Social Psychiatry and Psychiatric Epidemiology
https://doi.org/10.1007/s00127-023-02482-4

RESEARCH

Structural transphobia is associated with psychological distress and suicidality in a large national sample of transgender adults

Maggi A. Price[1,2] · Nathan L. Hollinsaid[2] · Sarah McKetta[3] · Emily J. Mellen[2] · Marina Rakhilin[1]

Received: 28 September 2022 / Accepted: 17 April 2023
© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany 2023

Abstract

Purpose Transgender adults face increasingly discriminatory laws/policies and prejudicial attitudes in many regions of the United States (US), yet research has neither quantified state-level transphobia using indicators of both, nor considered their collective association with transgender adults' psychological wellbeing, hindering the identification of this potential social determinant of transgender mental health inequity.

Methods We therefore used factor analysis to develop a more comprehensive structural transphobia measure encompassing 29 indicators of transphobic laws/policies and attitudes at the state level, which we linked to individual-level mental health data from a large national sample of 27,279 transgender adults (ages 18–100) residing in 45 US states and the District of Columbia (DC).

Results Controlling for individual- (i.e., demographics), interpersonal- (i.e., perceived discrimination), and state- (i.e., income inequality, religiosity) level covariates, transgender adults from US states with higher (vs. lower) levels of structural transphobia reported more severe past-month psychological distress and were more likely to endorse past-year and lifetime suicidal thoughts, plans, and attempts.

Conclusion Findings provide novel evidence that state-level transphobic laws/policies and attitudes collectively shape a range of important mental health outcomes among transgender adults in the US. Multilevel intervention strategies, such as affirming mental health treatments, provider-training interventions, and supportive legislation, are needed to address structural transphobia's multifaceted nature and negative mental health consequences.

Keywords Transgender adults · Structural transphobia · Mental health equity · Stigma · Suicidality · Psychological distress

Introduction

Transgender adults (whose gender differs from their birth-assigned sex) face considerable mental health adversity. Compared to cisgender adults (whose gender matches their birth-assigned sex), they experience higher risk for psychological distress, psychiatric disorders, and suicidality [1–7]. Strikingly, upwards of 40% of transgender adults in the United States (US) report a lifetime suicide attempt [8, 9]. Thus, identifying and addressing the potential drivers of these inequities—including those at the structural level, such as transphobic state laws/policies and attitudes—represents an urgent public health priority [10]. This need is especially pressing given the dramatic rise of transphobic laws/policies (e.g., restricting access to gender-affirming care, such as hormone therapy) in many US states [11–19].

To date, transgender adults' mental health inequities have largely been attributed to their experiences of minority stress at the individual level [20, 21]. In particular, interpersonal (e.g., discrimination enacted in social interactions) and internalized (e.g., feeling ashamed of one's transgender identity) forms of transphobia are believed to shape cognitive, behavioral, and affective processes underlying transgender individuals' risk for various mental health disorders [2, 22–25]. Increasingly, research has taken a socio-ecological approach to minority stress exposure—seeking to demonstrate that transgender adults' wellbeing is also associated with features

✉ Maggi A. Price
maggiprice1@gmail.com

1 School of Social Work, Boston College, McGuinn Hall 126, 275 Beacon St., Chestnut Hill, MA 02467, USA

2 Department of Psychology, Harvard University, Cambridge, MA, USA

3 Department of Population Medicine, Harvard Medical School, Boston, MA, USA

Published online: 10 May 2023

of the broader social context in which they live. Specifically, studies have begun to examine associations between transgender adults' mental and physical health and the extent to which they are exposed to *structural transphobia*, which we define as restrictive laws/policies (e.g., permitting discrimination based on gender identity) and/or prejudicial attitudes specific to transgender populations at the geographic (e.g., state, country) level [3, 26–32].

This conceptualization of structural transphobia builds on theory and scholarship on structural stigma, which has its roots in the robustly developed literature on structural racism [33–35]. Structural stigma is defined as "societal-level conditions, cultural norms, and institutional policies that constrain the opportunities, resources, and wellbeing of the stigmatized" [36]. Various dimensions of structural stigma—whether in the form of discriminatory laws/policies, prejudicial individual attitudes aggregated to the geographic level, or both—have been identified as key determinants of mental and physical health inequities across multiple stigmatized groups [35], including women [37], people of Color [38, 39], and sexual minorities (e.g., lesbian, gay, and bisexual people) [40]. This research underscores the importance of developing structural stigma measures that encompass both societal attitudes (e.g., cultural sexism) and laws/policies [41]. Such composite measures recognize that stigmatized individuals navigate sociopolitical contexts in which structural stigma manifests in the form of both discriminatory laws/policies and prejudicial attitudes at the state or other geographic levels [42–44].

Despite the relevance of this research to transgender people in the US, scholars have yet to quantify structural transphobia across US states using this combined measurement approach. Instead, research examining structural transphobia in the US has relied exclusively on measures of transphobic laws/policies (e.g., permitting insurance companies to deny coverage for gender-affirming care). This scholarship reveals higher incidences of mood disorders, suicidal ideation and attempts, and other correlates of psychological distress among transgender adults in US states with more (vs. less) transphobic laws/policies [13, 26, 27, 29, 30, 45]. Notably, a recent study in Europe—which measured structural transphobia by combining indicators of transphobic laws/policies and attitudes at the country level—found that transgender adults living in European countries with higher (vs. lower) levels of structural transphobia reported lower life satisfaction [3]. This finding underscores the need for more comprehensive structural transphobia measures in the US, as it is possible that existing measures comprising only transphobic laws/policies do not fully capture transgender adults' experiences of structural stigma. Existing state-level transphobia measures have additional limitations. For example, they often comprise a limited range of state laws/policies and are frequently studied in connection with mental health data from relatively small samples of transgender adults living in US states with limited variability in structural transphobia exposure [3, 41, 46]. Moreover, scholars have rarely made efforts to provide evidence of the construct validity of these measures. These shortcomings may obscure potentially meaningful associations between structural transphobia and mental health, hindering the identification of US states where transgender adults' mental health needs are greatest.

To remedy these gaps, we developed the first measure of structural transphobia encompassing transphobic laws/policies and attitudes across US states. Though defining and demonstrating construct validity for structural stigma measures has been a longstanding challenge, researchers have begun establishing promising methods to address this need [47]. Using recommended practices for establishing construct validity [48], we created our measure and examined its validity in three phases: (1) the substantive phase involved reviewing relevant literature to define the scope of our measure (see above); (2) the structural phase included quantitative analyses, including factor analysis; and (3) the external phase involved examining the measure's association with theoretically related constructs (e.g., psychological distress). We linked this measure to mental health data from United States Transgender Survey (USTS)—the largest national survey of transgender adults to date. This dataset afforded us considerable sample size and variability in state-level transphobia. Consistent with prior research on structural stigma among transgender and other stigmatized populations [3, 26, 27, 29, 30, 35, 39], we hypothesized that transgender adults living in US states with higher (vs. lower) levels of structural transphobia would report greater psychological distress and be more likely to endorse past-month and lifetime suicidal thoughts, plans, and attempts.

Methods

Study design and data sources

We used mental health data from transgender adult respondents to the 2015 USTS, which was administered online from August 19 to September 21, 2015 by the National Center for Transgender Equality [49]. Respondents were recruited via community-based outreach. Using participants' state identifiers, we linked their self-reported mental health data to an objective measure of state-level transphobic laws/policies and attitudes obtained from public sources, including the Movement Advancement Project (MAP) [50] and Project Implicit [51]. The original USTS study was approved by the University of California, Los Angeles Institutional Review Board (IRB), and the present study was reviewed and deemed exempt by the Boston College IRB.

Study population

USTS data were collected from 27,715 transgender adult respondents living in all 50 states of the US, its territories, and the District of Columbia (DC). The USTS methodology report includes recruitment details and notes that response rates could not be calculated due to difficulties obtaining this information from community partners [49].

Exposure

To objectively quantify structural transphobia across US states using best practices for enhancing construct validity in structural stigma measurement (i.e., the structural phase) [47], we created a composite measure by factor analyzing multiple state-level indicators of transphobic laws/policies and attitudes. A factor-analytic approach was chosen to provide evidence of the structural construct validity of our measure and to minimize measurement error.

Laws/policies

We considered state-level law/policy indicators from the MAP index of 32 laws/policies protecting or restricting transgender rights [50]. For each US state, the MAP scores individual laws/policies "1" if supportive, "0" if absent, and "− 1" if restrictive (with fractional values assigned to laws/policies applying to only a portion of a state's population). These individual law/policy scores are summed on seven domains: relationship/parental recognition, nondiscrimination, religious exemptions, transgender youth laws/policies, healthcare, criminal justice, and identity documentation (see Table S1 in the Online Resource for details). States' scores on these seven domains were included as candidate indicators in our factor analysis. We used MAP data from 2019 for two reasons: (1) domain-specific MAP scores were not available in previous years and (2) the timing coincided with the onset of data collection for state-level transphobic attitudes (described below). Given the rise in transphobic laws/policies between 2015 (when outcome data were collected) and 2019 (when laws/policies were measured), we examined the bivariate correlation between laws/policies in 2015 and 2019 and found them to be strongly and significantly correlated ($r = 0.90$, $p < 0.001$). We also conducted sensitivity analyses using a composite (i.e., sum score) of individual MAP law/policy scores for each state from 2015 as the primary exposure, revealing highly similar effects to our main analyses (see Table S2 in the Online Resource). These results suggest that state-level transphobia rankings were relatively stable from 2015 to 2019 (see Figure S3 in the Online Resource for a figure depicting the rankings in 2015 and 2019), which is consistent with a 2020 MAP report indicating regional stability in transphobic laws/policies over that timespan [52].

Attitudes

We also considered indicators of state-level transphobic attitudes, which we computed by aggregating individual responses to transgender-specific Project Implicit items to the state level, assessed throughout 2020 [51]. Project Implicit is a web-based platform that allows users to complete both Implicit Association Tests (IATs) and measures of explicit attitudes and stereotypes [53, 54]. Data collection for the larger Project Implicit has been ongoing since September of 1998 with millions of respondents to date, though transgender-specific items have only been administered since 2020 [51]. Data are obtained from a non-random volunteer sample of participants who find their way to the Project Implicit website through media coverage, personal recommendations, and search engine results, or who may have been instructed to visit the website by school or work. The 24 transgender-specific items probed respondents' explicit attitudes toward transgender people (e.g., "How warm or cold do you feel towards transgender people?") and support for laws/policies protecting transgender rights. Most items were assessed on a Likert-scale from 1 (*strongly agree*) to 7 (*strongly disagree*); they were re-coded when applicable so that higher scores indicated more negative attitudes (for a full list of items in our measure, see Table S1 in the Online Resource). Using respondents' state of residence, average state scores for each item were calculated and included in our factor analysis (see Table S4 in the Online Resource for sample sizes by state for attitudinal indicators). Laws/policies in 2015 and 2019 were strongly and significantly correlated with 2020 attitudes ($rs = 0.80$ and 0.83, respectively, $ps < 0.001$), providing evidence that laws/policies and attitudes were stable over time. Consistent with similar studies [54, 55], we sought to reduce measurement error by excluding states ($n = 5$) with < 50 observations on one or more indicators: Alaska, Montana, North Dakota, South Dakota, and Wyoming. To ensure that this cutoff did not bias our results, we conducted sensitivity analyses including all states (i.e., without the < 50 cutoff) and findings revealed similar effects (see Table S5 in the Online Resource).

Factor analysis

In all, 31 candidate indicators were modeled using exploratory factor analysis, with those loading > 0.60 retained. The scree plot with parallel analysis suggested a single underlying latent factor comprising 29 indicators and representing 74% of their variance (for included indicators and factor loadings, see Table S1 in the Online Resource). This single factor solution provides evidence for construct validity. As mapped in Fig. 1, model-generated, normally distributed factor scores were computed for each state (see Table S4 in the Online Resource for state-level factor scores), with

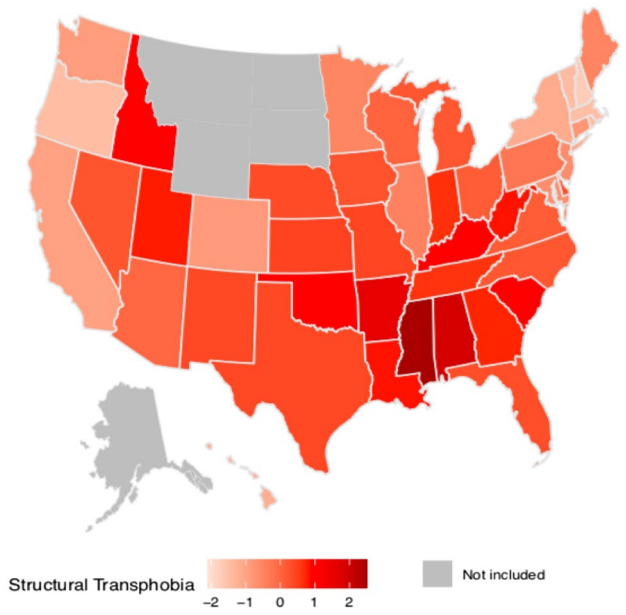


Fig. 1 Map of state-level transphobia factor scores for US states and DC. *Note:* Structural transphobia was quantified via state-level factor scores mapped in the figure. Higher factor scores, depicted in darker shades on the map, represent greater state-level transphobia

state-level transphobia being lowest in DC (− 2.12) and highest in Mississippi (2.51).

Outcomes

We examined four recent mental health outcomes: past-month psychological distress on the 6-item Kessler Psychological Distress Scale [56], past-year suicidal thoughts, past-year suicide plans, and past-year suicide attempts (prompts for these items are provided in Table S6 of the Online Resource). Three lifetime suicidality outcomes were also assessed: lifetime suicidal thoughts, lifetime suicide plans, and lifetime suicide attempts. Each suicidality outcome was modeled dichotomously (0 = no experience of suicidality, 1 = any experience of suicidality). These analyses also represented steps in the external phase of construct validation [47, 48], as the outcomes are theoretically related to the structural transphobia measure.

Covariates

At the individual level, we controlled for demographic characteristics theoretically related to our outcomes: continuous age, race/ethnicity (Alaska Native/American Indian, Asian American or Pacific Islander, Black or African American, Multiracial, Hispanic, Non-Hispanic White), relationship status (single, partnered), annual household income (none, $1–$9999, $10,000–$24,999, $25,000–$49,999, $50,000–$99,999, $100,000 +), and education (less than high school, high school, some college, bachelor's degree or higher). At the interpersonal level, we controlled for any lifetime experience of transphobic victimization (e.g., being attacked after revealing one's transgender identity) or transphobic discrimination in public settings (e.g., being denied services based one's transgender identity)—allowing us to establish that any observed associations between structural transphobia and mental health outcomes remained when accounting for stigma exposure at the interpersonal level. Additionally, to demonstrate that these associations were not better explained by other features of the social environment, we controlled for state-level income inequality (i.e., the Gini coefficient) [57] and religiosity (i.e., the percent of Evangelical Christians and Latter-day Saints/Mormons in each state) [58]. The religiosity measure has been used as a covariate in similar structural stigma studies [59, 60], including a recent study with transgender youth [46], as past research indicates that members of these two religions endorse more negative attitudes toward transgender people and their rights compared to members of other religions [61, 62].

Statistical analysis

To test associations between our exposure and outcomes, we fit separate multivariate linear and modified Poisson regressions for psychological distress and suicidality outcomes, respectively, with state-level transphobia factor scores and study covariates specified as fixed effects. Modified Poisson regression was chosen due the high prevalence of suicidality outcomes [63, 64]. Although USTS respondents were nested within states, we did not include a random intercept for states, as intraclass correlations revealed minimal clustering (ICCs = 0.002–0.006). Analyses were conducted using R, and our reproducible code is included in the Appendix of the Online Resource. All tests were two-tailed, and the threshold for statistical significance was set at $p < 0.05$. For analyses of (binary) suicidality outcomes, estimates are reported as prevalence ratios (PRs).

Results

Of the USTS respondents ($N = 27{,}279$) included in our analysis, the mean age was 31.2 years (SD = 13.5). We provide additional demographic information, as well as descriptive statistics for all study variables, in Table 1.

In unadjusted models, state-level transphobia was significantly associated with all study outcomes in the hypothesized directions (see Table 2). Likewise, when accounting for individual- (i.e., demographic), interpersonal- (i.e., discrimination or victimization exposure), and state- (i.e.,

Table 1 Descriptive statistics for demographics and study variables

Age (mean, SD)	31.2 (13.5)
Relationship status (*n*, %)	
Partnered	14,179 (52.0%)
Single	13,072 (48.0%)
Race/ethnicity (*n*, %)	
Alaska Native/American Indian	312 (1.1%)
Asian American or Pacific Islander	777 (2.8%)
Multiracial	1447 (5.3%)
Black or African American	787 (2.9%)
Hispanic	1437 (5.3%)
Non-Hispanic White	22,519 (82.6%)
Income (*n*, %)	
No income	980 (3.9%)
$1–$9999	3069 (12.3%)
$10,000–$24,999	4940 (19.9%)
$25,000–$49,999	5582 (22.4%)
$50,000–$99,999	6166 (24.8%)
$100,000 or more	4161 (16.7%)
Education (*n*, %)	
Less than high school	885 (3.2%)
High school	3410 (12.5%)
Some college	12,603 (46.2%)
Bachelor's degree or higher	10,381 (38.1%)
Interpersonal stigma exposure	
1 or more experiences of transphobic discrimination or victimization (*n*, %)	5245 (20.3%)
Mental health outcomes	
Past-month psychological distress (mean, SD)	10.6 (6.0)
Any lifetime suicidal thoughts (*n*, %)	22,256 (81.7%)
Any lifetime suicide plans (*n*, %)	11,537 (42.3%)
Any lifetime suicide attempts (*n*, %)	10,700 (39.3%)
Any past-year suicidal thoughts (*n*, %)	13,227 (48.5%)
Any past-year suicide plans (*n*, %)	6583 (24.1%)
Any past-year suicide attempts (*n*, %)	2005 (7.3%)

Note: 28 respondents declined to report their relationship status, and 2381 did not report their income

income inequality, religiosity) level covariates, we found that higher (vs. lower) levels of state-level transphobia were associated with greater past-month psychological distress ($B = 0.26$; 95% CI 0.14–0.39; $p < 0.001$; see Table 2 and Fig. 2). Further, transgender adults living in states with higher (vs. lower) levels of structural transphobia were more likely to endorse past-year suicidal thoughts (PR = 1.04; 95% CI 1.02–1.07; $p < 0.001$), suicide plans (PR = 1.06; 95% CI 1.02–1.10; $p = 0.01$), and suicide attempts (PR = 1.10; 95% CI 1.02–1.19; $p = 0.02$); they, too, reported higher risk of lifetime suicidal thoughts (PR = 1.02; 95% CI 1.004–1.03; $p = 0.01$), suicide plans (PR = 1.03; 95% CI 1.003–1.06; $p = 0.03$), and suicide attempts (PR = 1.05; 95% CI 1.02–1.08; $p < 0.001$; see Table 2 and Fig. 3). Detailed estimates for all models including covariates are available in Table S7 of the Online Resource.

Discussion

Transgender adults experience disproportionate mental health concerns relative to cisgender adults, including the highest rates of suicide attempt of any demographic group in the US [8, 9, 65, 66]. To date, these inequities have been largely attributed to stigma at the individual level, such as exposure to transphobia via interpersonal interactions and/or internalizations of these experiences [21, 23, 25]. Despite substantial evidence that structural stigma in the form of discriminatory laws/polices and prejudicial societal attitudes also shapes mental health among multiple stigmatized groups [35, 37, 39, 41, 67], as well as increasing calls to incorporate contextual factors into suicide research [68–71], scholars have rarely conceptualized or rigorously measured structural transphobia by accounting for both transphobic laws/policies and attitudes across US states. Further, research has not yet comprehensively assessed structural transphobia's associations with multiple dimensions of suicidality (e.g., thoughts, plans, attempts) and/or psychological distress among a large national sample of transgender adults. These measurement and methodological limitations have hindered efforts to identify and address structural determinants of suicidality and psychiatric morbidity among transgender adults in the US, which is particularly important in light of increasingly transphobic laws/policies and prejudicial attitudes in many US states.

Consequently, we created a measure of structural transphobia encompassing both transphobic laws/policies and attitudes at the state level, which we linked to mental health data from the largest US sample of transgender adults to date. Consistent with research examining the mental health sequelae of stigmatizing laws/policies and attitudes targeting other stigmatized groups, our study provides novel evidence that more negative state-level transphobic laws/policies and attitudes—collectively—are associated with greater psychological distress and higher rates of past-year and lifetime suicide thoughts, suicide plans, and attempts among transgender adults in the US.

Strengths and limitations

Our study has several key strengths that might inform future research. First, our measure of state-level transphobia is the first to incorporate transphobic state-level attitudes with transphobic state laws/policies, providing a novel measure of structural transphobia in the US that might be integrated into a wide array of scholarly investigations. Second, we provide evidence of substantive, structural, and external

Table 2 Estimates for psychological distress and suicidality by state-level transphobia

Continuous outcome	*B*	SE	*z*	95% CI	*p*
Psychological distress (past month)					
State-level transphobia (unadjusted)	0.498	0.046	10.88	0.408, 0.587	< 0.001
State-level transphobia (adjusted)	0.264	0.065	4.05	0.136, 0.391	< 0.001
Bivariate outcomes (suicidality)	PR	LCI		UCI	*p*
Suicidal thoughts (past year)					
State-level transphobia (unadjusted)	1.072	1.056		1.088	< 0.001
State-level transphobia (adjusted)	1.043	1.019		1.068	< 0.001
Suicidal thoughts (lifetime)					
State-level transphobia (unadjusted)	1.021	1.014		1.029	< 0.001
State-level transphobia (adjusted)	1.015	1.004		1.026	< 0.05
Suicide plans (past year)					
State-level transphobia (unadjusted)	1.111	1.079		1.136	< 0.001
State-level transphobia (adjusted)	1.058	1.016		1.102	< 0.05
Suicide plans (lifetime)					
State-level transphobia (unadjusted)	1.047	1.029		1.065	< 0.001
State-level transphobia (adjusted)	1.031	1.003		1.059	< 0.05
Suicide attempts (past year)					
State-level transphobia (unadjusted)	1.166	1.109		1.227	< 0.001
State-level transphobia (adjusted)	1.103	1.015		1.199	< 0.05
Suicide attempts (lifetime)					
State-level transphobia (unadjusted)	1.062	1.043		1.082	< 0.001
State-level transphobia (adjusted)	1.046	1.016		1.076	< 0.001

SE standard error, *PR* prevalence ratio, *CI* confidence interval, *LCI* lower confidence interval, *UCI* higher confidence interval

Note: Covariates for adjusted models included age, race/ethnicity, income, education, relationship status, interpersonal stigma exposure, state-level income inequality, and state-level religiosity. For categorical covariates, reference groups were "Non-Hispanic White" for race/ethnicity, "none" for income, "less than high school" for education, "partnered" for relationship status, and "no" for interpersonal stigma exposure

construct validity for this measure through our employment of a multi-phase approach. Third, we linked this measure to mental health data from the largest available national survey of transgender adults, enhancing our study's generalizability. Fourth, results were robust to interpersonal-level (i.e., discrimination and victimization exposure) and state-level (i.e., income inequality, religiosity) covariates, suggesting that our findings remained when accounting for stigma enacted in social interactions and were not spurious to other characteristics of the social environment in which transgender adults live. Fifth and finally, findings were consistent across a range of mental health outcomes as well as across time (e.g., past-year and lifetime sucidality).

Findings should be considered in light of study limitations. First, to the best of our knowledge, no large-scale national dataset measuring transphobic attitudes, such as Project Implicit, existed prior to 2019, precluding us from aggregating transphobic attitudes to the state level more contemporaneously to the USTS. However, we provide evidence (e.g., correlations, sensitivity analyses) suggesting that relative rankings of state-level transphobic laws/policies and attitudes changed minimally between 2015 and 2019 (see also Figure S3 in the Online Resource), partially attenuating this concern. Second, limited individual-level Project Implicit data on transphobic attitudes resulted in the exclusion of five states from our analysis. However, our sensitivity analyses inclusive of all states suggest that their exclusion did not bias our main results (see Table S5 in the Online Resource). As Project Implicit data collection is ongoing, subsequent research will be able to include an even greater range of US states. Third, data collection for the next iteration of the USTS, originally scheduled for 2020, was delayed by the COVID-19 pandemic, preventing us from accessing more recent national data on transgender adults' mental health. Analysis of these data, when available, should be used to replicate our findings. Fourth, USTS participants were recruited via community-based outreach, potentially limiting the survey's representativeness. However, we are unaware of another national dataset comparable in size and/or scope (e.g., encompassing as many mental health outcomes).

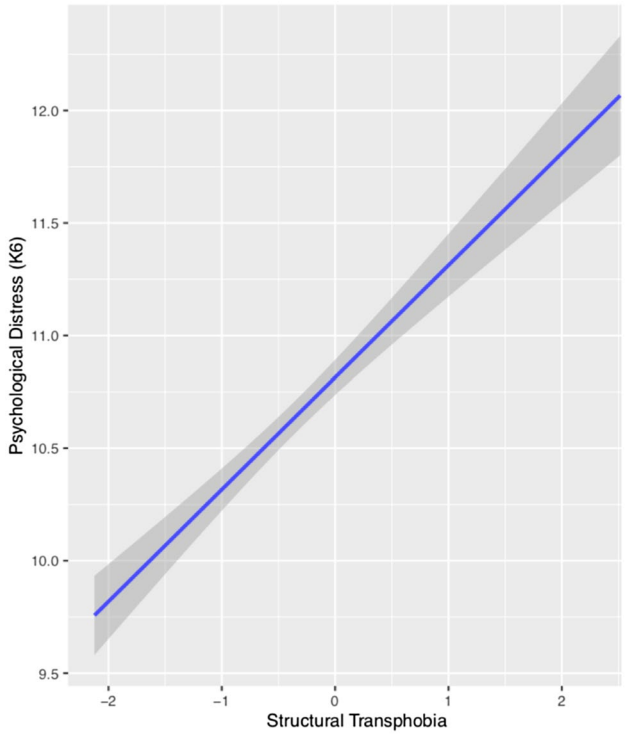


Fig. 2 Effects plot of past-month psychological distress by state-level transphobia. *Note:* Higher structural transphobia factor scores indicate greater state-level transphobia

Conclusions

Our study has important implications for intervening not only on the mental health sequelae of structural transphobia, but on transphobic laws/policies and attitudes as well. In many US states, the sociopolitical climate for transgender people is becoming increasingly hostile, with more transphobic state laws/policies enacted in 2021 and 2022 than in any other year to date [11, 72]. Our findings provide evidence that transphobic laws/policies—together with transphobic attitudes—have deleterious mental health effects for transgender people living in states where these laws/policies and attitudes are most negative. The passage of additional transphobic laws/policies in these states may result in even higher rates of psychological distress and suicidality among transgender residents. This possibility is particularly concerning considering emerging evidence that transgender individuals' access to supportive mental healthcare is substantially lower in states with higher levels of structural transphobia [46].

Critically, addressing structural transphobia and its mental health consequences requires multilevel intervention strategies, including efforts to transform transphobic laws/policies and attitudes at the state level, train mental health providers in the provision of gender-affirming care (e.g., increasing their knowledge of supportive resources, particularly for transgender adults living in highly stigmatizing contexts), and adapt existing mental health interventions to explicitly attend to structural stigma exposure [67]. For example, research demonstrates that reducing transphobic attitudes may increase individuals' support for transgender rights [73]. Accordingly, recently developed prejudice reduction interventions, which are brief and highly scalable, may represent a promising approach to facilitate changes in state laws/policies if widely deployed [74]. In turn, the implementation of supportive state laws/policies (e.g., nondiscrimination protections specific to gender identity) has been shown

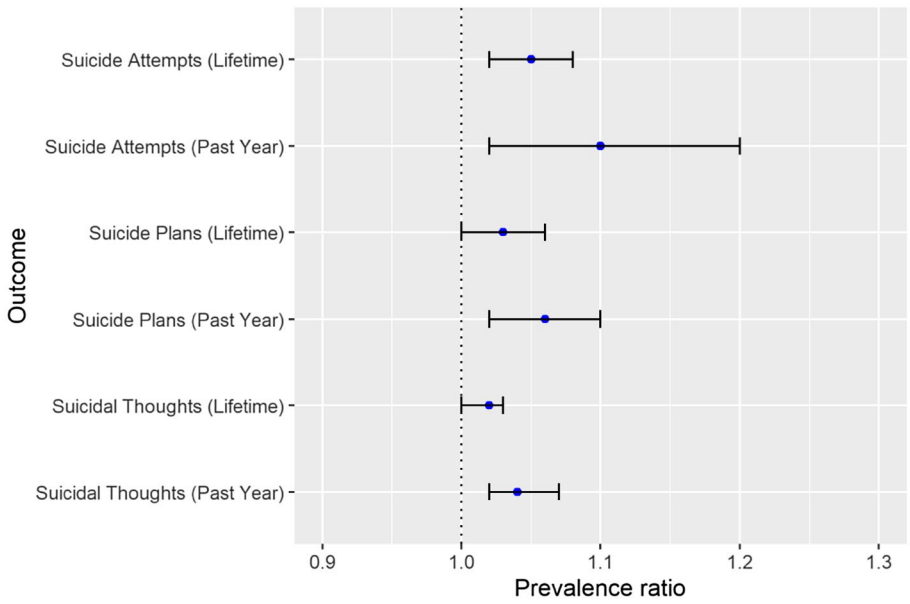


Fig. 3 Prevalence ratios for past-year and lifetime suicidality by state-level transphobia. *Note:* Prevalence ratios correspond to a 1-SD increase in state-level transphobia

to reduce suicidality among transgender individuals [29]. Training mental health providers in gender-affirming care [75–77], and adapting psychological interventions to meet the specific needs of transgender clients [78, 79], may similarly benefit transgender individuals. Our study underscores a particularly high need for these multifaced solutions in US states with highly transphobic laws/policies and attitudes.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s00127-023-02482-4.

Author contributions MAP and NLH designed the study. NLH, MAP, and SM conducted the analyses and interpreted the data. MAP and NLH created the figures. All authors wrote the main manuscript text. EM contributed to the introduction and discussion sections of the manuscript. MR contributed to the discussion section, the creation of the tables, and manuscript formatting. MAP is the corresponding author of this manuscript and accepts full responsibility for the work and the conduct of the study, had access to the data, and controlled the decision to publish. MAP attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Funding No funding was received directly in support of this research or in preparation of this manuscript. Dr. Price's time and effort are supported by NIMH grant K23MH124670, and she has received grant support from the American Psychological Foundation, the Boston College School of Social Work Center for Social Innovation, the Boston College Schiller Institute for Integrated Science and Society, the Boston College Provost's Office, the Harvard University Inequality in America Initiative, and the Pershing Square Fund for the Harvard Foundations of Human Behavior. Mr. Hollinsaid has received grant support from the Boston Area Research Initiative.

Data availability USTS data can be obtained via request from Inter-University Consortium for Political and Social Research (ICPSR). Structural transphobia scores for each US state are available in the supplementary materials.

Declarations

Conflict of interest The authors declare no competing interests.

Ethical approval This original USTS study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the IRB at the University of California, Los Angeles. The present study was reviewed and deemed exempt by the Boston College IRB.

References

1. Adams N, Hitomi M, Moody C (2017) Varied reports of adult transgender suicidality: synthesizing and describing the peer-reviewed and gray literature. Transgender Health 2:60–75. https://doi.org/10.1089/trgh.2016.0036
2. Bockting WO, Miner MH, Swinburne Romine RE et al (2013) Stigma, mental health, and resilience in an online sample of the US transgender population. Am J Public Health 103:943–951. https://doi.org/10.2105/AJPH.2013.301241
3. Bränström R, Pachankis JE (2021) Country-level structural stigma, identity concealment, and day-to-day discrimination as determinants of transgender people's life satisfaction. Soc Psychiatry Psychiatr Epidemiol 56:1537–1545. https://doi.org/10.1007/s00127-021-02036-6
4. Downing JM, Przedworski JM (2018) Health of transgender adults in the U.S., 2014–2016. Am J Prev Med 55:336–344. https://doi.org/10.1016/j.amepre.2018.04.045
5. McNeil J, Ellis SJ, Eccles FJR (2017) Suicide in trans populations: a systematic review of prevalence and correlates. Psychol Sex Orientat Gend Divers 4:341–353. https://doi.org/10.1037/sgd0000235
6. Millet N, Longworth J, Arcelus J (2017) Prevalence of anxiety symptoms and disorders in the transgender population: a systematic review of the literature. Int J Transgenderism 18:27–38. https://doi.org/10.1080/15532739.2016.1258353
7. Reisner SL, Poteat T, Keatley J et al (2016) Global health burden and needs of transgender populations: a review. Lancet 388:412–436. https://doi.org/10.1016/S0140-6736(16)00684-X
8. Budge SL, Adelson JL, Howard KAS (2013) Anxiety and depression in transgender individuals: the roles of transition status, loss, social support, and coping. J Consult Clin Psychol 81:545–557. https://doi.org/10.1037/a0031774
9. Herman JL, Brown TN, Haas AP (2019) Suicide thoughts and attempts among transgender adults in the US: findings from the 2015 US Transgender Survey. The Williams Institute
10. Dickey LM, Budge SL (2020) Suicide and the transgender experience: a public health crisis. Am Psychol 75:380–390. https://doi.org/10.1037/amp0000619
11. Barbee H, Deal C, Gonzales G (2022) Anti-transgender legislation—a public health concern for transgender youth. JAMA Pediatr 176:125–126. https://doi.org/10.1001/jamapediatrics.2021.4483
12. Barrera E, Millington K, Kremen J (2022) The medical implications of banning transgender youth from sport participation. JAMA Pediatr 176:223–224. https://doi.org/10.1001/jamapediatrics.2021.4597
13. Goldenberg T, Reisner SL, Harper GW et al (2020) State-level transgender-specific policies, race/ethnicity, and use of medical gender affirmation services among transgender and other gender-diverse people in the United States. Milbank Q 98:802–846. https://doi.org/10.1111/1468-0009.12467
14. Gordon CM (2022) Caught in the middle: the care of transgender youth in Texas. Pediatrics 149:e2022057475. https://doi.org/10.1542/peds.2022-057475
15. Hughes LD, Dowshen N, Kidd KM et al (2022) Pediatric provider perspectives on laws and policies impacting sports participation for transgender youth. LGBT Health 9:247–253. https://doi.org/10.1089/lgbt.2021.0392
16. Janssen A, Voss R (2021) Policies sanctioning discrimination against transgender patients flout scientific evidence and threaten health and safety. Transgender Health 6:61–63. https://doi.org/10.1089/trgh.2020.0078
17. Kidd KM, Sequeira GM, Paglisotti T et al (2021) "This could mean death for my child": parent perspectives on laws banning gender-affirming care for transgender adolescents. J Adolesc Health 68:1082–1088. https://doi.org/10.1016/j.jadohealth.2020.09.010
18. Paceley MS, Dikitsas ZA, Greenwood E et al (2021) The perceived health implications of policies and rhetoric targeting transgender and gender diverse youth: a community-based qualitative study. Transgender Health. https://doi.org/10.1089/trgh.2021.0125
19. Witt H, Medina-Martinez K (2022) Transgender rights and the urgent need for social work advocacy. Soc Work Public Health 37:28–32. https://doi.org/10.1080/19371918.2021.1970685
20. Cramer RJ, Kaniuka AR, Yada FN et al (2022) An analysis of suicidal thoughts and behaviors among transgender and gender

diverse adults. Soc Psychiatry Psychiatr Epidemiol 57:195–205. https://doi.org/10.1007/s00127-021-02115-8
21. Hendricks ML, Testa RJ (2012) A conceptual framework for clinical work with transgender and gender nonconforming clients: an adaptation of the minority stress model. Prof Psychol Res Pract 43:460–467. https://doi.org/10.1037/a0029597
22. Parr NJ, Howe BG (2019) Heterogeneity of transgender identity nonaffirmation microaggressions and their association with depression symptoms and suicidality among transgender persons. Psychol Sex Orientat Gend Divers 6:461–474. https://doi.org/10.1037/sgd0000347
23. Pellicane MJ, Ciesla JA (2022) Associations between minority stress, depression, and suicidal ideation and attempts in transgender and gender diverse (TGD) individuals: Systematic review and meta-analysis. Clin Psychol Rev 91:102113. https://doi.org/10.1016/j.cpr.2021.102113
24. Timmins L, Rimes KA, Rahman Q (2017) Minority stressors and psychological distress in transgender individuals. Psychol Sex Orientat Gend Divers 4:328–340. https://doi.org/10.1037/sgd0000237
25. Valentine SE, Shipherd JC (2018) A systematic review of social stress and mental health among transgender and gender non-conforming people in the United States. Clin Psychol Rev 66:24–38. https://doi.org/10.1016/j.cpr.2018.03.003
26. Blosnich JR, Marsiglio MC, Gao S et al (2016) Mental health of transgender veterans in US states with and without discrimination and hate crime legal protection. Am J Public Health 106:534–540. https://doi.org/10.2105/AJPH.2015.302981
27. Du Bois SN, Yoder W, Guy AA et al (2018) Examining associations between state-level transgender policies and transgender health. Transgender Health 3:220–224. https://doi.org/10.1089/trgh.2018.0031
28. Gleason HA, Livingston NA, Peters MM et al (2016) Effects of state nondiscrimination laws on transgender and gender-nonconforming individuals' perceived community stigma and mental health. J Gay Lesbian Ment Health 20:350–362. https://doi.org/10.1080/19359705.2016.1207582
29. McDowell A, Raifman J, Progovac AM, Rose S (2020) Association of nondiscrimination policies with wental health among gender minority individuals. JAMA Psychiat 77:952–958. https://doi.org/10.1001/jamapsychiatry.2020.0770
30. Perez-Brumer A, Hatzenbuehler ML, Oldenburg CE, Bockting W (2015) Individual- and structural-level risk factors for suicide attempts among transgender adults. Behav Med 41:164–171. https://doi.org/10.1080/08964289.2015.1028322
31. Rabasco A, Andover M (2020) The influence of state policies on the relationship between minority stressors and suicide attempts among transgender and gender-diverse adults. LGBT Health 7:457–460. https://doi.org/10.1089/lgbt.2020.0114
32. Lett E, Asabor EN, Tran N et al (2022) Sexual behaviors associated with HIV transmission among transgender and gender diverse young adults: the intersectional role of racism and transphobia. AIDS Behav 26:3713–3725. https://doi.org/10.1007/s10461-022-03701-w
33. Carmichael S, Hamilton C (1967) Black power: the politics of liberation. Vintage Books, New York
34. Dean LT, Thorpe RJ Jr (2022) What structural racism is (or is not) and how to measure it: clarity for public health and medical researchers. Am J Epidemiol 191:1521–1526. https://doi.org/10.1093/aje/kwac112
35. Hatzenbuehler ML (2016) Structural stigma and health inequalities: Research evidence and implications for psychological science. Am Psychol 71:742–751. https://doi.org/10.1037/amp0000068
36. Hatzenbuehler ML, Link BG (1982) Introduction to the special issue on structural stigma and health. Soc Sci Med 103:1–6. https://doi.org/10.1016/j.socscimed.2013.12.017
37. Beccia AL, Austin SB, Baek J et al (2022) Cumulative exposure to state-level structural sexism and risk of disordered eating: results from a 20-year prospective cohort study. Soc Sci Med 301:114956. https://doi.org/10.1016/j.socscimed.2022.114956
38. Bruzelius E, Baum A (2019) The mental health of Hispanic/Latino Americans following national immigration policy changes: United States, 2014–2018. Am J Public Health 109:1786–1788. https://doi.org/10.2105/AJPH.2019.305337
39. Michaels EK, Board C, Mujahid MS et al (2022) Area-level racial prejudice and health: a systematic review. Health Psychol 41:211–224. https://doi.org/10.1037/hea0001141
40. Hatzenbuehler ML, Flores AR, Gates GJ (2017) Social attitudes regarding same-sex marriage and LGBT health disparities: results from a national probability sample. J Soc Issues 73:508–528. https://doi.org/10.1111/josi.12229
41. Hatzenbuehler ML (2017) Advancing research on structural stigma and sexual orientation disparities in mental health among youth. J Clin Child Adolesc Psychol 46:463–475. https://doi.org/10.1080/15374416.2016.1247360
42. Price MA, Weisz JR, McKetta S et al (2022) Meta-analysis: are psychotherapies less effective for Black youth in communities with higher levels of anti-Black racism? J Am Acad Child Adolesc Psychiatry 61:754–763. https://doi.org/10.1016/j.jaac.2021.07.808
43. Roulston C, McKetta S, Price MA et al (2022) Structural correlates of mental health support access among sexual minority youth of Color during COVID-19. J Clin Child Adolesc Psychol. https://doi.org/10.1080/15374416.2022.2034633
44. Flores AR, Herman JL, Mallory C (2015) Transgender inclusion in state non-discrimination policies: the democratic deficit and political powerlessness. Res Polit 2:2053168015612246. https://doi.org/10.1177/2053168015612246
45. White Hughto JM, Murchison GR, Clark K et al (2016) Geographic and individual differences in healthcare access for U.S. transgender adults: a multilevel analysis. LGBT Health 3:424–433. https://doi.org/10.1089/lgbt.2016.0044
46. Hollinsaid NL, Price MA, Hatzenbuehler ML (2022) Transgender-specific adolescent mental health provider availability is lower in states with more restrictive policies. J Clin Child Adolesc Psychol. https://doi.org/10.1080/15374416.2022.2140433
47. Hehman E, Calanchini J, Flake JK, Leitner JB (2019) Establishing construct validity evidence for regional measures of explicit and implicit racial bias. J Exp Psychol Gen 148:1022–1040. https://doi.org/10.1037/xge0000623
48. Cronbach LJ, Meehl PE (1955) Construct validity in psychological tests. Psychol Bull 52:281–302. https://doi.org/10.1037/h0040957
49. James SE, Herman JL, Rankin S, et al (2016) The report of the 2015 U.S. Transgender Survey. National Center for Transgender Equality
50. Movement Advancement Project (2017) Mapping transgender equality in the United States. https://www.lgbtmap.org/mapping-trans-equality. Accessed 24 Apr 2022
51. Axt JR, Conway MA, Westgate EC, Buttrick NR (2021) Implicit transgender attitudes independently predict beliefs about gender and transgender people. Pers Soc Psychol Bull 47:257–274. https://doi.org/10.1177/0146167220921065
52. Movement Advancement Project (2020) LGBTQ policy spotlight: mapping LGBTQ equality 2010 to 2020. https://www.lgbtmap.org/file/2020-tally-report.pdf. Accessed 24 Apr 2022
53. Nosek BA, Smyth FL, Hansen JJ et al (2007) Pervasiveness and correlates of implicit attitudes and stereotypes. Eur Rev Soc Psychol 18:36–88. https://doi.org/10.1080/10463280701489053

54. Charlesworth TES, Navon M, Rabinovich Y et al (2022) The project implicit international dataset: measuring implicit and explicit social group attitudes and stereotypes across 34 countries (2009–2019). Behav Res Methods. https://doi.org/10.3758/s13428-022-01851-2
55. Lattanner MR, Ford J, Bo N et al (2021) A contextual approach to the psychological study of identity concealment: examining direct, interactive, and indirect effects of structural stigma on concealment motivation across proximal and distal geographic levels. Psychol Sci 32:1684–1696. https://doi.org/10.1177/0956797621 1018624
56. Kessler RC, Andrews G, Colpe LJ et al (2002) Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med 32:959–976. https://doi.org/10.1017/S0033291702006074
57. US Census Bureau (2015) 2015 American Community Survey 1-year estimates. US Department of Commerce
58. Grammich C, Hadaway K, Houseal R et al (2018) U.S. religion census: Religious Congregations and Membership Study, 2010. Association of Statisticians of American Religious Bodies
59. Everett BG, Limburg A, Homan P, Philbin MM (2022) Structural heteropatriarchy and birth outcomes in the United States. Demography 59:89–110. https://doi.org/10.1215/00703370-9606030
60. McKetta S, Prins SJ, Hasin D et al (2022) Structural sexism and Women's alcohol use in the United States, 1988–2016. Soc Sci Med 1982 301:114976. https://doi.org/10.1016/j.socscimed.2022.114976
61. Pew Research Center (2022) Americans' complex views on gender identity and transgender issues. https://www.pewresearch.org/social-trends/wp-content/uploads/sites/3/2022/06/PSDT_06.28.22_GenderID_fullreport.pdf. Accessed 5 July 2022
62. Todd NR, Yi J, Blevins EJ et al (2020) Christian and political conservatism predict opposition to sexual and gender minority rights through support for Christian Hegemony. Am J Community Psychol 66:24–38. https://doi.org/10.1002/ajcp.12420
63. Zou G (2004) A modified poisson regression approach to prospective studies with binary data. Am J Epidemiol 159:702–706. https://doi.org/10.1093/aje/kwh090
64. Zhang J, Yu KF (1998) What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. JAMA 280:1690–1691. https://doi.org/10.1001/jama.280.19.1690
65. Nock MK, Borges G, Bromet EJ et al (2008) Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. Br J Psychiatry J Ment Sci 192:98–105. https://doi.org/10.1192/bjp.bp.107.040113
66. Bachmann S (2018) Epidemiology of suicide and the psychiatric perspective. Int J Environ Res Public Health 15:e1425. https://doi.org/10.3390/ijerph15071425
67. Price MA, Hollinsaid NL (2022) Future directions in mental health treatment with stigmatized youth. J Clin Child Adolesc Psychol 51:810–825. https://doi.org/10.1080/15374416.2022.2109652
68. Franklin JC, Ribeiro JD, Fox KR et al (2017) Risk factors for suicidal thoughts and behaviors: a meta-analysis of 50 years of research. Psychol Bull 143:187–232. https://doi.org/10.1037/bul0000084
69. Nock MK, Ramirez F, Rankin O (2019) Advancing our understanding of the who, when, and why of suicide risk. JAMA Psychiat 76:11–12. https://doi.org/10.1001/jamapsychiatry.2018.3164
70. Mueller AS, Abrutyn S, Pescosolido B, Diefendorf S (2021) The social roots of suicide: theorizing how the external social world matters to suicide and suicide prevention. Front Psychol 12:621569. https://doi.org/10.3389/fpsyg.2021.621569
71. Chu JP, Goldblum P, Floyd R, Bongar B (2010) The cultural theory and model of suicide. Appl Prev Psychol 14:25–40. https://doi.org/10.1016/j.appsy.2011.11.001
72. Human Rights Campaign (2021) 2021 becomes record year for anti-trans legislation. https://www.hrc.org/press-releases/breaking-2021-becomes-record-year-for-anti-transgender-legislation. Accessed 31 May 2022
73. Flores AR, Haider-Markel DP, Lewis DC et al (2018) Transgender prejudice reduction and opinions on transgender rights: results from a mediation analysis on experimental data. Res Polit 5:1–7. https://doi.org/10.1177/2053168018764945
74. Amsalem D, Halloran J, Penque B et al (2022) Effect of a brief social contact video on transphobia and depression-related stigma among adolescents: a randomized clinical trial. JAMA Netw Open 5:e220376. https://doi.org/10.1001/jamanetworkopen.2022.0376
75. Lelutiu-Weinberger C, Pollard-Thomas P, Pagano W et al (2016) Implementation and evaluation of a pilot training to improve transgender competency among medical staff in an urban clinic. Transgender Health 1:45–53. https://doi.org/10.1089/trgh.2015.0009
76. Lelutiu-Weinberger C, Pachankis JE (2017) Acceptability and preliminary efficacy of a lesbian, gay, bisexual, and transgender-affirmative mental health practice training in a highly stigmatizing national context. LGBT Health 4:360–370. https://doi.org/10.1089/lgbt.2016.0194
77. Price MA (2022) Development of a training intervention to improve mental health treatment for transgender and gender diverse youth. osf.io/fv7jk. Accessed 16 Jun 2022
78. Budge SL, Sinnard MT, Hoyt WT (2021) Longitudinal effects of psychotherapy with transgender and nonbinary clients: a randomized controlled pilot trial. Psychotherapy 58:1–11. https://doi.org/10.1037/pst0000310
79. Craig SL, Austin A (2016) The AFFIRM open pilot feasibility study: a brief affirmative cognitive behavioral coping skills group intervention for sexual and gender minority youth. Child Youth Serv Rev 64:136–144. https://doi.org/10.1016/j.childyouth.2016.02.022

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.