Factor means were set to freely estimated for SM groups and set to zero in non-SM groups for both the baseline and constrained models. A significant decrement in model fit from the baseline to constrained model would indicate the difficulty parameter differed between SM and non-SM individuals (i.e., DIF).

Stratification by Sex. Indicators without indicator-level impairment were stratified by sex to examine potential sex-specific DIF in discrimination or difficulty parameters (e.g., if a

BPD indicator would be easier to endorse in SM women relative to heterosexual women). Indicators with indicator-level impairment were not stratified by sex due to low symptom endorsement in SM individuals (e.g., less than 20 cases for certain symptoms in sexual minority men), which could result in unstable parameter estimates or model non-convergence. To stratify by sex, we used the "UseObservations" function in Mplus to subset the sample by sex, where the models were run separately for men and women. The same stepwise procedure detailed above was used to test DIF for discrimination and difficulty parameters in men and women.

Impairment. We repeated the analyses with a more stringent criterion necessitating that participants endorsed significant distress/impairment associated with any BPD indicator for it to be counted as present (Rodriguez-Seijas et al., 2021a). For example, if a participant agreed to impulsive sex, and reported that it caused them problems, they would be coded as meeting the indicator of impulsive sex with impairment.

DIF Testing for Latent BPD

In addition to examining DIF relative to internalizing and externalizing, we also examined DIF relative to latent BPD. Here, DIF would represent differences in discrimination or difficulty parameters for latent BPD, as previously examined in other studies examining DIF across age and sex for latent BPD (Hoertel et al., 2014; McMahon et al., 2019; Sharp et al., 2014). We modeled all 18 BPD indicators to load onto a latent BPD factor, and examined model fit as a test of unidimensionality. To test for indicator-level DIF, we used the same approach as detailed in the main text for the internalizing/externalizing + 1 BPD indicator approach. 18 baseline models were estimated where each indicator would have a free loading or threshold (for discrimination and difficulty methods respectively) while all others were constrained. The baseline model would then be compared to a constrained model with all parameters constrained

using a nested chi-square model comparison test, with FDR correction applied on the 18 p values at a correction of .05. A significant chi-square would indicate that applying equality constraints on that specific parameter would improve model fit, holding all other parameter values constant.

Results

Internalizing, Externalizing, and BPD Factor Invariance

The baseline model fit well for both internalizing (CFI = .96, RMSEA = .031) and externalizing (CFI = .97, RMSEA = .026) when modeled as unidimensional factors. Nested model comparisons revealed no significant decrement in model fit after equality constraints for both the internalizing (DIFFTEST value = 6.6, $\Delta df = 7$, $p = .48$) and externalizing (DIFFTEST value = 5.5, $\Delta df = 4$, $p = .24$) factors were implemented. Given no significant decrement in model fit, we compared factor means for the SM group relative to the non-SM group. The SM group was .7 standard deviation units higher on latent internalizing relative to the non-SM group and .6 standard deviation units higher on latent externalizing relative to the non-SM group.

The baseline model fit well for a unidimensional BPD factor (CFI = .96, RMSEA = .028). Nested model comparisons showed a significant decrement in model fit after equality constraints were implemented (DIFFTEST value = 158.481, $\Delta df = 17$, $p < .0001$, ΔRMSEA = .002), indicating that measurement invariance was not met for the BPD latent factor. Thus, mean comparisons of the latent BPD factor based on SM status might be confounded by group-specific measurement error.

Baseline Model fit

All tested factor models showed good fit when specified as unidimensional with CFI values exceeding .97 and RMSEA values below .02 for both internalizing and externalizing models without indicator-level impairment (See Table S1). On average, BPD indicators were

weakly-to-moderately related to the externalizing factor for both SM ($M\lambda$ = .42, SDλ = .08) and non-SM ($M\lambda$ = .47, SDλ = .07) groups. Similarly, BPD indicators were weakly-to-moderately related to the internalizing factor for both the SM ($M\lambda$ = .49, SDλ = .10) and non-SM ($M\lambda$ = .55, SDλ = .10) groups. Table 2 reports standardized factor loadings in the baseline (unconstrained) models, where factor loadings were freely estimated for SM and non-SM groups.

[Insert Table 2]

When symptom-level impairment was accounted for, model fit remained good (see Table S2). However, several indicators failed to load significantly onto the internalizing and externalizing factors within the SM group (see Table S3 and additional details in Supplemental Materials). Thus, although the unidimensionality assumption of the internalizing and externalizing factors was met, some BPD indicators were unrelated to the internalizing or externalizing factors when impairment was taken into consideration.

DIF in Discrimination Parameters

We found no significant differences in BPD discrimination parameters in relation to either the internalizing or externalizing factors when symptom-level impairment was not considered (see Tables S4-S5). This was also the case when stratifying by sex (see Tables S6-S9). We did find some significant differences in discrimination parameters for some BPD indicators when accounting for symptom-level impairment though the indicators that showed DIF for discrimination were specific to either the internalizing or externalizing factor (see Tables S10-S12 and supplemental materials results).

DIF in Difficulty Parameters

As BPD indicators without symptom-level impairment did not show evidence of DIF at the discrimination level, all factor loadings/discrimination parameters were constrained to

equality to test DIF for indicator difficulty. Several BPD indicators demonstrated significantly lower difficulty in the SM group (see Table 3); BPD criteria were easier to endorse for SM groups compared with the non-SM group. Significant DIFFTEST values indicated DIF for 14 out of 18 BPD indicators in their relationship with the latent externalizing factor and six out of 18 BPD indicators in their relationship with the latent internalizing factor based on SM status. Impulsive sex, self-injury/suicide attempt, and deliberate self-harm were the only items that had significantly lower thresholds for SM individuals relative to non-SM in relation to both internalizing and externalizing factors.

[Insert Table 3]

On average, the difference in difficulty parameters was just under a standard deviation for internalizing ($M\Delta_{\text{difficulty}} = 0.97$, $SD\Delta_{\text{difficulty}} = 0.25$) and just over a standard deviation for externalizing ($M\Delta_{\text{difficulty}} = 1.11$, $SD\Delta_{\text{difficulty}} = 0.28$), indicating that the same probability of endorsing any of these BPD indicators as associated with approximately one standard deviation units lower internalizing/externalizing factor levels for SM individuals when compared with non-SM individuals. For example, the indicator “Have you gotten into sexual relationships quickly or without thinking about the consequences?” has a 50% probability of being endorsed by SM individuals at approximately 0.7 SD units above the average level of externalizing, whereas for non-SM individuals, the same 50% probability of endorsing the indicator happens at 1.8 SD units above the average level of externalizing (see Table 4 and Figure 2). There was a full standard deviation difference in the level of externalizing required for the same probability of endorsing the indicator based on SM status, a difference we find clinically significant and which exceeds prior benchmarks (0.25 difference in difficulty parameters) for a clinically significant effect size for DIF in the NESARC-II (Hoertel et al., 2014; McMahon et al., 2019).

[Insert Figure 2]

[Insert Table 4]

Stratification by Sex

Difficulty DIF stratified by sex results largely aligned with the non-stratified results. However, some additional indicators showed DIF in the sex-stratified results that were not present in the mixed-sex results. For SM women, 12 out of 18 items had significantly lower indicator thresholds for internalizing compared to non-SM women (Table S13), whereas for men only impulsive sex had a significantly lower indicator threshold for internalizing compared to non-SM men (Table S14). For SM women, four out of 18 indicators had significantly lower indicator thresholds for externalizing compared to non-SM women: frantic concerns of abandonment, self-injury/suicide attempt, deliberate self-harm, and affective lability (Table S15). For SM men, 11 out of 18 item indicators had significantly lower indicator thresholds for externalizing compared to non-SM men (Table S16). Lower difficulty among BPD indicators was more frequently observed for SM women in relation to the internalizing factor. However, lower difficulty among BPD indicators were more frequently observed for SM men in relation to the externalizing factor (see Tables S17-S18).

Accounting for Symptom-level impairment

The same pattern of findings was the case when accounting for symptom-level impairment. Some indicators had significantly lower thresholds for both internalizing and externalizing (see Table 2 for difference test values and Table S19 for difficulty parameters). On average, the difference in difficulty parameters was just under 1.5 standard deviation units for both internalizing ($M\Delta_{difficulty} = 1.28$, $SD\Delta_{difficulty} = 1.03$) and externalizing ($M\Delta_{difficulty} = 1.21$, $SD\Delta_{difficulty} = 0.36$).This suggests that the same probability of endorsing any of these BPD

indicators with item-level impairment was associated with approximately one standard deviation units lower internalizing/externalizing factor levels for SM individuals when compared with non-SM individuals. Consistent with the findings across internalizing and externalizing domains, sex, impulsive sex and chronic suicidality showed the most robust evidence of DIF with or without consideration of symptom-level impairment.

Three indicators showed DIF for internalizing when we accounted for symptom-level impairment: impulsive sex ($\Delta_{difficulty}$ = 4.24), impulsive shopping/gambling ($\Delta_{difficulty}$ =3.00), and deliberate self-harm ($\Delta_{difficulty}$ = 1.40). The differences in magnitude for the impulsivity indicators was strikingly large. For example, the same probability of endorsing impulsive shopping/gambling with associated impairment was associated with approximately 3 SD units lower internalizing factor levels for SM individuals when compared with non-SM individuals.

Five indicators showed DIF for externalizing when symptom-level impairment was required: frantic concerns of abandonment ($\Delta_{difficulty}$ = 1.66), impulsive sex ($\Delta_{difficulty}$ = 1.10), self-injury/suicide attempt ($\Delta_{difficulty}$ = 1.78), deliberate self-harm ($\Delta_{difficulty}$ = 1.85), affective lability ($\Delta_{difficulty}$ = 1.80), and paranoia ($\Delta_{difficulty}$ = 1.30). This set of indicators partially overlapped with the results when symptom-level impairment was not accounted for, indicating no new indicators showed evidence of DIF but rather indicators showed DIF for externalizing when symptom-level impairment was accounted for. This suggests that accounting for symptom-level impairment attenuates differences in indicator difficulty between SM groups and non-SM groups for externalizing, a pattern of results which was more pronounced for externalizing relative to internalizing.

DIF in Relation to the BPD Latent Factor

As a further analysis, we examined indicator parameters relative to a latent BPD factor. Results are presented in tables S20-S22 of the supplement. No indicators showed discrimination DIF, either with or without endorsement of symptom-level impairment or across sex, indicating that BPD indicators were correlated with the BPD factor in the same way across SM and non-SM groups (Table S20). Three out of 18 indicators showed difficulty DIF (Table S21); on average, BPD indicator thresholds were 0.7 SD units lower in the SM group relative to the non-SM group for the BPD factor. The thresholds for the impulsive sex ($\Delta_{difficulty}$ = 1.06), self-injury/suicide attempt ($\Delta_{difficulty}$ = 1.06), and deliberate self-harm ($\Delta_{difficulty}$ = 1.27) indicators were significantly lower for the SM group relative to the non-SM group.

Next, we examined differences in BPD indicator thresholds for latent BPD when symptom-level impairment was required. Impulsive sex ($\Delta_{difficulty}$ = 1.13) and deliberate self-harm ($\Delta_{difficulty}$ = 1.14) continued to demonstrate significantly lower thresholds in the SM group relative to the non-SM group. However, when impairment was required for endorsement of a BPD symptom, the threshold for self-injury/suicide attempt no longer differed significantly for the SM group.

Then we examined differences in BPD indicator thresholds for latent BPD across sexual orientation for women and men separately. Impulsive sex (men $\Delta_{difficulty}$ = 1.02, women $\Delta_{difficulty}$ = 1.17) and deliberate self-harm (men $\Delta_{difficulty}$ = 1.02, women $\Delta_{difficulty}$ = 1.37) had significantly lower thresholds in the SM group in both men and women. Two BPD symptoms demonstrated sex-specific differences: thresholds for emptiness were significantly lower in SM women relative to non-SM women ($\Delta_{difficulty}$ = 0.54), and physical anger was significantly higher in SM men relative to non-SM men ($\Delta_{difficulty}$ = -0.50).

In summary, the latent BPD factor levels associated with 50% probability of endorsement of sex, self-injury/suicide attempt, and deliberate self-harm were significantly lower for SM individuals relative to non-SM individuals. This effect was largely consistent across sex, and whether the symptoms resulted in impairment or not (see Table S22). This pattern of results is also largely consistent with the results obtained from the internalizing and externalizing models (Table 5).

[Insert Table 5]

Discussion

We examined the psychometric properties of the BPD diagnostic criterion indicators in the NESEARC-III to determine whether the indicator endorsement in relation to underlying psychopathology domains differed between SM and non-SM individuals. Results from discrimination DIF analyses suggested few consistent group differences in how well BPD indicators differentiated higher versus lower levels of internalizing or externalizing psychopathology. In contrast, results from difficulty DIF analyses demonstrated that several BPD indicators had significantly lower thresholds, and were ‘easier’ to endorse for SM individuals relative to non-SM individuals across internalizing, externalizing, latent BPD, sex assigned at birth, and when symptom-level impairment was endorsed (see Table 5 for a summary of indicator-level DIF across sex, impairment, and psychopathology).

Which BPD Indicators Were ‘Easier’ to Endorse?

The thresholds for indicators measuring impulsive sex and chronic suicidality were consistently lower among SM relative to non-SM groups in relation to the internalizing and externalizing psychopathology factors as well as the latent BPD factor. These indicators continued to show evidence of difficulty DIF even when accounting for symptom-level

impairment, and when stratifying by sex. Notably, chronic suicidality as a criterion of BPD has been found to show DIF across sex and some age groupings in relation to the BPD phenotype (Hoertel et al., 2014; McMahon et al., 2019; Sharp et al., 2014). As we found evidence of DIF for suicidality in SM for both BPD and internalizing and externalizing, we build on existing findings suggesting bias across age and sex, and extend these results toward SM populations. We unpack these findings below within a social-contextual framework that has been proposed as a potential explanation for disparities in personality disorder diagnosis in minoritized individuals (Rodriguez-Seijas, Li, et al., 2023; Rodriguez-Seijas, Rogers, & Asadi, 2023).

Chronic Suicidality

Social-contextual predictors of suicidal behavior that are particularly pertinent to SM populations may contaminate chronic suicidality as a criterion of BPD. From direct experiences of victimization to overarching stigmatizing policies, minority stress processes influence suicidality in SM populations (Haas et al., 2010; Hatzenbuehler, 2011; Pachankis et al., 2021). The minority stress processes—resultant from existing in heteronormative environments—also influence risk for other psychiatric disorders (Hatzenbuehler, 2009), with importance for understanding suicidality. For instance, a study using the NESEARC-II data found that SM individuals living in U.S. states with lower state-level protections for lesbian, gay, and bisexual populations demonstrated higher prevalence of most past-year psychiatric disorders and were more likely to present with higher psychiatric comorbidity than those living in lower structural stigma states (Hatzenbuehler et al., 2009). Even without accounting for such structural stigma, SM individuals demonstrated higher prevalence of most past-year psychiatric disorders in the NESARC-II than non-SM individuals (Hatzenbuehler et al., 2009), an association which was

replicated using the present dataset as well (NESARC-III; e.g., McCabe et al., 2022; Rodriguez-Seijas et al., 2019).

SM individuals who experience high stress from their environments may see suicide or self-injury as an escape from the heterosexist systems in which they are embedded (Rodriguez-Seijas, Rogers, & Asadi, 2023). This contrasts with the prevailing conceptualization of suicidality in the context of BPD, where chronic suicidality is viewed as a manipulative tactic that occurs in response to threats of separation or rejection (American Psychiatric Association, 2013). Our results suggest that suicidality in SM individuals is less strongly associated with underlying psychopathology factors or an underlying BPD factor. Future research should explore how chronic suicidality among SM individuals—as well as gender minority individuals who also evidence elevated BPD diagnosis (Rodriguez-Seijas, Morgan, et al., 2023; Zimmerman et al., 2022) —is associated with minority stress processes, assumed intra-individual deficits of personality, or the confluence of the two.

Impulsive Sex

Impulsive sex in the NESARC gauges "[getting] into sexual relationships quickly" and "[getting into sexual relationships] without thinking about the consequences". These criteria may be differentially endorsed for reasons relating to differing social and cultural norms around sex in SM populations, rather then necessarily being reflective of difficulties with disinhibition, sensation seeking, and impulsivity. Notably, the impulsive sex indicator in the NESARC closely parallels the definition of a hookup (e.g., short-term casual sexual relationships with strangers or acquaintances). Casual sexual behavior may be a relatively normative process among SM individuals as a part of positive identity and sexual development (Hanna-Walker et al., 2023;

Pingel et al., 2013) and may be endorsed for reasons other than impulsivity and disinhibition or a propensity to experience negative affect.

Indeed, people who engaged in casual sex were more likely to evaluate the experiences as positive rather than negative (Wesche et al., 2021). SM adults report a plurality of positive motivations for engaging in casual sex, ranging from exploration, emotional connectedness, and feeling validated and powerful (Snapp et al., 2023; Watson et al., 2019). Evidence suggests casual sexual behaviors are predictive of community involvement and connectedness, and are motivated by minority stress experiences (Jaffe et al., 2021). This suggests a confluence of motives spanning enhancement (i.e., affiliative) and coping strategies motivating casual sexual behaviors in SM populations (Snapp et al., 2023). Notably, these motives are less related to an intra-individual deficit than an SM individual's transactions with their environment and social context. As the indicators are written as behavioral indicators of casual sexual behavior, the above reasons may explain why we found 'impulsive sex' easier to endorse for SM groups in relation to both internalizing and externalizing. Our findings support other research demonstrating that sexual behavior among SM populations may not be as strongly associated with the externalizing domain for SM relative to non-SM individuals (Rodriguez-Seijas, Rogers, Harkness, et al., 2023). Thus, these results suggest caution in assuming that behavioral indicators that index underlying psychopathology/maladaptive personality traits function identically based on SM status.

Sex Differences

We found evidence of some sex differences when we stratified DIF analyses across women and men. The indicators that demonstrated more robust evidence of difficulty DIF across sex and SM status were chronic suicidality and impulsive sex. Chronic suicidality indicators

showed DIF for SM women and men in relation to externalizing, whereas the indicators only showed evidence of DIF for SM women in relation to internalizing. Thus, for SM men, endorsement of suicidality appears less associated with disinhibitory psychopathology but not less associated with the propensity to experience negative affect when compared with non-SM men. Suicidal attempts are more common among SM populations relative to non-SM populations (Salway et al., 2019), though the role of gender/sex at the intersection of SM status is less well understood. In the NESARC sample, SM women reported more suicidal behavior than SM men (Fish et al., 2019). Other work suggests that bisexual women are at higher risk for suicide attempts relative to bisexual men and gay/lesbian men and women, supporting both sex and plurisexual status as moderators of suicidality (Salway et al., 2019). We encourage future research to examine the intersections between psychopathology domains, gender/sex, and sexual orientation.

Another sex difference emerged for impulsive sex, where endorsement of the indicator in SM men was associated with lower internalizing and externalizing psychopathology levels compared with non-SM men, but for SM women DIF was only observed in relation to externalizing. As with the other sex results, this work is exploratory; however, we see parallels with the discussion above on group norms related to casual sexual behavior for SM women. Future research in this area is needed.

Implications for the BPD Syndrome

Though we highlighted the indicators that functioned differently and demonstrated DIF in relation to sex and internalizing/externalizing psychopathology, the patterns of DIF for remaining indicators were mixed. Given the potential for Type I error to affect DIF testing, we are hesitant to overinterpret indicators which demonstrated inconsistent DIF. This comprised

most BPD indicators we tested, which suggests that concerns about validity and criterion contamination may be relatively specific to indicators involving sexual behavior and chronic suicidality. Though we did not have a priori hypotheses about which indicators would be more easily endorsed, we had previously argued that indicators assessing interpersonal instability, frantic efforts to avoid abandonment, identity disturbance, impulsivity, and chronic suicidality would theoretically be related to SM-specific minority stress processes with potential consequence for assessment (Rodriguez-Seijas et al., 2021b, in press; Rodriguez-Seijas, Morgan, et al., 2023; Rodriguez-Seijas, Rogers, & Asadi, 2023). These criteria did not show consistent patterns of DIF in the difficulty parameter in the current study. However, apart from the NESSARC-III, the few population-based datasets that contain assessment of BPD or related domains—such as the National Survey on American Life (Jackson et al., 2004), the Midlife in the United States Study (Brim et al., 2004), and the National Comorbidity Survey (Kessler, 1994)—either exclude measurement of SGM status or possess samples restrictively small to preclude analysis of SGM individuals. Simultaneously, datasets focused squarely on understanding the mental health of SGM individuals typically include relatively superficial measurements of psychopathology domains (E. A. Krueger et al., 2020; Meyer, 2020; Sterzing et al., 2018); their focus is more often on granular assessment of structural and social predictors of mental and physical health among SGM individuals. Thus, further research on the relationships between minority stress (and other potential sources of criterion contamination) are required to better understand how minority stress processes relate with BPD criteria.

Relatedly, we hypothesized that accounting for indicator-level impairment may decrease difficulty DIF. This was only partially supported. For externalizing, we saw a drastic reduction in the indicators that showed difficulty DIF after requiring the indicator cause impairment. Whereas

for internalizing, self-injury/suicide attempt no longer show difficulty DIF, while impulsive gambling showed DIF after accounting for impairment. Outside of those two indicators, deliberate self-harm and impulsive sex continued to show DIF even when accounting for impairment. For latent BPD, self-injury/suicide attempt no longer showed difficulty DIF when accounting for impairment, while impulsive sex and deliberate self-harm continued to show DIF even when accounting for impairment. Thus, the reduction in difficulty DIF when accounting for impairment was largely specific to externalizing, which may indicate that BPD indicators tend to be more biased for SM individuals as indexes of externalizing liability unless impairment is accounted for. Another study found few relationships between sex-related substance use and externalizing in a clinical sample of sexual minority men (Rodriguez-Seijas, Rogers, Harkness, et al., 2023). It may be that drawing from a clinical sample with higher impairment/distress at baseline than an epidemiological sample could change the patterns of difficulty DIF beyond using a single item to measure impairment.

Clinical Implications

For clinicians, we recommend that assessment of BPD symptoms for SM individuals be nested within a multilevel understanding of the person's social context. For SM individuals, simply endorsing a binary item on a screener or a clinician interview may not provide sufficient clinical information, as the items may be endorsed for reasons other than BPD. It is pertinent for clinicians to get examples to inform why a SM individual may meet criteria due to an intraindividual deficit, and not conflate reactions to stress and stigma from their environment with criteria for a personality disorder (Rodriguez-Seijas, Rogers, & Asadi, 2023). We suspect for most SM individuals, it will be difficult to disentangle the influence of the environment on self and interpersonal functioning, so we caution the diagnosis of BPD in SM individuals not

hinge on the presence of impulsive sex as one of the two areas of problematic impulsivity, nor on the presence of chronic suicidality. We also note that the sex-stratified analyses suggest that these processes are not sex specific, and that clinicians should be sensitive to the reasons why sexual minority men and women endorse BPD items, particularly impulsive sex and chronic suicidality.

Limitations

The present study is cross-sectional and cannot speak to when and how minority stressors affect BPD indicators. We note that sources of DIF and criterion contamination were not statistically tested in the present investigation. We hypothesized about the sources of DIF from extant theory, but DIF may be due to other reasons other than those that we posited. Critically, there is a dearth of studies that examine minority stressors in the context of BPD symptoms. Such work is essential to better understand how social contexts affect the development of BPD symptoms in SM populations. Further research should model the relationships between minority stressors, BPD indicators, and psychopathology domains over time.

We modeled BPD as a latent factor in the present study as a supplemental analysis to our internalizing and externalizing results. Though a useful point of reference, it comes with notable limitations. First, BPD indicators were represented unevenly across the AUDADIS interview, with as many as four identity disturbance questions, three anger and impulsivity indicators, and only one indicator each for paranoia, relationship problems, and affective lability. Thus, what latent BPD actually means in this study is likely not an evenly weighted composite of DSM-5 criteria and may be more heavily weighted in favour of certain diagnostic criteria relative to others.

Second, we found internalizing and externalizing demonstrated threshold and loading invariance, though this was not the case for latent BPD. Though only three of the 18 BPD indicators consistently showed difficulty DIF, none of the internalizing and externalizing indicators showed DIF in SM groups. Arguably, internalizing and externalizing posed as more valid domains against which to examine BPD indicators. Though we found good model fit for a unidimensional solution, it was beyond the scope of this study to comprehensively test competing structural models for BPD indicators. It is plausible that other factor structures may fit equally as well. Thus, our findings of unidimensionality for BPD indicators are tentative. Future research should subject the factor structure of BPD to further scrutiny.

DIF testing is prone to type I error, whereby minor differences in indicator parameters may be flagged by chi square difference testing. Though we accounted for type I error by applying false discovery rate correction on all obtained parameter tests, replication of these results across diverse measures of BPD symptoms and diverse samples is crucial to ensure the robustness of these findings. The sample size for the SM versus non-SM groups was highly unequal, which is inherent given lower proportions of SM individuals in the population relative to non-SM. Unequal sample sizes can influence the magnitude of chi square difference tests, where invariance testing across equal group samples sizes results in larger chi square differences tests where non-invariance is supported. Thus, type II error also remains a possibility where significant differences in indicator parameters in SM populations are inherently harder to detect (Chen, 2007).

Conclusion

We used tests of DIF to examine whether BPD indicator difficulty parameters differed across SM versus non-SM groups relative to internalizing and externalizing latent factors (i.e.,

the amount of latent psychopathology required for a 50% probability of endorsing any BPD indicator) in a population-level dataset. We found that indicators of impulsive sex as a measure of impulsivity and chronic suicidality consistently demonstrated evidence of DIF in the difficulty parameter in relation to both the internalizing and externalizing factors. Endorsement of these indicators was associated with lower levels of internalizing/externalizing for SM individuals to have the same 50% probability of endorsing the indicator relative to non-SM individuals. We interpret these results as indicative of criterion contamination, whereby social-contextual factors unique to SM populations may affect their endorsement of these indicators. It is critical to continue researching *why* these indicators show evidence of DIF. We believe that studying BPD indicators in the context of minority stress can yield a more nuanced understanding of how the BPD syndrome functions across minoritized groups and potentially explain previous findings of BPD diagnostic disparities based on sexual and gender minority status.

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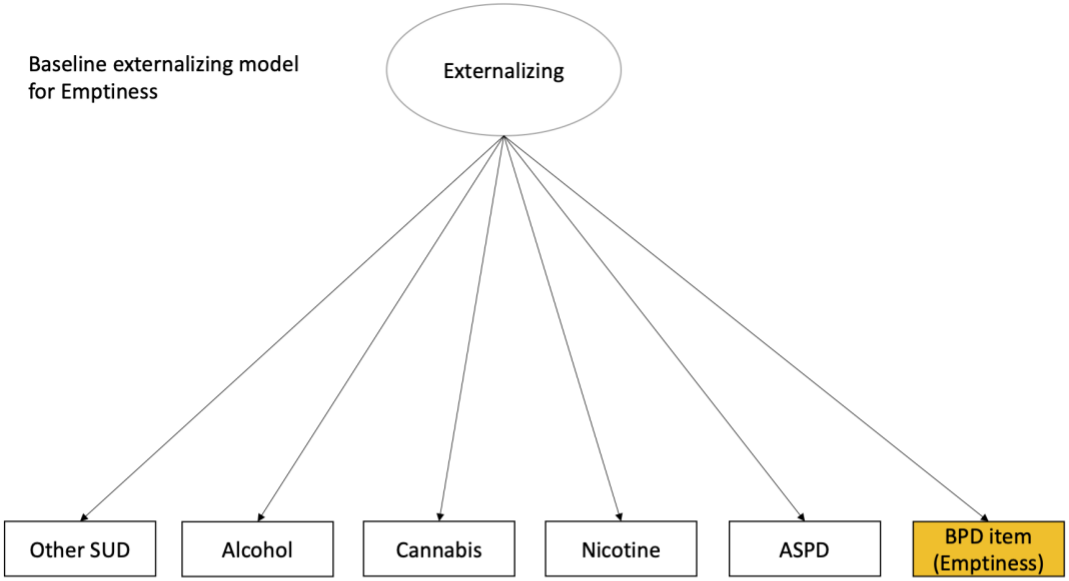
Baseline externalizing model for Emptiness
Externalizing
Other SUD
Alcohol
Cannabis
Nicotine
ASPD
BPD item (Emptiness)

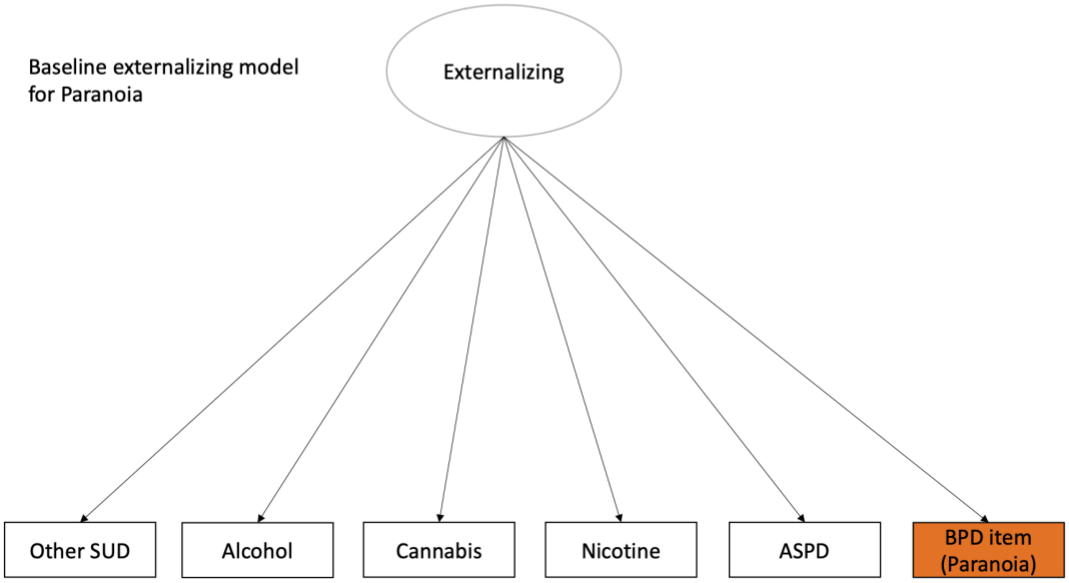
Baseline externalizing model for Paranoia
Externalizing
Other SUD
Alcohol
Cannabis
Nicotine
ASPD
BPD item (Paranoia)

Figure 1. *Example of the INT/EXT+1 models used in this present study. Figure illustrates that a BPD item (in this case, Emptiness and Paranoia) was set to load on a psychopathology factor (in this case, externalizing) across two separate models.*

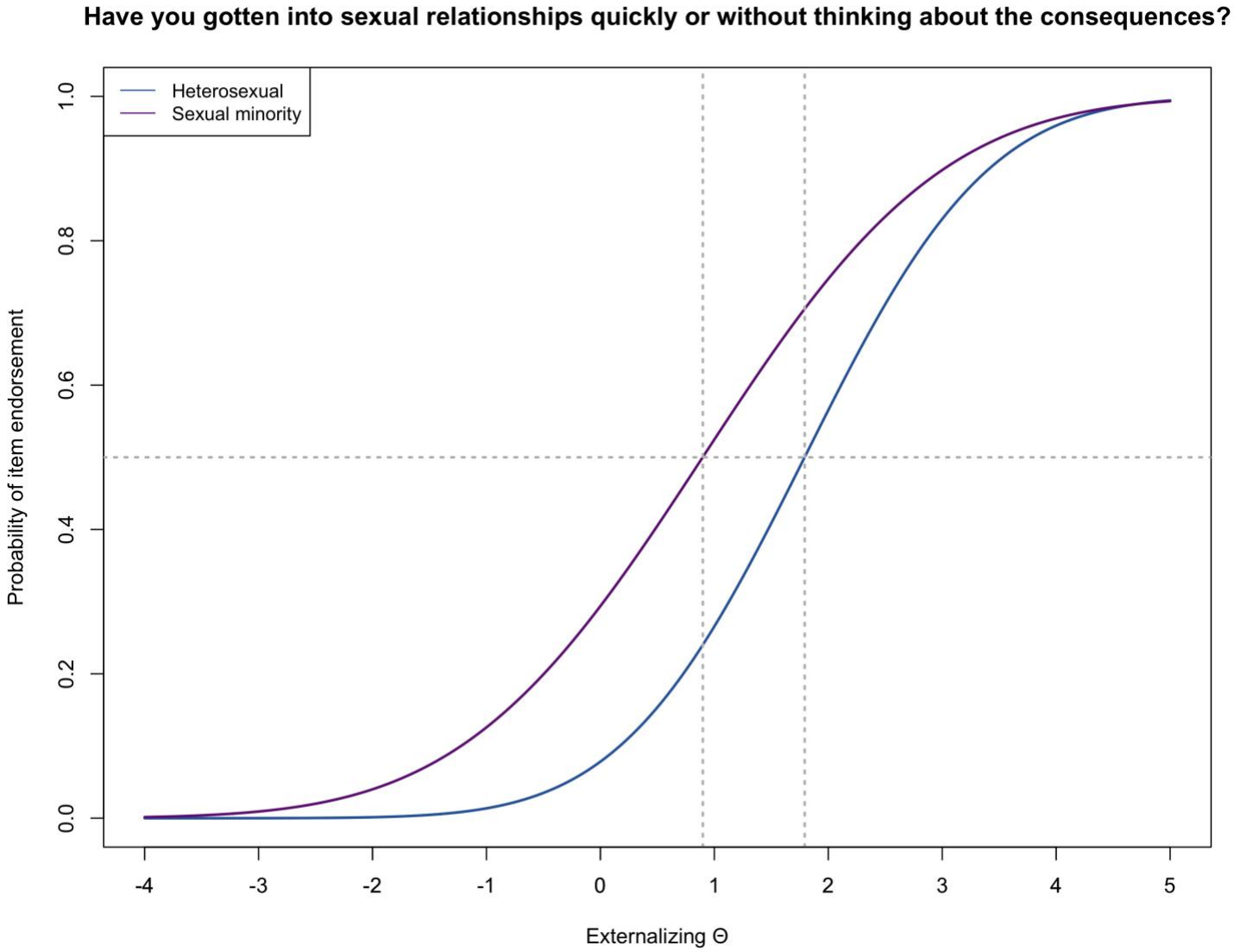

Figure 2. *Item response curve for the item "Have you gotten into sexual relationships quickly or without thinking of the consequences" without symptom-level impairment for externalizing.*

Table 1. *Item names, constructs, and descriptions for Borderline Personality Disorder Diagnostic Criteria in the NESARC Study*

Item title (construct title)	Item description (Since early adulthood…)
Abandonment 1 (frantic concerns of abandonment)	Have you often become frantic when you thought that someone you really cared about was going to leave you?
Abandonment 2 (preventing abandonment)	Have you gone to extremes to keep people from leaving you?
Unstable Relationships	Have your relationships with people you really care about had lots of extreme ups and downs?
Identity Disturbance 1 (sudden changes)	Have you all of a sudden changed your sense of who you are and where you are headed?
Identity Disturbance 2 (changes with others)	Has your sense of who you are often changed depending on the situation or whom you are with?
Identity Disturbance 3 (big differences)	Have you been so different with different people or in different situations that you sometimes don't know who you really are?
Identity Disturbance 4 (life changes)	Have there been lots of sudden changes in your personal goals, career plans, and religious beliefs?
Impulsivity 1 (impulsive behavior)	Have you often done things impulsively, not caring about the consequences?
Impulsivity 2 (impulsive sex)	Have you gotten into sexual relationships quickly or without thinking about the consequences?
Impulsivity 3 (impulsive shopping/ gambling)	Have there been periods of your life when you often spent too much money while shopping or gambling?
Suicidality 1 (self-injury/ suicide attempt)	Have you tried to hurt or kill yourself, or threatened to do so?
Suicidality 2 (deliberate self-harm)	When you've been under a lot of stress, have you cut, burned, or scratched yourself on purpose?
Affective Lability	Have you had a lot of sudden mood changes?
Emptiness	Have you often felt empty inside?
Anger 1 (temper)	Have you often had temper outbursts or gotten so angry that you lose control?
Anger 2 (physical)	Have you hit people or thrown things when you got angry?
Anger 3 (frustrability)	Have even little things made you angry or have you had difficulty controlling your anger?
Paranoia	When you've been under a lot of stress, have you felt suspicious or distrustful of other people?

Table 2. *BPD items without symptom-level impairment factor loadings across sexual orientation for internalizing and externalizing*

	Internalizing				Externalizing			
	Heterosexual		Sexual minority		Heterosexual		Sexual minority	
Items	λ	SE	λ	SE	λ	SE	λ	SE
Abandonment 1 (frantic concerns of abandonment)	0.598	0.012	0.559	0.055	0.414	0.015	0.322	0.064
Abandonment 2 (preventing abandonment)	0.543	0.015	0.476	0.063	0.455	0.019	0.29	0.063
Unstable Relationships	0.49	0.011	0.377	0.058	0.393	0.012	0.35	0.064
Identity Disturbance 1 (sudden changes)	0.522	0.012	0.482	0.056	0.458	0.013	0.367	0.06
Identity Disturbance 2 (changes with others)	0.578	0.016	0.537	0.07	0.414	0.017	0.415	0.086
Identity Disturbance 3 (big differences)	0.644	0.015	0.578	0.064	0.44	0.019	0.446	0.077
Identity Disturbance 4 (life changes)	0.521	0.012	0.462	0.066	0.415	0.012	0.299	0.067
Impulsivity 1 (impulsive behavior)	0.469	0.012	0.461	0.062	0.644	0.011	0.569	0.048
Impulsivity 2 (impulsive sex)	0.382	0.015	0.319	0.061	0.62	0.012	0.517	0.049
Impulsivity 3 (impulsive shopping/ gambling)	0.384	0.011	0.284	0.061	0.481	0.012	0.406	0.047
Suicidality 1 (self-injury/ suicide attempt)	0.656	0.014	0.582	0.052	0.479	0.018	0.491	0.063
Suicidality 2 (deliberate self-harm)	0.609	0.024	0.545	0.061	0.442	0.022	0.422	0.072
Affective Lability	0.658	0.011	0.596	0.053	0.418	0.015	0.439	0.064
Emptiness	0.72	0.009	0.646	0.046	0.428	0.014	0.404	0.067
Anger 1 (temper)	0.547	0.012	0.437	0.07	0.498	0.015	0.423	0.067
Anger 2 (physical)	0.422	0.013	0.356	0.056	0.505	0.011	0.525	0.05
Anger 3 (frustrability)	0.55	0.013	0.574	0.057	0.484	0.013	0.416	0.054
Paranoia	0.633	0.01	0.583	0.046	0.454	0.013	0.437	0.057

Note: Factor loadings are compiled from separate internalizing and externalizing models and are presented side by side for ease of comparison. All factor loadings significant at $p < .001$. λ = Factor Loading; SE = Standard Error of factor loading; BPD = Borderline Personality Disorder.

Table 3. *Difficulty testing for BPD items without and with symptom-level impairment*

	Internalizing	Externalizing

Item title	Without symptom-level impairment		With symptom-level impairment		Without symptom-level impairment		With symptom-level impairment	
	DIFFTEST value	DIFFTEST *p* value	DIFFTEST value	DIFFTEST *p* value	DIFFTEST value	DIFFTEST *p* value	DIFFTEST value	DIFFTEST *p* value
Abandonment 1 (frantic concerns of abandonment)	4.429	0.0353	3.704	0.0543	21.399	**<.0001**	8.263	**0.004**
Abandonment 2 (preventing abandonment)	1.708	0.1913	0.307	0.5795	4.417	**0.0356**	0.906	0.3412
Unstable Relationships	2.455	0.1172	2.502	0.1137	8.904	**0.0028**	1.846	0.1743
Identity Disturbance 1 (sudden changes)	3.038	0.0813	2.114	0.1459	6.665	**0.0098**	1.631	0.2015
Identity Disturbance 2 (changes with others)	0.741	0.3894	0.256	0.6127	7.831	**0.0051**	1.417	0.2338
Identity Disturbance 3 (big differences)	3.828	0.0504	0.718	0.3966	15.311	**0.0001**	3.516	0.0608
Identity Disturbance 4 (life changes)	0.111	0.7394	1.727	0.1888	2.989	0.0838	2.599	0.1069
Impulsivity 1 (impulsive behavior)	5.367	0.0205	6.181	0.0129	0.291	0.5895	0.201	0.6538
Impulsivity 2 (impulsive sex)	44.333	**<.0001**	60.952	**<.0001**	21.046	**<.0001**	13.473	**0.0002**
Impulsivity 3 (impulsive shopping/ gambling)	5.914	0.015	14.854	**0.0001**	2.68	0.1016	3.141	0.0763
Suicidality 1 (self-injury/ suicide attempt)	11.759	**0.0006**	4.807	0.0283	31.834	**<.0001**	9.251	**0.0024**
Suicidality 2 (deliberate self-harm)	27.006	**<.0001**	11.709	**0.0006**	44.462	**<.0001**	18.661	**<.0001**
Affective Lability	3.367	0.0665	4.362	0.0367	24.719	**<.0001**	12.343	**0.0004**
Emptiness	0.722	0.3954	0.949	0.3299	12.779	**0.0004**	1.876	0.1708
Anger 1 (temper)	1.758	0.1849	0.105	0.7464	3.968	0.0464	0.335	0.563
Anger 2 (physical)	1.706	0.1916	0.612	0.4342	0.46	0.4976	0.014	0.9054
Anger 3 (frustrability)	2.277	0.1313	1.177	0.2781	6.315	**0.012**	3.313	0.0687
Paranoia	2.258	0.133	4.02	0.045	16.61	**<.0001**	7.286	**0.0069**

Bolded *p* values indicate the difficulty parameters that significantly differed across groups, after surviving false discovery rate *p* value correction.
BPD = Borderline Personality Disorder.

Table 4. *BPD item difficulty parameters across sexual orientation for internalizing and externalizing*

	Internalizing				Externalizing			
	Heterosexual		Sexual minority		Heterosexual		Sexual minority	
Items	Difficulty	SE	Difficulty	SE	Difficulty	SE	Difficulty	SE
Abandonment 1 (frantic concerns of abandonment)	2.279	0.054	1.372	0.091	**3.217**	0.116	**1.936**	0.141
Abandonment 2 (preventing abandonment)	3.287	0.094	2.368	0.178	**3.926**	0.158	**2.828**	0.224
Unstable Relationships	1.777	0.047	0.888	0.107	**2.159**	0.067	**1.079**	0.132
Identity Disturbance 1 (sudden changes)	2.466	0.067	1.581	0.107	**2.762**	0.086	**1.772**	0.123
Identity Disturbance 2 (changes with others)	2.762	0.08	1.957	0.119	**3.728**	0.146	**2.641**	0.176
Identity Disturbance 3 (big differences)	2.834	0.075	1.903	0.118	**4.043**	0.171	**2.716**	0.193
Identity Disturbance 4 (life changes)	2.356	0.063	1.602	0.117	2.901	0.088	1.972	0.148
Impulsivity 1 (impulsive behavior)	2.705	0.074	1.704	0.135	1.965	0.036	1.238	0.096
Impulsivity 2 (impulsive sex)	**2.944**	0.117	**1.23**	0.142	**1.823**	0.044	**0.761**	0.085
Impulsivity 3 (impulsive shopping/ gambling)	2.33	0.077	1.256	0.141	1.83	0.051	0.987	0.111
Suicidality 1 (self-injury/ suicide attempt)	**2.716**	0.066	**1.621**	0.111	**3.631**	0.126	**2.17**	0.166
Suicidality 2 (deliberate self-harm)	**3.581**	0.133	**2.158**	0.157	**4.801**	0.228	**2.894**	0.228
Affective Lability	2.009	0.039	1.134	0.087	**3.069**	0.108	**1.732**	0.145
Emptiness	1.816	0.029	1.156	0.068	**2.982**	0.086	**1.9**	0.124
Anger 1 (temper)	2.457	0.061	1.597	0.117	2.65	0.082	1.722	0.13
Anger 2 (physical)	2.591	0.09	1.678	0.159	2.156	0.051	1.397	0.126
Anger 3 (frustrability)	2.389	0.059	1.53	0.099	**2.725**	0.081	**1.745**	0.115
Paranoia	1.835	0.033	0.995	0.082	**2.518**	0.074	**1.367**	0.116

Note: Item difficulty parameters are compiled from separate internalizing and externalizing models and are presented side by side for ease of comparison. Difficulty values are in standard deviation units for latent internalizing and externalizing theta. Bolded values indicate a significant difference between heterosexual and sexual minority groups for the difficulty parameter for either internalizing or externalizing; if both rows are bolded for a column, that means it was significantly different for both internalizing and externalizing. BPD = Borderline Personality Disorder. SE = Standard Error of the difficulty parameter.

Table 5. *BPD item difficulty DIF testing result summary across sex, domain, and symptom-level impairment*

	Presence of Difficulty DIF											
	Internalizing				Externalizing				Latent BPD			
Item title (construct title)	Men	Women	Overall w/o SLI	Overall w/ SLI	Men	Women	Overall w/o SLI	Overall w/ SLI	Men	Women	Overall w/o SLI	Overall w/ SLI
Abandonment 1 (frantic concerns of abandonment)		*			*	*	*	*				
Abandonment 2 (preventing abandonment)		*					*					
Unstable Relationships		*					*					
Identity Disturbance 1 (sudden changes)					*		*					
Identity Disturbance 2 (changes with others)					*		*					
Identity Disturbance 3 (big differences)		*		†	*		*					
Identity Disturbance 4 (life changes)							*					
Impulsivity 1 (impulsive behavior)		*										
Impulsivity 2 (impulsive sex)	*	*	*	*	*		*	*	*	*	*	*
Impulsivity 3 (impulsive shopping/ gambling)				*	*							
Suicidality 1 (self-injury/ suicide attempt)		*	*		*	*	*	*	*		*	
Suicidality 2 (deliberate self-harm)		*	*	*	*	*	*	*	*	*	*	*
Affective Lability		*			*	*	*					

Emptiness		*	*			*
Anger 1 (temper)	*					
Anger 2 (physical)	*				*	
Anger 3 (frustrability)	*		*			
Paranoia		*	*	*		

Note: * indicates a significant difference in difficult parameters between SM and non-SM group. † = item yielded difficulty parameters that were below zero, and thus present unreliable estimates. SLI = symptom-level impairment, DIF = Differential item functioning, BPD = Borderline Personality Disorder.